Class: 8 KEY ANSWERS Term : 1

Chapter - 1 RATIONAL NUMBERS

Page No. 2

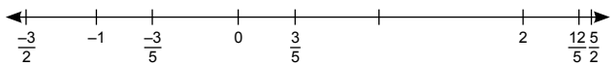
Revision Exercise:

I. 1. True 2. False 3. True

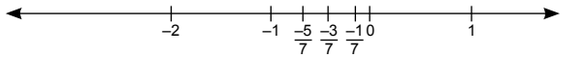
Page No. 5

Exercise 1.1

1.



2.



Mean of $\frac{-5}{7}$ and $\frac{-1}{7}$ is $\frac{-3}{7}$ is $\frac{-5}{7} < \frac{-3}{7} < \frac{-1}{7}$

Page No. 12

Exercise 1.2

1. a. 0.400 b. 0.875 c. 1.247 d. 2.120

2. a. 0.714 b. 0.478 c. 0.307 d. 0.272

3. a. $\frac{219}{250}$ b. $\frac{4479}{1000}$ c. $\frac{203}{25}$ d. $\frac{1909}{100}$

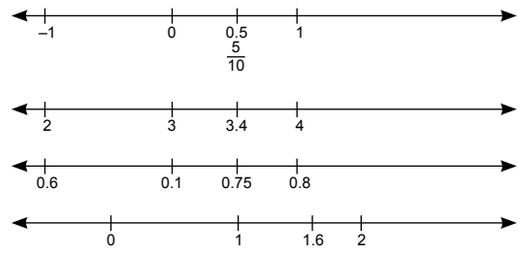
4. a. terminating
b. non-terminating
c. non-terminating
d. terminating

5. a. $-0.5\overline{3}$ b. $-0.\overline{3}$
c. $-0.8\overline{3}$ d. $-0.58\overline{3}$

6. a. −0.83 b. −0.625
c. −0.8125 d. −0.84

7. a. $\frac{7}{9}$ b. $\frac{13}{99}$ c. $\frac{733}{999}$
d. $\frac{4193}{999}$ e. $\frac{3127}{9999}$ f. $\frac{47076}{99900}$

8.



9. a. Equivalent
b. Equivalent
c. Not equivalent
d. Not equivalent

10. a. $\frac{11}{20}$ b. $\frac{3}{4}$ c. $\frac{10}{3}$
d. $\frac{16}{25}$ e. $\frac{-5}{7}$

Page No. 15

Exercise 1.3

1. a. $-0.6 < 0.3 < 13 < 45$

b. $\frac{73}{7} < \frac{78}{14} < 7.7$

c. $\frac{-4}{5} < \frac{-3}{4} < \frac{-1}{2}$

2. a. $\frac{-1}{4} > \frac{-2}{4} > \frac{-5}{4} > \frac{-7}{4}$

b. $0.4 > 0.2 > 0.15 > -0.\overline{5}$

c. $-0.\overline{2} > -0.3 > \frac{-2}{3} > \frac{-5}{7}$

Page No. 18

Exercise 1.4

1. a. 1 b. $\frac{-10}{9}$ c. $\frac{109}{252}$
d. $\frac{-2}{3}$ e. $\frac{21}{20}$

2. a. 8 b. $\frac{-5}{18}$ c. $\frac{13}{70}$ d. $\frac{59}{50}$

3. a. $\frac{3}{2}$ b. $-\frac{27}{8}$ c. $\frac{183}{403}$
d. $\frac{-38}{17}$ e. $\frac{2}{3}$

4. a. $\frac{91}{60}$ b. $\frac{2}{5}$ c. $\frac{73}{21}$ d. $\frac{1}{36}$

Page No. 19

Exercise 1.5

1. a. $\frac{-5}{56}$ b. $\frac{-1}{90}$ c. $\frac{-77}{96}$ d. $\frac{1}{5}$

2. a. $\frac{511}{300}$ b. $\frac{646}{385}$ c. $\frac{-157}{40}$

3. a. False b. False c. True

4. a. $\frac{3075}{56}$ b. $\frac{102}{35}$ c. $\frac{38}{5}$

Page No. 20

Exercise 1.6

1. a. $\frac{7}{5}$ or $\frac{12}{5}$ b. $\frac{-9}{2}$ or $\frac{41}{2}$
c. $\frac{-6}{23}$ d. $\frac{13}{4}$ or $\frac{31}{4}$

//Note to teacher: Correction in page no: 20, example: 2

$14\frac{2}{3} \div \frac{11}{5} = \frac{44}{3} \times \frac{15}{11} = 4 \times 5 = 20$.//

Page No. 22

Exercise 1.7

1. a. $11\frac{2}{3} \div \frac{5}{7} = \frac{49}{3}$ b. $\frac{-1}{8}$ c. $\frac{16}{5}$ d. $\frac{1}{3}$

2. a. True b. True, they are same.

3. a. $\frac{-8}{63}$ b. $\frac{10}{3}$ c. $\frac{3}{2}$

4. a. False b. True

Page No. 23

Exercise 1.8

1. $\frac{75}{2}$

2. $20\frac{1}{2}$ feet

3. $3\frac{11}{12}$ inches

4. $27\frac{11}{12}$ liters

5. $2\frac{7}{9}$ boxes

6. a. Closure - The difference between any two rational numbers is always a rational number.

7. a. Associative property of addition
b. Distributive property of multiplication over addition.
c. Multiplicative inverse property.
d. Does not exist.
e. A rational number.

8. 16^{th} of his earnings is left with him for other expenses.

9. 4 kg and 300 gm.

10. both are in simplest forms.

11. 6 m.

Challenging questions:

1.
$$\left(\frac{\frac{7}{9}-5}{\frac{4}{3}}\right) \div \frac{3}{2} + \frac{4}{9} - \frac{1}{3}$$
$$= \left(\frac{7-45}{9} \times \frac{3}{4}\right) \times \frac{2}{3} + \frac{4-3}{9}$$
$$= \frac{-38}{3 \times 4} \times \frac{2}{3} + \frac{1}{9}$$
$$= \frac{-19}{9} + \frac{1}{9} = \frac{-18}{9} = -2$$

2. Total distance covered by A = $2\frac{7}{20}$. 'A' walked $2\frac{11}{12}$ times the distance he jogged.

3. //Students may use different examples of their choice//

a. $\frac{5}{7} \div \frac{30}{21} = \frac{1}{2}$, which is a rational number.

b. $3 - 2 = 1$; $2 - 3 = -1$. Therefore subtraction is not commutative.

c. $\frac{1}{2} \div (\frac{3}{4} \div \frac{9}{2}) = 3$; $(\frac{1}{2} \div \frac{3}{4}) \div \frac{9}{2} = \frac{4}{27}$

d. $\frac{1}{2}(\frac{3}{4} - \frac{9}{2}) = \frac{-15}{8} = \frac{1}{2} \times \frac{3}{4} - \frac{1}{2} \times \frac{9}{2}$

e. $(\frac{5}{2} + \frac{3}{2}) \div 2 = 2$, which is a rational number and lies between those two numbers.

4. $\frac{(p + 2q)}{pq} = \frac{2}{p} + \frac{1}{q} = \frac{18}{40} = \frac{9}{20}$

5. $x = 3$

6. The number is 225

Chapter 2 MEASUREMENTS

Page No. 36 and 36 Exercise 2.1

1.

#	(cm) Radius, r	1 cm^1 Arc length, 1	(cm^2) Area, $= \frac{1}{2} \times l \times r$	Perimeter $P = l + 2r$, (cm)	Angle $q = \frac{360 \times l}{2\pi r}$
a	5	8	20	18	91.67°
b	3.5	6	10.5	13	98.22°
c	8	3	12	19	21.49°
d	6.3	10	31.5	22.6	90.95°

2.

#	Radius, r(cm)	Ange, θ°	Arc length, $l = \frac{\theta}{360} \times 2\pi r$	Perimeter $p = l + 23$(cm)	Area $= \frac{1}{2} \times l \times r$
a	4.2	30°	2.2	10.6	4.62
b	5.6	45°	4.4	15.6	12.32
c	6.3	40°	4.4	50.17	13.86
d	14	120°	29.3	57.3	205.1

3.

#	Radius (cm)	Arc Length, l (cm)	Area $= \frac{1}{2} \times l \times r$ (cm^2)	Perimeter $P = l + 2r$ (cm)	Angle $q = 360 \times \frac{l}{2\pi r}$
a	5.5	8	22	19	83.34°
b	7	4.6	16.1	18.6	37.65°
c	10	12.4	62	22.4	71.05°
d	11	22	121	44	114.6°

4.

#	$(cm)^2$ Area $= \frac{1}{2} lr$ (4)	Angle	A $= \frac{\theta}{360} \times \pi r^2$ Radius, r, (cm)	Arc Length, l $l = \frac{2 \times 4}{4}$ (cm)	Perimeter, P $p = l + 2r$ (cm)
a	7.7	72°	3.5	4.4	11.4
b	15.4	36°	7.0	4.4	18.4
c	7.7	36°	5.0	3.1	13.1
d	1540	36°	70.0	44	184

5.

#	Radius, r (cm)	(cm) Perimeter, $p = l + 2r$	(cm) Arc length, $l = p - 2r$	$1cm^2$ Area $= \frac{1}{2} \times l \times r$
a	6	58	48	144
b	5	28	18	45
c	21	72	30	315
d	12.5	75	50	312.5

6.

#	Area A $= \frac{1}{2}$lr (cm)	Radius, r (cm)	Arc Length, l $l = \frac{2 \times 4}{r}$ (cm)	Angle, θ° $\theta = \frac{360\ l}{2\pi r} = \frac{180\ l}{\pi r}$	Perimeter, P $p = l + 2r$ (cm)
a	38.5	7	11	90°	25
b	12.32	5.6	4.4	45°	15.6
c	924	42	44	60°	128
d	115.5	21	11	30°	53

7.

#	Perimeter $p = l + 2r$	Angle $\theta = 360 \times \frac{1}{2\ \pi r}$	$(\frac{l}{r} = \frac{\theta\pi + 360}{180p})$ Radius, r (cm)	Arc Length, l. $l = p - 2r$ (cm)	Area $= \frac{1}{2} \times l \times r$ (cm^2)
a	183	135°	42	99	2079
b	78	60°	25.6	26.8	1045.2
c	228	90°	63.9	100.2	3201.4
d	228	72°	70.0	88	3080

8. a. π b. Chord c. Diameter
d. 12 cm e. arc

9. a. 754.3 b. 3080 cm^2

10. $A = \frac{1}{2}lr = \frac{1}{2} \times 50 \times 14 = 350\ mm^2$

11. $P = l + 2r = 64$ $l = 44$;

$r = \frac{p - 1}{2} = 10cm$

$A = \frac{1}{2}lr = \frac{1}{2} \times 44 \times 10 = 220\ cm^2$

12. $A = 9.24 = \frac{1}{2} \times l \times r = \frac{1}{2} \times l \times 4.2 \Rightarrow l = 4$ cm

$\therefore$ perimeter, $p = l + 2r = 4.4 + 2 \times 4.2 = 12.8$ cm

13. Radius, $r = 2ft$

Area of pot (circular quadrant) $= \frac{\pi r^2}{4} = \frac{3.14 \times 2^2}{4} = 3.14\ ft^2$

Exercise 2.2

1. $[\pi = \frac{22}{7}]$

#	Figure	Area $(cm)^2$	Perimeter (cm)
a	Two semicircles	$\pi (r_1^2 + r_2^2) = \pi(14^2 + 7^2)$ $= 245\ \pi = 770$	$\pi (r_1 + r_2) + 2 \times 7 =$ $\pi (14 + 7) + 14 = 80$ cm
b	Two semicircle One Larger Semicircle	$\pi \times (\frac{2.1}{2})^2 \times \frac{1}{2} \times \frac{2 \times \pi}{2} (\frac{2.1}{4})^2$ $\pi[(\frac{2.1^2}{8}) + \frac{2.1^2}{16}]$ $\pi(2.1)^2 [\frac{1}{8} + \frac{1}{16}] = 2.59$	$\pi \times (\frac{2.1}{2}) + 2 \times \pi (\frac{2.1}{4})$ $= \pi \times 2.1 = 6.6$
c	One Square Two Semicircle	$\pi \times 7^2 + 14^2 = 350$	$2 \times \pi \times 7 + 2 \times 14 = 72$
d	One rectangle[semicircles are inside rectangle]	$10 \times 7 = 70$	$2\ (10 + 7) = 34$

2. $\pi = \frac{22}{7}$

a. Area $= 7 \times 10 - \frac{\pi}{2} \times (3.5)^2 = 50.75\ m^2$

Perimeter $= 2 \times 10 + 7 + \pi \times 3.5 = 38$ m

b. Area $= 6 \times 3.5 + 2 \times \frac{\pi \times (3.5)^2}{4} = 40.25\ cm^2$

[one rectangle and two quadrants of circle]

Perimeter $= 2 \times 6 + \frac{2 \times \pi\ 3.5}{4} \times 2 = 23$ cm

3. a. $4 \times \pi \times \frac{52}{4} = 3.14 \times 52 = 78.5\ cm^2$

b. $\frac{1}{2} (\pi \times 72) - 2 \times (\frac{1}{2} \times 7 \times 7) = 27.93\ cm^2$

4. $2 \times b \times h = 2 \times 8 \times 3 = 48\ cm^2$

5. Area = Area of semicircle + Area of triangle

$= \frac{1}{2} \times \pi \times 3 + \frac{1}{2} \times 6 \times 9$ [$\pi = 3.14$] $= 41.13 cm^2$

6. Area = 2 × Area of trapezium with || sides 70 and 90 cm and height 35 cm.

$= 2 \times \frac{1}{2} (70 + 90)\ 35 = 5600\ cm^2$

H.O.T.S

1. Area of remaining carboard =

Area of square – 4 × Area of sector.

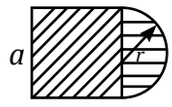
$= 225 - 4 \times (\frac{9°}{360°}) \times \pi \times 72$

$= 225 - 154$

$= 71\ cm^2$

$\pi = \frac{22}{7}$.

2. Area of Square $= 196\ cm^2$



Area $= 19\ cm^2$

Then side $a = \sqrt{196}$

$= 14$ cm

Area of window = Area of square + Area of semicircle

$= 196 + \frac{1}{2} \times \pi \times 7^2$ $\quad [r = \frac{a}{2}]$

= 273 cm^2

Rate of painting = ₹5/cm^2

Cost of painting = 5 × 273

= ₹1365

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Exercise 2.3

1. a. cube
b. Tetrahedron
c. Triangular prism
d. Cuboid
e. Triangular prism
f. Hexagonal prism

Page No. 44

Exercise 2.4

1.

Shape		Cross Section.
a. Cube	_____	Square.
b. Cone	_____	Circle.
c. Cylindrical Prism	_____	Circle.
d. Triangular Pyramid	_____	Triangle.

2.

#	Faces, F	Vertices, V	Edges, E	Euler's Formula F + V = E + 2
A	4	4	6	4 + 4 = 6 + 2
B	10	6	12	10 + 6 = 12 + 2
C	12	20	30	12 + 20 = 30 + 2
D	32	60	90	32 + 60 = 90 + 2

∴ '*b*' is not a polyhedron.

3. Verifying Euler's Formula

F = 12, E = 22, V = 17

F + V = E + 2 12 + 17 = 22 + 2

Not a polyhedron

Chapter 3 Algebra

Page No. 49

Exercise 3.1

1. a. $-2x + 6y + a$
b. $24x + 8y$
c. $5x - 6y$
d. $-[(b-4)x + (7-b)y] = (4a-ab)x + (ab-7ay)$.

2. a. $5x^2$, $-2x^2$ and $-10xy$, $2xy$
b. Yes, $(x - y)$

3. a. $3y^3$ b. $-5xz$ c. $-bcd$

4. $8xy^2 + 5x^3y^2 - 4$

5. 15 Mangoes

6. 20 cm

7. a. $6p2q + qr - 11pq$
b $5xy + x^3y + y^3n + 2$
c. $116\,p^4 + 176\,p^2 - 13p + 8$
d. $-a^3 - a^2 + 8a^2c + 2ac$

8. a. $a^2 + 2b^2 + 2ab$
b. $-3a - 3ab + 5bc + 2ac$.
c. $5.5x^3 - 7.7x^2$

9. $-3x^2y - 3xy^2$

10. $-8p^2q^2 + 3pq + 2$

11. $3a^3 + 2b^2 + 7$

12. $-3a^2x^2 - 9ax + 3a$

13. $(ax^2 + bx - c)$

Page No. 53

Exercise 3.2

1. a. $6x^3y$ b. $30x^3y$ c. $3a^2 + 6a$
d. $12x^4y^5 - 8x^3y^4$
e. $42p^2 + 68pq + 18q^2$
f. $18x^4 - 33x^3 - 22x^2 - 20x$
g. $15p^4 - 23p^3 - 46p^2 + 70p - 12$.

2. Distance = Speed × Time

$= (x + 30)\ (y + 2)$ (km)

$= (xy + 2x + 30y + 60)$ km

Page No. 55

Exercise 3.3

1. a. x^{48} b. a c. $2xy$ d. $16abc$

e. $-5x^4$ f. 1

2. a. $x - y$ b. $-25x + 4y$ c. $-5q^3 - 2q^7$

d. $7p^6 - 4pq$ e. $3xy - 7y^2$

f. $25xz - 16x^2y^3z$

3. $\frac{18x^2 + 6x}{2}$ is the cost of pen is $(9x + 3)$ ₹/pen.

4. Length of other side $= \frac{18x^2 + 27x}{9x} = (9x - 3)$.

Page No. 58

Exercise 3.4

1. a. $3x + 3$ b. $a + 2$

c. $(y - 4)$ and remainder = 8

d. $(x + 2y)$ and remainder $(-y^2)$

e. $(3y + 1)$ and remainder (-2)

f. $3a - 5$

g. $(2x + 19)$ and remainder 105

h. $(x + 9)$ and remainder 38

i. $(3p + 3)$ and remainder (-4).

2. Width $= \frac{\text{area}}{\text{length}} = \frac{(a^2 - 19a + 90)}{a - 9} = (a - 10)$ units.

Page No. 61 to 63

Exercise 3.5

1. a. $x^2 + 6x + 8$ $[(x + a)(x + b) = x^2 + (a + b)x + ab]$

b. $x^2 - 2 + \frac{1}{x^2}$

c. $12^2 = (10 + 2)^2 = 100 + 40 + 4 = 144$

d. $(a + B)\ (a - 6) = a^2 + (B - 6)\ a - 6b$

e. $(x^2 - 1x^2)$

f. $95 \times 85 = (90 + 5)\ (90 - 5) = 90^2 - 52 = 8075$

g. $x^6 - 3x^2y\ (x^2 - y) + y^3 = x^6 - 3x^4y + 3x^2y^2 - y^3$
$[(a - b)^3 = a^3 - 3ab\ (a - b) - b^3]$

h. $a^2 + 4b^2 + 9c^2 + 12bc - 4ab - 6ac$

i. $(103)^3 = (100 + 3)^3 = 100^3 + 900\ (100 + 3) + 27$
$= 1000000 + 90000 + 2700 + 27$
$= 1092727$

2. a. $(8b + 7a)$ b. $(9x - 8)$

3. a. $(b + 3)$ b. $(x - 7)$ c. $(y - 9)$

4. a. (i) $(y - 7)$

b. (iv) $(p + 2q - 3r)$ use $(a + b)(a - b) = a^2 - b^2$.

5. a. (i) $9 + 2y^3$

(ii) $2a + 5b^3$

6. a. (iv) Dana: $(16 \div 4) \times (x^2 \div n)$

b. (i) Monomial.

c. (iv) $4\ (2x - 7) = (4)(2x) + (4)\ (-7)$

7. a. $18.87xy$

b. $2.5x$

c. $4x^2 - 30x$

d. i. $9x$ ii. $-8 + 2x$

e. Step 2 is $= (5x)(7x) + (5x)(-2)$
$= (5)(7)(x)(x) + (5)(x)(-2)$
$= 35\ x^2 - 10x$

8. Volume $= (x + 1)^3 = x^3 + 3x^2 + 3x + 1$

9. Volume $= (x + 2)\ (x - 1)\ (x - 3) = (x^2 + x - 2)$
$(x - 3) = x^3 + x^2 + 2x - 3x^2 - 3x + 6 = x^2 - 2x^2 - 5x + 6$

H.O.T.S.

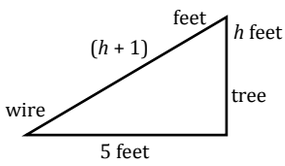
1. Area = base x height

Area $= (12x^2 + 3x)$ cm^2

Base = (3x) cm

$\therefore$ height $= \frac{12x^2 + 3x}{3x} = (4x + 1)$ cm

2. Given



Let 'h' be the height where wire is tried to free

$h^2 + 5^2 = (h + 1)^2$ [pythagoras theorem]

$h^2 + 5^2 = h^2 + 2h + 1$

$h^2 + 2^5 = h^2 + 2h + 1$

$2h = 2^5 = h = 12$

Length of wire = $h + 1 = 12 + 1 = 13$ feet.

Page No. 64

Exercise 3.6

1. a. $8x^2y^2$ b. $6xy^2z$ c. $2xy^3$

d. $3xy^2$ c. $4a^3b$ f. 10

Page No. 65

Exercise 3.7

1. a. $x^3 \div x^3 = 1$

b. $(x + 2)^3 = x^3 + 6x^2 + 12x + 8.$

c. $5x + 3x = 8x$

d. $(2x - 3y)^2 = (2x)^2 + (3y)^2 - 2(2x)\,(3y)$

$= 4x^2 + 9y^2 - 12xy.$

e. $(xx + 3y)\,(x + y) = 2x\,(x + y) + 3y\,(x + y)$

$= 2x^2 + 2xy + 3xy + 3y^2.$

$= 2x^2 + 5xy + 3y^2.$

Page No. 67

Exercise 3.8

1. a. HCF of $2a^2$, $4a^3$, $10a^5$ in $2a^2$

$2a^2 - 4a^3 + 10a^5 = 2a^2\,(1 - 2a + 5a^3)$

b. HCF of $4p^2q^2$, $12pq$, $28p^3q^3$ in $4pq$.

$4p^2q^2 - 12pq + 28p^3q^3 = (4pq(pq + 7p^2q^2 - 3)$

c. HCF of $5x^2y^2$, $15x^3y^3 - 25xy$ is $5xy$

$-5x^2y^2 + 15x^3y^3 - 25xy = 5xy\,(-xy + 3x^2y^2 - 5)$

d. HCF of $2x$, $2y$, $2z$ in 2. Then

$2x + 2y + 2z = 2\,(x + y + z)$.

e. HCF of $4ab^4c^2$, $22a^2b^2c^2$, + $8a^3bc$ is $2abc$ the $4ab^4c^2 + 22a^2b^2c^2 + 8a^3bc^4 = 2abc$ $[2b^3c + 11abc + 4a^2]$

Page No. 70 and 71

Exercise 3.9

1. a. $(15xy + 10y) + (6x + 4) = 5y\,(3x + 2) + 2(3x + 2)$

$= (5y + 2)(3x + 2)$

b. $ab + 4a - 3b - 12 = (ab - 3b) + (4a - 12)$

$= b(a - 3) + 4(a - 3) = (b + 4)\,(a - 3)$

c. $3xy - 4y - 3x + 4 = (3xy - 3x) - (4y - 4) = 3x$

$(y - 1) - 4\,(y - 1) = (3x - 4)\,(y - 1)$

d. $12ab - 8b - 6 + 9a = (12ab + 19a) - (8b + 6)$

$= 3a(4b + 3) - 2(4b + 3) = (3a - 2)(4b + 3)$

e. $x^2 + xy + 9x + 9y = (x^2 + 9x) + (xy + 9y) =$

$x(x + 9) + y(x + 9) = (x + y)\,(x + 9)$

Or

$(x^2 + xy) + (9x + 9y) = x(x + y) + 7(x + y)$

$= (x + y)\,(x + 9)$

2. a. $x^2 - 25 = (x + 5)(x - 5)$

b. $4p^2 - 16q^2 = (2p^2) - (4q)^2 = (2p + 4q)(2p - 4q)$

$= 4(p + 2q)(p - 2q).$

c. $4x^2 + 4xy + y^2 = (2x^2) + 2 \times 2x \times y + y^2$

$= (2x + y)\,2 = (2x + y)(2x + y)$

d. $25x^2 - 20xy + 45y^2 = (5x)^2 - 2 \times 5 \times 2y + (2y)^2$

$= (5x - 2y)^2 = (5x - 2y)(5x - 2y)$

e. $x^2 - 8x + 16 = x^2 - 2 \times 4 \times x + 4^2$

$= (x - 4)^2 = (x - 4)\,(x - 4)$

f. $x^2 + 13x + 40 = x^2 + (8 + 5)x + (8 \times 5) = (x + 8)(x + 5)$

g. $x^2 - x - 6 = x^2 + (3x + 2)x + (-3)(-2) = (x - 3)\,(x + 2).$

h. $x^2 - 5x + 6 = x^2 + (2 - 3)x + (-2)(-3)(x - 3)(x - 2)$

i. $x^8 - y^8 = (x^4)^2 - (y^4)^2 = (x^4 + y^4)(x^4 - y^4)$

$= (x^4 + y^4)(x^2 + y^2)(x^2 - y^2)$

$= (x^4 + y^4)(x^2 + y^2)(x + y)(x - y).$

j. $4a^2 - 12a + 9 = (2a)^2 - 2 \times 2a \times 3 + 3^2$.
$= (2a + 3)^2 = (2a + 3)\ (2a + 3)$

3. a. $3x + 3y = 3(x + y)$

b. $10x^2 + 10y^2 = 10\ (x^2 + y^2)$

c. $xy + x = x(y + z)$

d. $abc = abd = ab(c + d)$

e. $12x^2 + 6x^2y = 6x^2\ (2 + y)$

f. $8a^3 + 4x^3 = 4(2a^3 + x^3)$

g. $5p^2q^2 - 4x^3$

h. $-20x + 5x^3 = 5x\ (-4 + x^2)$

i. $15x^2y^2 - 30x^2y = 15x^2y\ (y - 2)$

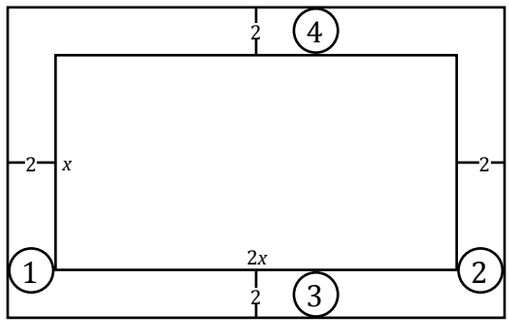
j. $36abx - 45aby = 9ab\ (4x - 4y)$

4. a. Let one integer be x, then other is $(x + 1)$
Given $x(x + 1) = 272 \Rightarrow x^2 + x - 272 = 0$
$\Rightarrow x^2 + (17 + 16)x - (17\ x\ 16) = 0$
$(x + 17)(x - 16) = 0$
$x = -17\ x = 16$
$\therefore$ The integers are –17, –16 or 16, 17

b. Let three consecutive odd integers be $x, x + 2, x + 4$
Given $x(x + 2) - 2 = x + 4$
$x^2 + 2x - 2 = x + 4 = x^2 + x - 6 = 0$
$(x + 3)(x - 2) = 0$
$x = -3$ or $x = 2$
x is an odd integer

The three consecutive odd integers are –3, –1, 1

c. Area of walkway = (① + ② + ③ + ④)



$= [2[x + 4) + 2x \times 2]^2$.
$= (2x + 8 + 4x)^2$
$= (12x + 16) = 196$.
$\Rightarrow 12x = 180 \Rightarrow x = 15$
Length = 15 feet; width = 30 feet

d. Length of side of first square be x. their length of side of second square is $2x$.
Given combined area = $20cm^2$
$x^2 + (2x)^2 = 20$
$x^2 + 4x^2 = 20 = 5x^2 = 20$
$x^2 = 4$
$x = +4$
(Cannot be negative)
$\therefore$ Length of side of first square = 4cm
Length of side of second square = $2 \times 4 = 8$cm

e. Let width of rectangular plot be 'x', the length is $(x + 6)$.
Area of plot = $x(x + 6) + x^2 + 6x = 16$ (Given)
$x^2 + 6x - 16 = 0$
$(x + 8)(x - 2) = 0$
$x = -8$, or $x = 2$
$x = 2$ (width cannot be negative)
Width = 2m.
Length = 2 + 6 = 8m

5. Here principal amount – p, = ₹$5a^2b^2$

Rate of interest, $r = 7b\%$ per annum.

# of years, N = $4ab$ years

Simple interest = PNR $(5a^2b^2)(\frac{7b}{100})\ (4ab)$

$= \frac{7}{5}\ a^3b^4$

6. Cost of a note book = ₹$10ab$

Amount Babu has = ₹$(5a^2b + 20ab^2 + 40ab)$.

$\#\ \text{of notebooks he can buy} = \frac{5a^2b + 20ab^2 + 40ab}{10ab}$

$= 0.5a + 2b + 4$

H.O.T.S.

1. $(4x^2 + 11x + 6) \div (x + 2) = (4x + 3)$

# of cutlets is $(4x + 3)$

2. Area of the floor = $(x^2 + 6x + 8)$
$= (x^2 + (4 + 2)x + 4 \times 2)$
$= (x + 4)(x + 2)$

Length of room = $(x + 4)$

$\therefore$ Width of room = $(x + 2)$

Chapter 4A Geometry

Page No. 72 and 73

Revision Exercise

1. a. Obtuse angle triangle

b. Right triangle

c. Equilateral triangle

2. a. Equilateral triangle

b. Isoceles triangle

c. Scalene triangle

3. Given triangle is an isosceles triangle. Therefore the angles 1 and 2 are equal.

4. For an equilateral triangle all angles are equal

$\angle 1 + \angle 2 + \angle 3 = 180°$

$\angle 1 + \angle 2 + \angle 3 = \frac{180°}{30°} = 60°$

5. $\left.\begin{array}{l}\angle 1 = \angle a + \angle c \\ \angle 2 = \angle a + <b \\ \angle 3 = \angle b + <c \\ \angle 2 = 180° - <c\end{array}\right]$ $\angle a + \angle b + \angle c = 180°$

6. The largest angle is $\angle 1 = 90°$

The smallest angle is $\angle 2 = <3 = 45°$

The largest angle is opposite to the largest side

The smallest angle is opposite to the smallest side

Remember:
The sum of the measures of the interior angles of a triangle in Euclidean space is always 180°. If there are two right angles, third angle will be zero. Therefore it is not possible to construct a triangle with two right angles.

Page No. 76

Exercise 4.1

1. a. $\angle x + 2\angle x + 2\angle x + \angle x = 180°$;
$6\angle x = 180° \angle x = 30°$

b. $40° + 35° + \angle x = 180°$
$\angle x = 180° - 75° = 105°$

c. $\angle x + 2\angle x = 180° \angle x = \frac{180°}{3} = 60°$

d. $\angle x + 2\angle x + 2\angle x + \angle x = 180°; 6\angle x = 180° \angle x = 30°$

e. $\angle x + 2\angle x + \angle x + 2\angle x + \angle x = 360°$ g $\angle x = 360° \Rightarrow \angle x = 45°$

2. $180° - (90° + 47°) = 43°$

3. $\angle x + 2\angle x + 3\angle x = 180°$;

$6\angle x = 180° \angle x = 30°$

Therefore angles of triangle are 30°, 60°, 90°

4. If all angles are equal, say $\angle x$ then

$3\angle x = 180° - \angle x = 60°$

5. The angles are $x + 15$, $x - 15$ and $x + 60°$ the $(x + 15)° + (x - 15)° + (x + 60)° = 180°$

$3x = 120° \; x = 40°$

6. $\angle A = \angle B = \angle C = 60°$ [Eqilateral triangle]

$\angle CAD = \frac{60°}{2} = 30°$

$\angle CAD + \angle ADC + \angle C = 180°$

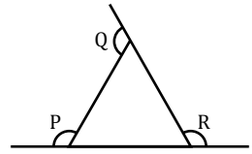
$\angle ADC = 180° - (60° + 30°) = 90°$

AD $\perp$r BC

7. P + Q + R = $\angle RQP + \angle PRQ + \angle QPR$, + $\angle PRQ + \angle QPR + \angle RQP$.

$= 2(\angle RQP + \angle PRQ + \angle QPR)$

$= 2 \times 180° = 360°$



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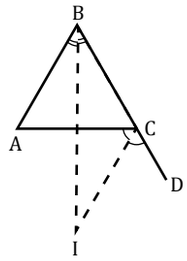


$\angle A + \angle B + \angle C = 180°$ 1

$\angle ACD = \angle A + \angle B.$ 2

$\angle BIC + \angle ICB + \angle CBI = 180°$

$\angle BIC + \frac{\angle ACD}{2} + \angle C + \frac{\angle B}{2} = 180°$ [Angle bisectors]

$\angle BIC + \angle A + \frac{\angle B}{2} + \angle C + \frac{\angle B}{2} = 180°$ By 2

$\angle BIC + \frac{\angle A}{2} + (180° - \angle A) = 180°$ By 1

$\angle BIC - \frac{\angle A}{2} = 0$

$\angle BIC = \frac{\angle A}{2}$

9. $\angle A + \angle B + \angle C = 180°$ 1

To prove: $\angle BOC = 90° \frac{-A}{2}$

Proof: $\angle BOC + \angle DCB + \angle OBC = 180°$

(sum of angles in a triangle]

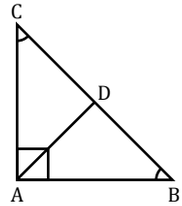
$\angle BOC + \frac{\angle A + \angle B}{2} + \frac{\angle A + \angle C}{2} = 180°$

(bisectors of exterior angles and by exterior angle property]

$\angle BOC + \angle A + \frac{180° - \angle A}{2} = 180º$ (By 1]

$<BOC = 90° - \frac{\angle A}{2}$

10.



Given $\angle A = 90°$

$\angle B = \angle C = 45°$ [isosceles Δ]

$\angle DAB = 45°$ [bisected angle]

$\angle DAB + \angle B + \angle ADB = 180°$

[Sum of angles in is 180°]

$45° + 45° + \angle ADB = 180°$

$\angle ADB = 90°$

H.O.T.S.

1. Let $\angle A$, $\angle B$, $\angle C$ be the angles of the triangle then $\angle A + \angle B + \angle C = 180°$ ...(1)

[sum of angles of a triangles in 180°]

Given one angle of triangle is equal to the sum of the other angles, say $\angle a = \angle b + \angle c$ ...(2)

Substituting eqn (2) in equ (1) we get

$2\ \angle a = 180°\ \angle A = 90°$

Given triangle is a right angled triangle.

Page No. 83

Exercise 4.2

1. Triangles ABC and X BY are similar

$\frac{3.5}{3.5 + 2.5} = \frac{5}{5 + a} = \frac{3.5}{b}.$

Solving for b, b = 6cm

Solving for a, $3.5\ (5 + a) = 5 \times 6$

A = 3.57cm.

2. $\angle C = \angle B$, $\angle D = \angle A$, $\angle AOB = \angle COD = 50°$

Then by AA Similarity theorem AOB ~ DOC

$\frac{OD}{OA} = \frac{OC}{OB} = \frac{CD}{AB}$

Given AO = 15cm $OD = \frac{3}{5} \times 15 = 9$cm.

OA = 15 – 9 = 6cm.

$\frac{OC}{OB} = \frac{9}{5}\ OC = \frac{9}{6}\ OB.$

$BC = BO + OC = OB + \frac{9}{6}\ OB = [\frac{(1 + 9)}{6}]\ OB = [\frac{15}{6}]$

$OB = [\frac{5}{2}]\ OB$

$BC = 2.5 \times OB$

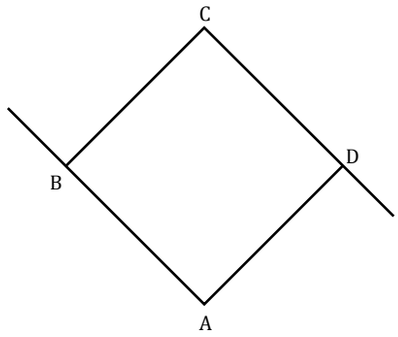
3. PSR Is an isosceles triangle $\therefore$ PS = PR

$\overline{PQ}$ is median is QS = QR

$\overline{PQ}$ is the common side

By 5.5.5 similarity theorem ΔPQS ~ ΔPRQ

4.



$\overline{CD} \parallel \overline{AB}$

$\therefore \angle DCA = \angle BAC$

$\overline{CB} \parallel \overline{AD}$

$\therefore \angle DAC = \angle BCA.$

Which also implies $\angle CBA = \angle ADC$

By AA similarity theorem $\Delta ABC \sim \Delta ADC$

5. $\overline{PQ} \parallel \overline{NO}$ $\angle MPQ = \angle MNO$ Corresponding angles $\overline{MN}$ as transversal

$\angle MQP = \angle MON$ Corresponding angles as $\overline{MO}$ as transversal

$\angle M$ in common angle for MPQ and MNO

Therefore By AA Similarity theorem MPQ ~ MNO

Given MPQ is an isosceles triangle.

Say MP = MQ

$\frac{MP}{MN} = \frac{MQ}{MO} = \frac{MN}{MO} = \frac{MP}{MQ} = 1$ MN = MO

Therefore MNO is also an isosceles triangle

6. $\Delta ABE \sim RQP. \therefore \frac{AB}{RQ} = \frac{BE}{QP} = \frac{EQ}{PR} = \frac{53}{212} = \frac{1}{4}$

Perimeter of ABE in AB + BE + EA = 133cm

$AB + BE + EA = \frac{1}{4}(RQ + QP + PR)$

$133cm = \frac{1}{4}(RQ + QP + PR)$

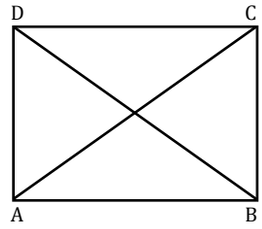
Perimeter of ΔRQP is $RQ + QP + PR = 4 \times 133$

$= 532cm$

Page No. 88 to 89

Exercise 4.3

1.



Consider ΔABD and ΔBAC $\overline{AB}$ is common side

$\overline{BC} = \overline{AO}$, Opposite sides of rectangle are equal.

$\angle CBA = \angle DAB, = 90°$ (Definition of rectangle)

$\therefore \Delta DAB \cong \Delta CAB = \overline{DB} = \overline{CA}$ (CPCT)

[SAS Congruent theorem]

2. Given $\overline{XY} = \overline{YZ}$

$\angle XYO = XZO$ Isoceles triangle

$\angle XOY = \angle XOZ = 90°$ [Median of triangle]

By AAS congruence theorem $\Delta \times O7 \cong \Delta \times OZ$

$\therefore \overline{OY} = \overline{OZ}$ [CPCT]

3. PQR is an equilateral triangle

$\angle P \cong \angle Q$ $\overline{PA} = \overline{AQ} = \overline{PC} = \overline{QB}$

$\therefore \Delta 1 \cong \Delta 2$, By SAS Congruency Theorem

|||rly $\Delta 2 \cong \Delta 3$ $\therefore \Delta 1 \cong \Delta z = 3$ ...1

$\angle PAC = \angle PQR = \angle PCA = \angle PRQ = 60° = \angle P$

$\Delta 1$ is an equilateral triangle

By (1) $\Delta 1$, $\Delta 2$, $\Delta 3$ are equilateral triangle

$\therefore AC = CB = BA$

$\therefore 4$ is also equilateral triangle

$\therefore \Delta 1$, $\Delta 2$, $\Delta 3$, $\Delta 4$ are congarent triangles.

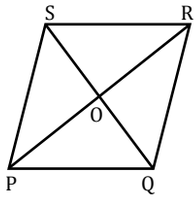
4. Given BC Common base of MBC and NBC hypotnuse

MB = NC

$\angle BMC = \angle BNC = 90°$

Therefore RAS Congrurency theorem BMC ~ CNB

5.



PQ = QR = RS = SP [PQRS ~ Rhombus]

$\overline{OP}$ Bisects ∠QPS

Is ∠SPO = ∠QPO

OP is common for POS and POQ

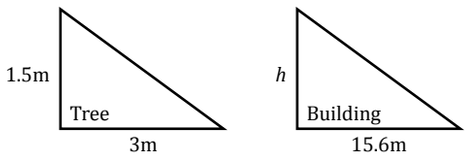
Therefore by SAS congruency theory POS = POQ

Is ∠QOP = ∠SOP

And ∠QOP + ∠SOP = 180° (linear pair angles)

$\therefore \angle QOP = \frac{180^\circ}{2} = 90^\circ$

6.



$\frac{h}{1.5} = \frac{15.6}{3} \Rightarrow h = \frac{15.6}{3} \times 1.5 = 78$ m.

7. Given PQ = PR . PQR is an isosceles triangle

∠PQR = ∠PRQ [isosceles base angles]

∠OPS = ∠ORS [Given] 2

∠PQR = ∠PQR = ∠PQO + ∠OQS = ∠PRO + ∠ORS

= ∠PQO = ∠PRO – 3

Eqn 2 ⇒ OQR is also an isosceles triangle

OQ = OR

(1), (3), (4), By SAS Congurence theorem

POQ = POR

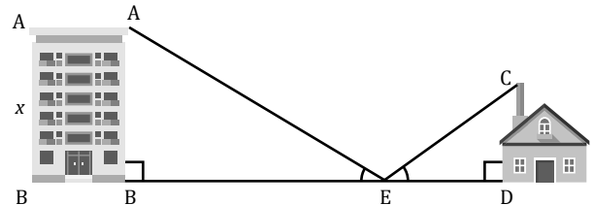
∠DPR = ∠OPQ [CPCT]

(1), (5) and PS is common side of ΔPSQ and ΔPSR says that by SAS congruence theorem

ΔPSQ ≅ ΔPSR

$\overline{QS} = \overline{SR}$ [s is midpoint of QR]

8. Given ABCD is a rhombus AB = BC = CD = DA



Here we have one common angler and one angle is equal

∴By AA similary we have DABE and CDE are similar.

$\therefore \frac{AB}{CD} = \frac{BE}{DE} = \frac{AE}{CE}$

$\therefore \frac{AB}{20} = \frac{18}{1.8} 18/1.8$

$AB = \frac{18 \times 20}{1.8} = 200$m

9. Given ABCD is a rhombus AB = BC = CD = DA

BC = CD ...1

BD is the diagonal BD bisects ∠CBA and ∠ADC

∠CBM = ∠CON ...2

Given BM = ND ...3

Condition (1), (2), (3), says by SAS Congruence theorem

ΔDNC ≅ ΔBMC

10. Given BCE is an equilateral triangle

BE = BC = CE and ∠BCE = ∠CEE = ∠EBC = 60° ...1

∠CED = ∠ECB = 60°

[CB || AD, Alternate interior angle with CE as transversal]

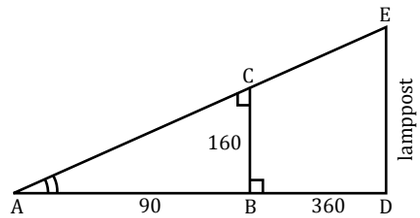
∠BEA = ∠CBE = 60°

[CB || AD, Alternate interior angle with BE as transversal]

∠CED = ∠BEA = 60° ...2

$\overline{AE} = \overline{AD}$ [E is the midpoint of AD]

11.



Conside ABC and ADE

$\angle A$ is common to both triangles.

$\angle BCA = DEA$ [BC||DE and alternate corresponding angles with CE as transversal]

$\angle ABC = \angle ADE = 90°$

$\therefore$ ABC ~ ADE by AA Similarity theorem.

$\therefore \frac{AB}{AD} = \frac{AC}{AE} = \frac{CB}{ED} \Rightarrow \frac{90}{360 + 90} = \frac{160}{ED}$

$ED = \frac{160 \times 450}{90} = 800$

Height of the lamp post is 800 cm

Miscellaneous Practice Problems.

12. Consider ΔPQS and ΔPRT, $\angle P$ is common for both triangle.

$l_1 \parallel l_2$ and PT is transversal, which says

$\angle PSQ = \angle PTR$

Therefore $\Delta PQS \sim \Delta PRT$ by AA similarity axis

$\therefore \frac{PQ}{PR} = \frac{PS}{PT} = \frac{24}{24} + 40 = \frac{30}{PT}$

$= PT = 30 \times \frac{64}{24} = 80$

13. From Figure AY||UN, RA||SU, RY||SN

AYUR forms a parellelogram. $\angle SUN = \angle RAY$

||rly NAYR forms a parallelogram. $\angle SNU = \angle AYR$

SARY forms a parallelogram <USN = <ARY

By AA similarity axios SON ~ RAY

14.

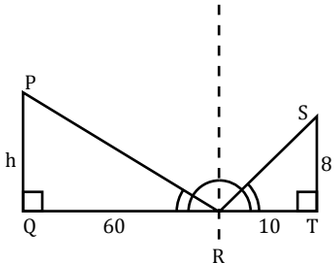


Figure can be redrawn as

$\angle SRT$ is common to ΔPQR and ΔRST

$\angle PQR = \angle STR = 90°$

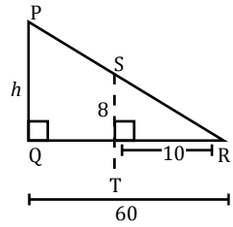
Then by AA Similarity axions

PQR ~ STR

$\frac{h}{8} = \frac{10}{60} = h = \frac{10}{6} \times 8 =$

In reflection, angle of incidence is equal to angle of reflection

$\angle SRT = \angle PRQ$



15. Given $\angle 1 = \angle 2$ GBC is an isosceles triangle

$\therefore \overline{BD} = \overline{UG}$

$\angle 3 = \angle 4$ ΔMUT is an isosceles triangle = $\overline{MU} = \overline{TU}$

$\angle BUT = \angle GUM$ [Vertical Opposite angles are equal]

By SAS Congruent axiom $\Delta MUG = \Delta TUB$

16. $\angle WAR = \angle MOB$

Additional pair of corresponding part by required by ASA congruency anons is $\overline{RA} = \overline{BO}$

Challenging Problem

17. Given P and N are the midpoints of $\overline{IM}$ and $\overline{AI}$

$\therefore \frac{IP}{IM} = \frac{IN}{IS} = \frac{1}{2}$ and $\angle I$ is common

To the both ΔAIM and $\Delta PIN \Rightarrow \Delta AIM \sim \Delta PIN$ [SAS Similarity]

Given $\angle TAM = \angle IMA$ and $\angle TMA = \angle IAM$ and MA is common side to triangles ATM and AIM

Therefore by ASA Congruent the axiom $\Delta ATM = \Delta MIA$

Which implies $\Delta ATM \cong \Delta PIN$

18. $DG^2 = DE \times DF$. Hence proved.

19. Given $\angle TON = \angle TEN = 90°$ [Right angle]

NT is common to both TON and TEN [Hypotneuse]

Given $\overline{TO} = \overline{TE}$

$\therefore$ By RHS Congruency axion $\Delta TON = \Delta TEN$

$\angle TNO = \angle TNR$ [CPCT]

$\overline{ON} = \overline{EN}$

$R\overline{N}$ is common to both ΔRON and ΔREN

By SAS Congurency axion ΔRON = ΔREN

∴ ∠ORN ≅ ∠ERN [CPCT]

20. Given $\overline{PQ} = \overline{TS}$, PR = 2PQ and TR = 2TS

⇒ PR = TR.

ΔPTR is an isosceles triangle

Then ∠P = ∠T ...1

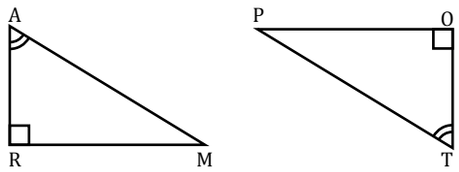
Given ∠PQU = ∠TSU ...2

PQ = TS ...3

By ASA Congurency Axion ΔPQU ≅ ΔTSU

∴ QU = SU

21. //Correction in figure//



Given RO = RM

∠TOP = ∠ARM = 90°

∠MAR = ∠PTO

Then by ASA Congurent Axion

ΔTOP ≅ ΔARM

Page No. 96

Exercise: 4.4

1. a) True b) False c) False d) False

e) False f) False g) True h) True

i) True j) False

Chapter 5 INFORMATION PROCESSING

Page No. 98

Exercise 5.1

1. Let the leaf patterns ①, ②, ③

Arrangements ① ② ③ | ② ③ ① | ③ ① ②

① ③ ② | ② ① ③ | ③ ② ①

First place have 3 possibilities

Second place have 2 possibilities (As first place is occupied)

Third play – only one possibility.

∴ Total possibilities = 3 × 2 × 1 = 6

2. Arrangements

135, 153, 315, 351, 513, 531 – 6 possibilites

Fundamental counting principle [FCP]

1st place – 3 possibilities

2nd place – 2 possibilities

3rd place – 1 possibilities

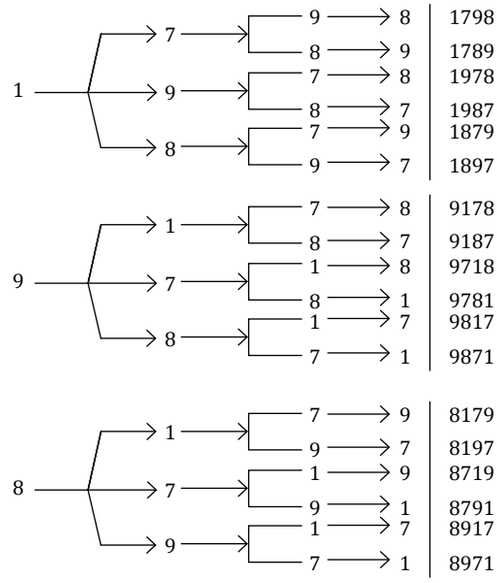
Total possibilities = 3 x 2 x 1 = 6.

3. Arrangements

508, 580, 850, 805.

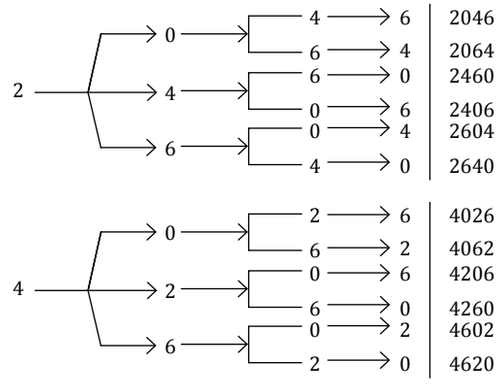
Since 085, 058 are not 3 digit numbers, there are 4 possibilities not 6 possibilities

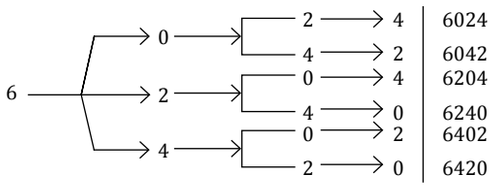
4. a.



Total (6 + 6 + 6 + 6) 24 possibilities

b. 2, 0, 4, 6





'o' cannot be the first digit

$\therefore$ Only 6+6+6 = 18 possibilities

FCP 1st place – 3possibilities

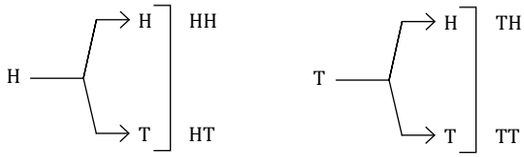
2nd place – 3 possibilities

3rd place – 2 possibilities

4th place – 1 possibility

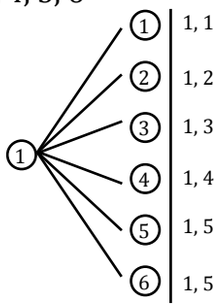
Total = $3 \times 3 \times 2 \times 1 = 18$ possibilities

5.



Total 4 possibilities

6. IIIrly for 2, 3, 4, 5, 6



	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2	2, 1	2, 2	2, 3	2, 4	2, 5	2, 6
3	3, 1	3, 2	3, 3	3, 4	3, 5	3, 6
4	4, 1	4, 2	4, 3	4, 4	4, 5	4, 6
5	5, 1	5, 2	5, 3	5, 4	5, 5	5, 6
6	6, 1	6, 2	6, 3	6, 4	6, 5	6, 6

Page No. 100 and 101

Exercise 5.2

1. a. Not a set [① and ③ have same colour]

b. Not a set [① and ③ have same design]

c. Set [same shape & designs number and different colour]

d. Set [same colour, shape, number and different designs]

e. Not a set [① and ③ have same colour]

f. Set [Same colour and number but different shape and design].

g. Set [Same colour and number but different shape and design]

h. Not a set [① and ③ have same colour.

[① and ③ have same shape.

2. a.  All in red colour

b.  All in green colour

c.  All in red colour

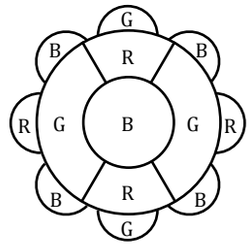
d.  all in red colour

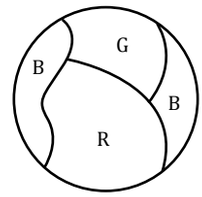
3. Answers may vary. Left to students.

Page No. 103

Exercise 5.3

1.

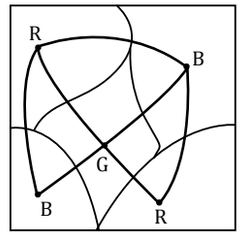


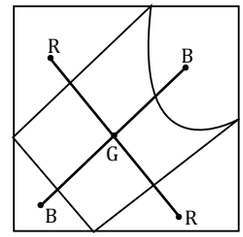


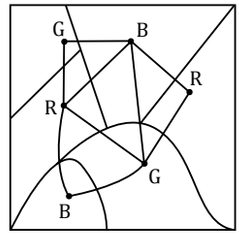
(Colours may vary one of the choices are shown here

(B-Blue, R-Red, G-Green

2.







3. Left to students.

Class: 8 KEY ANSWERS TERM : I

Chapter - 1 MEASUREMENT

I. Choose the best answer:

1. c – FPS
2. a – base
3. c – kelvin
4. a – directly proportional to the number of atoms
5. c – visible light
6. b – ammeter
7. a – International System of Units
8. b – precision
9. b – derived quantities
10. a – Approximation gives accurate value
11. d – luminous intensity
12. c – 5.0
13. c – atomic clock

II. Fill in the blanks:

1. steradian
2. Scientists
3. temperature
4. Ammeter
5. One mole
6. solid angle
7. electronic
8. error
9. Accuracy
10. plane angle

III. State True or False. If false, correct the statement:

1. True
2. False – Temperature is a measure of average kinetic energy of the particles in a system.
3. False – In thermometers, boiling point of water is taken as the Upper Fixed Point.
4. False – One coulomb of charge flowing per second is called 'ampere'.
5. True
6. True
7. True
8. False – Atomic clocks are used in GPS devices.
9. False – Candela is used to express luminous intensity.
10. True

IV. Match the following:

1. b
2. e
3. d
4. a
5. c

V. Consider the statements labelled as Assertion and Reason and choose the correct option:

1. (b) Both assertion and reason are true but reason is not the correct explanation of the assertion.

   Correct Explanation: In SI systems the units are precisely defined and have the same value everywhere.

2. (a) Both assertion and reason are true and reason is the correct explanation of the assertion.
3. (d) Assertion is false, but reason is true.

   Correct Explanation: Radian is the unit of plane angle.

4. (a) Both assertion and reason are true and reason is the correct explanation of the assertion.

VI. Answer in a word or two:

1. Pound
2. Seven
3. Thermometer
4. Candela (cd)
5. 6.023×10^{23}
6. Periodic vibrations
7. Analog clock and digital clock

8. One time
9. 60 minutes = 1 hour; 1 minute = 1/60 = 0.0167 hours
10. A photometer is used to measure the intensity of light produced by an unknown source in terms of a standard source.

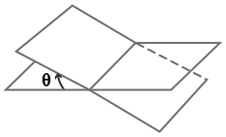
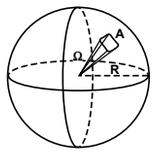
VII. Answer briefly:

1. Measurement is the process of finding an unknown physical quantity by using a standard quantity.
2. Some common systems of measurement are:

   FPS – Foot for length, Pound for mass and Second for time.

   CGS – Centimeter for length, Gram for mass and Second for time.

   MKS – Metre for length, Kilogram for mass and Second for time.
3. Temperature is a measure of the average kinetic energy of the particles in a system. The SI unit of temperature is kelvin (K).
4. One ampere is defined as one 'coulomb' of charge moving in a conductor in one second. **1 *A* = (1 *C*)/(1 *s*)**
5. Electric current refers to the rate of flow of electric charges passed in a given point in the circuit. The SI unit of current is ampere (A).
6. The measure of the power of the emitted light from a light source in a particular direction per unit solid angle is called luminous intensity. The unit of luminous intensity is candela (cd).
7. Mole is defined as the amount of substance, which contains 6.023×10^{23} particles (atoms, molecules or ions).
8. Plane Angle Vs Solid Angle:

Plane Angle	Solid Angle
Angle between the intersection of two lines or planes. 	Angle between the intersections of three or more planes at a common point. 
It is two dimensional.	It is three dimensional.
Unit is radian (rad).	Unit is steradian (sr).

9. Measurement is the base of all experiments in science and technology. The value of every measurement contains some uncertainty. These uncertainties are called '**errors**'.
10. Accuracy Vs Precision:

Accuracy refers to the closeness of a measured value to a standard or known value.	Precision is the closeness of two or more measurements to each other.

VIII. Answer in detail:

1. Base quantities are also called fundamental quantities. They are as follows:

Quantity	Unit	Symbol
Length	Metre	m
Mass	Kilogram	kg
Time	Second	s
Temperature	Kelvin	K
Electric Current	ampere	A
Amount of Substance	Mole	mol
Luminous Intensity	candela	cd

2. Types of clocks: Based on Display

Analog Display	Digital Clock
An analog clockface has numbers from 1 to 12 written around the perimeter of the clockface. Time is read with the help of the 'hands' of the clock.	A digital clock (also called electronic clock) displays the time digitally, in numbers or symbols.
A classic analog clock usually has three hands. **Hours hand:** The hour hand is the shortest and thickest among the three hands. The number that the hour hand points at denotes the hour. It makes one rotation in 12 hours.	• Most digital clocks show the hour in the 24-hour format. • Some are in or can be changed to the • 12-hour format too. • They are sometimes battery-run or directly connected to an electric power supply.

Minutes hand: It is long and thin and points towards the minute. Some clocks only have minute and hour hands. It makes one rotation in one hour. **Seconds hand:** It is usually the longest or of the same size of the minute hand and is the thinnest among the three. It makes one rotation in one minute.	• Some advanced digital clocks show date, time, month, year, temperature, humidity etc.

Types of clocks: Based on Mechanism

Quartz clock	Atomic Clock
These clocks are activated by 'electronic oscillations', which are controlled by a 'quartz crystal'.	These clocks make use of the periodic vibrations occurring within an atom.
Quartz crystals maintain a precise frequency standard, which helps to regulate the movement of a watch or clock, thus making the timepieces very accurate. Quartz is also used in radios, microprocessors and many other technological and industrial applications.	Atomic clocks are used in Global Positioning System (GPS), Global Navigation Satellite System (GLONASS) and International time distribution services.
These clocks have an accuracy of one second in every 10^9 seconds.	These clocks have an accuracy of one second in every 10^{13} seconds.

3. **Fundamental quantities:** Physical quantities that cannot be expressed in terms of any other quantities are called fundamental quantities. E.g.: Length, mass, time etc.

   Derived quantities: Physical quantities that can be expressed by multiplication or division of fundamental quantities are called derived quantities. E.g.: Area, speed, force etc.

4. a. **Electric current:** Rate of flow of charges in a conductor or the amount of electric charges flowing through a conductor in one second is called electric current. SI unit of electric current is ampere (A).

$$\textit{Electric current (I)} = \frac{\textit{amount of electric charges (q)}}{\textit{(time (t)}}$$

   b. **Radian:** It is the angle subtended at the centre of a circle, by an arc, whose length is equal to the radius. 1 radian = 57.27°

   c. **Steradian:** It is the solid angle made at the centre of a sphere of radius r, by a portion of its surface of area equal to r^2.

5.

4 meters – 4 m	kilogram – kg	cubic centimeter – cm^3
5 newtons – 5 N	pascal – Pa	kilometer – km
second – s	square centimeter – cm^2	kelvin – K

6. Temperature is a measure of the degree of hotness or coldness of a body. The body that gives out heat is said to be at higher temperature than the body that receives heat. Thus, temperature determines the direction of flow of heat. If there is no transfer of heat between the two bodies placed in contact, they are said to be at the same temperature. A thermometer is a device used to measure the temperature of a body.

IX. Solve the numerical:

1. Given: Length of the wire (l) = 1 mm ; Charge (q) = 2 C; Time (t) = 0.5 s

   We know:

$$\textit{Electric current (I)} = \frac{\textit{amount of electric charges (q)}}{\textit{(time (t)}}$$

$$= \frac{2}{0.5} = 4 \text{ A}$$

2. a) If the last digit in 2.864 is less than 5, then remove the last digit.

   Therefore, the answer is 2.86.

   b) If the last digit in 4.868 is 5 or more and the second to the last digit in 4.868 is less than 9, then remove the last digit and add 1 to the second to the last digit. Therefore, the answer is 4.87.

X. Higher Order Thinking Skills (HOTS):

1. No, it is not possible to have 100° C fevers. The normal temperature of human body is 98.4° F to 98.6° F. So, my friend should say that he was affected by a fever of 100° F and it is not 100° C.

Chapter - 2 FORCE AND PRESSURE

I. Choose the best answer:

1. c – move with a decreased speed
2. c – both (a) and (b)
3. d– both (a) and (b)
4. a – 76 cm of mercury column
5. a – Grease
6. b – poise

II. Fill in the blanks:

1. increases
2. Pascal's Law
3. surface tension
4. Torricelli

III. Match the following:

Match: I	Match: II
1. e	1. b
2. c	2. d
3. b	3. e
4. a	4. a
5. d	5. c

IV. State True or False. If false, correct the statement:

1. True
2. True
3. True
4. True
5. False – Rolling friction < Sliding friction < Static friction
6. False – When energy is transformed from one form to another, or moved from one place to another, or from one system to another there is energy loss.
7. True
8. True
9. False – Viscosity is normally independent of pressure, but liquids under extreme pressure often experience an increase in viscosity. Since liquids are normally incompressible, an increase in pressure doesn't really bring the molecules significantly closer together.

V. Arrange the following in the increasing order:

1. Rolling friction < Sliding friction< Static friction
2. Cotton cloth, paper, card board, silver plate, glass plate.

VI. Complete the analogy:

1. Knot in a thread : static friction; Ball bearing : rolling friction
2. Buoyancy

VII. Solve the numerical:

1. Given: weight of a stone (W) = 500 N = F

   Area (A) = 25 cm^2 = 25×10^{-4} m^2

   Pressure (P) = $\frac{F}{A} = \frac{500}{2.5 \times 10^{-4}} = 2 \times 10^5$ Pa

VIII. Consider the statements labelled as Assertion and Reason and choose the correct option:

1. (a) Both assertion and reason are true and reason is the correct explanation of the assertion.
2. (b) Both assertion and reason are true but reason is not the correct explanation of the assertion.

   Correct Explanation: The weight of the bags fall on larger area of shoulder. So, lesser pressure is produced.

3. (b) Both assertion and reason are true but reason is not the correct explanation of the assertion.

   Correct Water strider slides easily due to the surface tension of water.

IX. Answer in a word or two:

1. a) When a lump of chapatti dough is pressed, pushed and pulled, we see the shape of the dough changing.

   b) If you pull the two ends of a rubber band, it gets stretched.

2. Example 1: Lifting a book lying on the table.

   Example 2: Kicking a football at rest.

3. Pascal's Law (applying pressure).

4. The nail becomes hot due to friction. Friction changes kinetic energy to heat.

5. Friction arises due to the interlocking of the irregularities of the two surfaces.

6. Barometer, Manometer, Pressure gauge etc.

7. One atmosphere is the pressure exerted by column of air on the ground at sea level.

8. Broader straps are provided on a back-pack for giving less pressure on the shoulders by providing a large area of contact with the shoulder.

9. In plants water molecules are absorbed by the roots and the xylem tissue vessels help the water rise upward due to capillary action, which is caused by the surface tension of the water.

10. Honey has greater viscosity.

    Reason: Thicker liquids are more viscous than thinner liquids. As honey has greater viscosity, more frictional force will be acting on it. (Or) The resistance offered by honey to any kind of change or deformation is greater than oil.

X. Answer briefly:

1. Frictional force is the force that resists or opposes the motion of an object. It exists at the surface of contact between two bodies, when at least one of them is in motion.

Examples:

i. Friction helps to fire match stick using match box.

ii. Friction is necessary for walking and running.

2. **By using lubricants:** Lubricants like oil and grease are used in engines and moving parts of machines to reduce friction. Lubricants fill up the gaps in the irregular surfaces between the bodies in contact. This provides a smooth layer thus preventing a direct contact between their rough surfaces.

With the help of polishing the surface:

We sprinkle fine powder on the carrom board and then we polish its surface to make smooth, so that the striker slides easily on the surface.

By using ball bearings:

Since the rolling friction is smaller than sliding friction, sliding is replaced by rolling with the usage of ball bearings. Ball bearings are used for smooth rotation of wheels, fans and motor pumps.

3. Pascal's law states that the pressure applied at any point of a liquid at rest, in a closed system, will be distributed equally through all regions of the liquid.

Applications of Pascal's law:

i. In an automobile service station, the vehicles are lifted upwards using the hydraulic lift, which works as per Pascal's law.

ii. The automobile brake system works according to Pascal's law.

iii. The hydraulic press is used to make the compressed bundles of cotton or cloth so as to occupy less space.

4. The rolling friction is smaller than sliding friction, sliding is replaced by rolling with the use of ball bearings. So, lead shots are used in the bearing of a cycle hub.

5. During a heavy storm, sailors pour soap powder or oil into the sea near their ship to decrease the surface tension of sea water. This process reduces the impact of the violent water current against the walls of the ship.

XI. Answer in detail:

1. Friction is a necessity in most of our day to day activities. It is desirable in most situations of our daily life.

   i. We can hold any object in our hand due to friction.

ii. We can walk on the road because of friction. The footwear and the ground help us to walk without slipping.

iii. Writing easily with a pen on paper is due to friction.

iv. Automobiles can move safely due to friction between the tyres and the road. Brakes can be applied due to frictional resistance on brake shoes.

v. We are able to light a matchstick, sew clothes, tie a knot or fix a nail in the wall because of friction.

Though it is giving a negative effect, in most of our day to day life friction helps us to make our life easy. So, it is called as "necessary evil".

Disadvantages of friction:

We know that due to friction, large amount of useful energy is wasted in the form of heat. This causes wear and tear of machine parts.

i. Friction wears out the surfaces rubbing with each other, like screws and gears in machines or soles of shoes.

ii. We also know that due to friction from air, which opposes the movement, fuel is wasted in automobiles.

2. Friction can be classified into two basic types:

i. Static friction

ii. Kinetic friction.

Static friction: The frictional force that exists between the two surfaces so long as they are relatively at rest when an external force acts is called static friction. There is no movement of the body in static friction.

In static friction,

force of static friction = applied force.

Kinetic friction: Friction existing during the motion of bodies is called kinetic friction.

Further, kinetic friction can be classified into two:

i. Sliding friction

ii. Rolling friction.

Sliding friction: When a body slides over the surface of another body, the friction acting between the surfaces in contact is called sliding friction.

Rolling friction: When a body rolls over another surface, the friction acting between the surfaces in contact is called rolling friction. Rolling friction is less than sliding friction. That is why wheels are provided in vehicles, trolleys, suitcases etc.

3. **Aim:** To understand about the frictional force between the layers of liquid in motion.

Materials required:

- Different kinds of liquids – coconut oil, honey, water and ghee,
- Glass plates – four in number

Procedure:

i. Take a small quantity of different kinds of liquid like coconut oil, honey, water and ghee in a cup.

ii. Place one drop of each liquid on a separate glass plate.

iii. Next, gently raise one end of the glass plate, one by one, so as to allow the liquid to slide down the smooth surface of the plate.

iv. Observe the speed of each liquid.

Observation:

Each liquid moves with a different speed. Water flows faster than other liquids. Coconut oil and honey flows with a moderate speed. Ghee flows very slowly.

Inference:

Between the layers of each liquid in motion, there is a frictional force parallel to the layers of the liquid. This frictional force opposes the motion of the liquid layers while they are in motion.

4. **Friction can be minimised:**

i. with decrease in surface area of contact between two bodies.

ii. with decrease in mass of the body.

iii. with decrease in speed of the body.

iv. when surface of contact between the two bodies is smooth.

By using lubricants: Lubricants like oil and grease are used in engines and moving parts of machines to reduce friction. Lubricants fill up the gaps in the irregular surfaces between the bodies in contact. This provides a smooth layer thus preventing a direct contact between their rough surfaces.

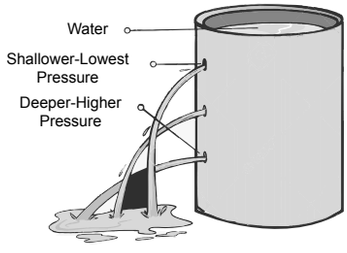
With the help of polishing the surface: We sprinkle fine powder on the carrom board and then we polish its surface to make smooth, so that the striker slides easily on the surface.

By using ball bearings: Since the rolling friction is smaller than sliding friction, sliding is replaced by rolling with the usage of ball bearings. Ball bearings are used for smooth rotation of wheels, fans and motor pumps.

5. Take an empty container made of plastic. Keep it on a horizontal table surface. Make holes at different heights of the bottle. Now pour some water into it and let it flow through the holes. It is observed that water jets out from these holes.

Inference:

Observe how the water is flowing out. The water comes out from all the holes with varied forces and falls on the table at distances that are at different distances from the bottle. Water from the lowest hole comes out with the greatest force and falls at a point that is at the maximum distance from the bottle. Water from the topmost hole comes out with the least force and falls at the point that is at the minimum distance from the bottle.



This concludes that liquid pressure at a point increases with the increase of depth of point from the free surface.

XII. Higher Order Thinking Skills (HOTS):

1. Given dimensions of the brick are:
   Mass = 2.4 kg, length = 30 cm, breadth = 12 cm and height = 10 cm.

   a) Force = mass x acceleration due to gravity
      $F = ma = 2.4 \times 9.8 = 23.52$ N

   b) Pressure exerted when the broader side is in contact with ground
      = Force exerted by the brick on the ground ÷ area of contact ($0.3 \text{ m} \times 0.12 \text{ m}$)
      = 653.33 Pa

   c) Pressure exerted when the narrower side is in contact with ground
      = Force exerted by the brick on the ground ÷ area of contact ($0.3 \text{ m} \times 0.1 \text{ m}$)
      = 784 Pa

2. Fountain pens are built in such a way that the pressure inside them balances the atmospheric pressure at sea level. Since atmospheric pressure decreases with an increase in height above sea level, the pressure inside the pen turns out to be much greater than the air pressure in an aeroplane and the pen starts leaking.

3. Yes, tribometre is a special device used to measure the magnitude of friction directly.

4. Mercury is commonly used in barometers because of its high density (13.6 g/cc) means height of the column can be a reasonable size to measure atmospheric pressure. Whereas, the density of water is 1 g/cc and a barometer using water, would need to be 13.6 times taller than a mercury barometer to obtain the same pressure difference. That is why; it is difficult to construct a water barometer.

   Note: The atmospheric pressure is equivalent to 0.76 m of mercury column and the height of the water column will be around 10 m (13×0.76 m).

5. At higher altitudes the atmospheric pressure is very low when compared to the blood pressure which caused the blood vessels to burst and as a result the nose bleeds.

6. We know that the atmospheric pressure is equivalent to 10 m of water column and pressure increases with depth. So the pressure at depth, 'd', of water is $(10 + d)$ of water column. It is given the volume of bubble is inversely related to pressure.

Therefore, $r^3 \propto \frac{1}{P}$ where 'r' is the radius and 'p' is the pressure.

Initial radius: r_1 and final radius: $3\,r_1$

$$27\ \frac{{r_1}^3}{{p_1}^3} = \frac{(10 + d)}{10}$$

Therefore, d = 260 m.

Chapter - 3 LIGHT

I. Choose the correct answer:

1. b – spherical mirrors
2. b – concave mirror
3. b – centre of curvature
4. b – convex mirror
5. c – principal axis
6. b – focal length
7. c – radius of curvature
8. c – 20 cm (Since, R = 2F = 2 × 10 cm = 20 cm)
9. d – at C
10. b – 1.33

II. Fill in the blanks:

1. concave mirror
2. pole
3. smaller, virtual and erect
4. concave mirror
5. 45°
6. infinity

III. Match the following:

Match: I	Match: II
1. c	1. b
2. a	2. c
3. d	3. d
4. b	4. a

IV. Answer briefly:

1. Mirrors in which curved reflecting surface forms a part of a sphere are called spherical mirrors.

2. Given: radius of curvature (R) = 25 cm

$$\text{Focal length (f)} = \frac{\text{radius of curvature}}{2} = \frac{R}{2} = \frac{25}{2}$$

$$= 12.5 \text{ cm}$$

3. **Applications of concave mirror:**

   i. **As a shaving mirror:** When a concave mirror is held near the face (that is the face is between the pole and the focus of the mirror), the image will be erect and magnified. This makes it easier to see tiny facial hair.

   ii. **As a reflector:** In torches, search lights and headlights of vehicles, the lamp is placed at the focus of the concave reflector so that the reflected light will reach larger distances.

Applications of convex mirror:

   i. **As rear view mirror in vehicles:** The image formed by a convex mirror is always small, virtual and erect. This enables the driver to see all the traffic approaching from behind. A plane mirror can also be used for this purpose but the field of view is greater for a convex mirror compared to the plane mirror of the same size.

   ii. Convex mirrors are used in roads, parking lots of shopping malls, hallways etc. where there are sharp turns; so that an observer can see the vehicles or people approaching even from a faraway distance, from the other side of the turn.

4. **Given:** angle of inclination (θ) = 45°

$$\text{Number of images} = \frac{360}{\text{angle of inclination}} - 1$$

$$= \frac{360}{45} - 1 = 7$$

5. **(a) Convex mirror:** A convex mirror is made by silvering the inner surface of the hollow sphere such that the reflection takes place from the outer (or bulging) surface. The image

formed by these mirrors is smaller than the object.

(b) Concave mirror: A concave mirror is made by silvering the outer (or bulging) surface of the piece of a hollow sphere such that the reflection takes place from the hollow (or concave) surface. These mirrors magnify the object placed close to them.

6. **(a) Focal length:** The distance between the pole and the principal focus is called focal length (f) of a spherical mirror. The focal length is half of the radius of curvature (R).

   (b) Radius of curvature: It is the distance between the pole and the centre of curvature. It is denoted by the symbol R.

7. Image formed by convex mirror placed at different positions is as follows:

Position of the Object	Position of the Image	Size of the Image	Nature of the Image
At infinity (∞)	At the focus **F**, behind the mirror	Highly diminished, point-sized	Virtual and erect
Behind infinity (∞) and the pole **P** of the mirror	Between **P** and **F** behind the mirror	Diminished	Virtual and erect

8. Kaleidoscope is a device that functions on the principle of **multiple reflection** of light to produce numerous patterns of images. It has two or more mirrors inclined with each other. It can be designed from inexpensive materials, and the colourful image patterns formed is very beautiful and interesting to observe. This instrument is used as a toy for children.

9. When a ray of light falls normally on the surface of the mirror, then the angle of incidence and the angle of reflection for such a ray of light will be zero. This ray of light will be reflected back along the same path. This is called normal reflection.

10. (a) When a light ray travels from **a rarer medium to a denser medium,**

    i the speed of light decreases.

    ii the light ray bends towards the normal.

    iii the angle of refraction < angle of incidence.

    (b) When a light ray travels from **a denser medium to rarer medium,**

    i the speed of light increases.

    ii the light ray bends away from the normal.

    iii the angle of refraction > angle of incidence.

11. **Effects of refraction of light:**

    i A pencil dipped in water in a glass appears to be bent at the interface of air and water due to refraction of light.

    ii. Swimming pool looks shallower than the reality as the light coming from the bottom of the pool bends when it comes out at the surface due to refraction of light.

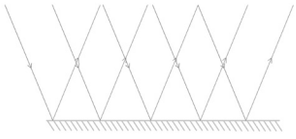
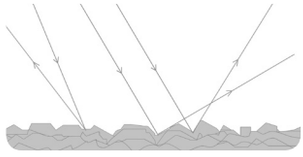
V. Answer in detail:

1. The image formed by a concave mirror can be real or virtual depending on the position of the object. The following table shows the nature, position and relative size of the image formed by a concave mirror.

Position of the Object	Position of the Image	Size of the Image	Nature of the Image
At infinity	At the focus F	Highly diminished, point-sized	Real and inverted
Beyond C	Between F and C	Diminished	Real and inverted
At C	At C	Same size	Real and inverted
Between C and F	Beyond C	Enlarged	Real and inverted
At F	At infinity	Highly Enlarged	Real and inverted
Between P and F	Behind the mirror	Enlarged	Virtual and erect

2. **Reflection:** The bouncing back of the light rays as they fall on the smooth, shiny and polished surface is called reflection.

Regular reflection Vs Irregular reflection:

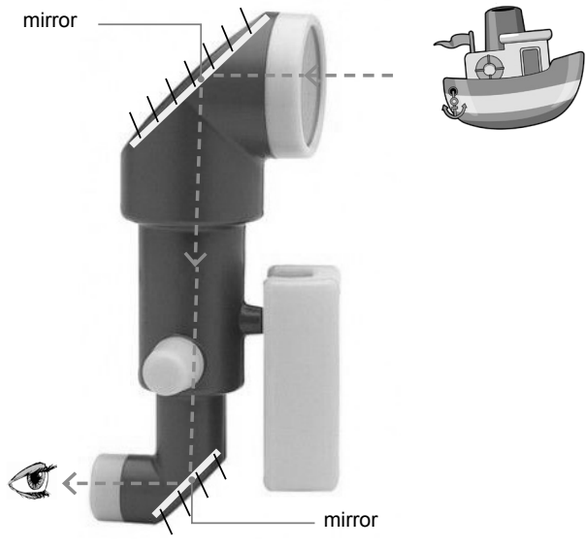
Regular Reflection	Irregular Reflection
When the reflecting surface is smooth or polished, as in a mirror, the laws of reflection will be obeyed. If a parallel beam is incident, the reflected beam is also parallel and the reflected ray takes a definite path. This is known as regular reflection.	When a parallel beam is incident on a rough surface, like a wall, paper, wood, a dull metal, etc., the reflected beam is not parallel. The rays of the beam after reflection move randomly in different directions. Thus, the reflected rays do not follow a definite pattern. This type of reflection is called irregular or diffused reflection.
	

3. **Working of a periscope:**

i. This contains a hollow cardboard or wooden tube, which is bent twice at right angles in opposite directions as shown in the figure.

ii. Two plane mirrors are fixed at the two bends such that they make an angle of 45° with the frame of the tube. The reflecting faces of the two mirrors face each other.

iii. Rays of light moving parallel to the top limb are incident at an angle of 45° on the first mirror.



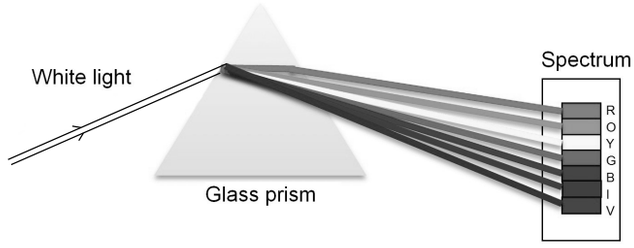
Periscope model

iv. The reflected rays move parallel to the vertical portion of the tube and are incident again on the second mirror at the same angle.

v. After reflection from the second mirror, the rays move parallel to the bottom limb of the tube. Thus, a periscope can be used to see objects behind an opaque obstruction.

vi. It is used in warfare and in the navigation of submarines. In the military it is used for pointing and firing guns from a 'bunker'.

4. **Dispersion:** The splitting of white light or sunlight into its seven constituent colours is called dispersion. The phenomenon was discovered by Isaac Newton, and the display of colours is known as a **spectrum**.



i. A prism contains two refracting faces inclined at an angle called angle of the prism, which is usually 60°. A ray of white light incident on the prism undergoes refraction at the two faces and comes out as the constituent seven colours namely violet, indigo, blue, green, yellow, orange and red.

ii. In vacuum or air all the constituent colours of sunlight travel at the same speed, which is 3×10^8 m/s.

iii. In all the other denser media like glass or water, different colours travel at different speeds. Hence different colours deviate or bend to different extents and thus get separated.

iv. When a ray of white light is incident on one face of the prism, the angle of incidence remains same but the angles of refraction for different colours will be different.

v. Red colour deviates or bends to a minimum extent and violet to the maximum extent. This means, inside the glass, red-light travels slowest and violet travels fastest.

5. **Given:** speed of the light in air (c) = 3×10^8 m/s; refractive index (μ) = 1.5

Speed of the light in medium (v) =?

We know that: $\mu = \frac{c}{v} \Rightarrow 1.5 = \frac{3 \times 10^8}{v}$

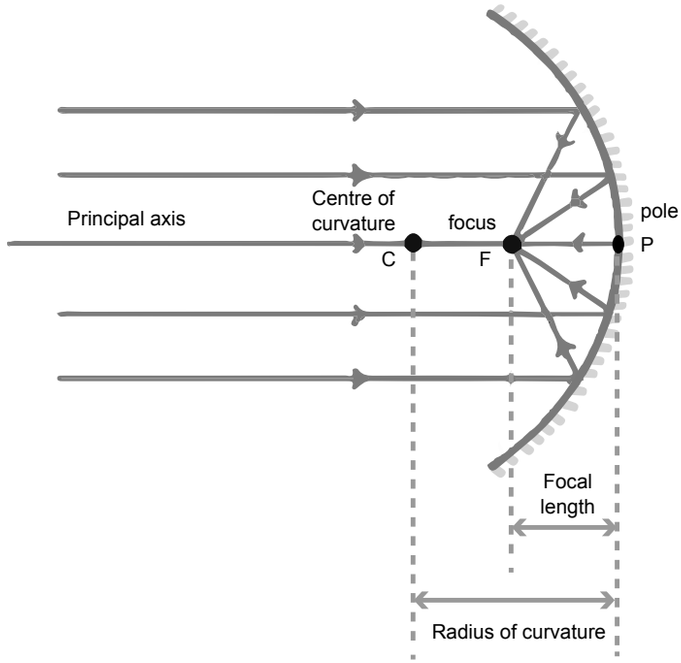
$\Rightarrow v = 2 \times 10^8$ m/s

6. (a) **Centre of curvature:** Centre of curvature of the mirror is the centre of the sphere of which the mirror is a part. It is denoted by the letter **C**.

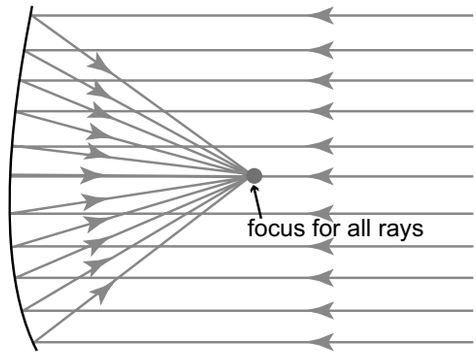
(b) **Pole:** It is the geometric centre of the spherical mirror. It is denoted by the letter **P**.

(c) **Principal axis:** The line passing through the pole of the mirror and its centre of curvature is known as the principal axis. **PC** represents the principal axis.

(d) **Focus:** When a beam of light is incident on a spherical mirror, the reflected rays converge (concave mirror) at or appear to diverge from (convex mirror) a point on the principal axis. This point is called the 'focus' or 'principal focus'. It is also known as the **focal point**. It is usually denoted by the letter **F** (in ray diagrams).



7. Parabolic mirrors are concave mirrors in the shape of a parabola. The first parabolic mirrors were constructed by Heinrich Hertz, a German physicist, in the form of reflector antenna in the year 1888.



Ray diagram of the Parabolic mirror

i. The concave reflecting surface of the parabolic mirror focuses the incident beam of light to converge at the focal point of the mirror.

ii. If a light source is kept at the focus point of the parabolic mirror, the reflected light rays will follow the direction parallel to the principal axis of the mirror. This enables the light rays to travel longer distances without the intensity getting diminished.

<u>Uses of parabolic mirrors:</u>

i. Parabolic mirrors, also known as parabolic reflectors, are used to collect or project

energy such as light, heat, sound and radio waves.

ii. They are used in reflecting telescopes, radio telescopes and parabolic microphones.

iii. Parabolic troughs are used in case of solar panels. These panels are equipped with a tracking mechanism that changes the vertical angle of the trough according to the position of the sun in the sky. Some troughs also contain water in the central tube that gets heated due to the focus of the sun's rays.

8. **Refractive index:**

i. The refractive index is denoted by the symbol μ, (pronounced as mew) generally defined with respect to vacuum or air.

ii. It is the ratio of the speed of light in vacuum to the speed of light in a medium i.e.

$$\mu = \frac{\textit{speed of light in air } (c)}{\textit{speed of ligth in medium } (v)}$$

iii. It is ratio of two similar quantities and doesn't have any units.

iv. Refractive index of a medium is always greater than 1 as speed of light in medium is always less that in vacuum or air.

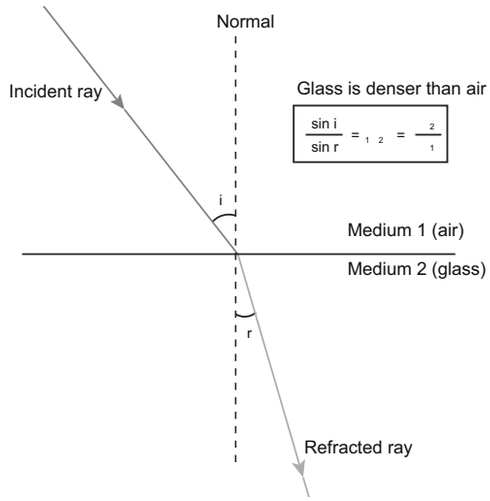
9. Refraction of light: The bending of light due to change in its speed, when it travels from one optical medium to another, is called refraction of light.

Snell's law of refraction:

i. The incident ray, the refracted ray and the normal at the point of incidence all lie in the same plane.

ii. The ratio of the sine of angle of incidence (i) to the sine of angle of refraction (r) is equal to the refractive index of the medium 2 with respect to the medium 1 and is a constant.

$$\frac{Sin\ i}{Sin\ r} = {}_1\mu_2, \text{ constant}$$



VI. Higher Order Thinking Skills (HOTS):

1. a. Size of the image is increasing as the object is moving away from the mirror. The magnification is only possible in concave mirror. Since the image is upright, the object is in between pole and focal point.

b. Convex mirror image is always diminished, upright and decrease size when object moves away from mirror.

c. In a plane mirror, image distance is always equals the object distance. The size of the image is the same as the object (the mirror does not magnify the image). Also image is always upright.

2. Medium A is optically denser than medium B. A ray bends away from the normal only on entering a rarer medium from a denser medium.

Note: Speed of light in rarer medium is more in comparison with speed of light in denser medium.

Chapter - 4 MATTER

I. Choose the best answer:

1. d. All of the above
2. b. Mercury
3. b. ▽
4. d. Mercury
5. b. Hg

6. d. Carbon
7. c. Zinc
8. b. Malleability
9. a. Carbon
10. a. Graphite

II. Fill in the blanks:

1. Metalloids
2. W
3. Higher
4. Hydrogen and oxygen
5. Silicon or Germanium

III. State True or False. If false, correct the statement:

1. False – Metals are good conductors of heat and electricity.
2. False – Gallium has very low melting point.
3. False – Compounds is a pure substance which is formed due to the chemical combination of two or more elements in a fixed ratio by mass.
4. False – Coal is a non metal.
5. False – Zinc is low ductile.

IV. 1. Steel – Sewing needle
Copper – for making wires
Tungsten – making filament of the bulb
Boron – as a fuel for ignition in rockets

2. a. 1 - A, 2 - C, 3 - B, 4 - D
3. a. A – gas, B – solid, C – liquid

V. Answer briefly:

1. Metals can be drawn into thin wires. This property of metals is called ductility.
2. a. Carbon and oxygen (CO).
   b. Sodium, Carbon and Oxygen ($NaCO_3$)
3. (a) O (b) Au (c) Ca (d) Cd (e) Fe
4. Sodium and Potassium.
5. Oxygen
6. Metals are sonorous
7. A chemical symbol represents the name of the element. It is represented by a letter of the alphabet written in upper case. It is often the first letter of the name of the element.

   Examples: hydrogen is H, nitrogen is N, sulphur is S.

   Sometimes, two letters are used to write the symbol of the element.

   Example: Copper is Cu, iron is Fe.

   The symbol also represents an atom of that element.
8. Boron and Silicon
9. Water, hydrochloric acid, sulphuric acid.
10. Physical properties of metalloids

    Metalloids are all solid at room temperature.

    i. They form alloys with other metals

    ii. Some metalloids, such as silicon and germanium are electrical conductors under specific conditions, thus they are called semiconductors.

    iii. Silicon for example appears lustrous, but is neither malleable nor ductile (it is brittle - a characteristic of some non metals). It is a much poorer conductor of heat and electricity than the metals

    iv. The physical properties of metalloids tend to be metallic, but their chemical properties tend to be non-metallic.

VI. Answer in detail:

1. As lemon pickle is acidic and aluminum is a metal and metals react with acids to produce hydrogen gas, it is not advisable to store lemon pickle in an aluminum utensil because it will spoil the pickle and holes corrode in the vessel.
2.

Property	Metal	Non-Metal
Malleability	Good	Poor (Brittle)
Ductility	Good	Poor (Brittle)
Conductivity	Good	Very poor
Melting point	Usually high	Usually low

3. Metals have the capacity to withstand strain without breaking. This property is called tensile strength.

4. Aluminium and brass can be made into different shapes. Also they are good conductors of heat. So they are used to make utensils.

5. The process of changing less valuable metals into gold is called alchemy.

6. a. Sodium
   b. Tungsten
   c. Barium
   d. Aluminium
   e. Uranium

7. Sulphur – S, Oxygen – O, Carbon – C, Hydrogen – H, Phosphorus – P.

8. Water – for drinking and as a solvent for many substances.
   Table salt – essential component of our daily diet, preservative for meat and fish.
   Quick lime – to manufacture cement and glass.
   Lime stone – preparation of chalk pieces.

9. Silver, gold, platinum

   (any one metal is acceptable).

   It does not react easily with air and is malleable and ductile.

   Also the metal can be highly polished and looks attractive.

10. a. Baking soda – fire extinguisher, preparation of baking powder and preparation of cakes and bread.
    b. Bleaching powder – as bleaching agent, disinfectant and sterilisation of drinking water.
    c. Quick lime – manufacture of cement and glass.

VII. Reason out:

1. a. Aluminium foils are used to wrap food items because aluminium being a soft malleable metal it can be beaten to in sheets to form thin wrapping sheets. Moreover it does not react with food items.
   b. Immersion rods are made of metallic substances metals are good conductors of heat and electricity. They get hot very soon when electric current is passed through them and thus warm the water.
   c. The tablet is not made of iron metal; instead it contains a salt of iron which will have properties different from the properties of the metal.
   d. Sodium and Potassium are stored in kerosene since they are very reactive. They quickly react in air and water, however they do nor react with kerosene.
   e. Mercury is used because of its high density and uniform expansion at different temperature.

VIII. Analyse the following:

1. a. air is being filled into the tyre of the cycle.
   b. air is highly compressible.
   c. pressure in the tyres would be very high and they could burst.

2. a. 3 b. iii
   c. H - represents an atom of hydrogen
   H_2 - represents a molecule of hydrogen containing two atoms of hydrogen.

Chapter - 5 CHANGES AROUND US

I. Choose the correct answer:

1. Chemical
2. Contact
3. Iron
4. Melanin
5. Sodium chloride
6. Calcium carbonate
7. Electricity
8. Metallic iron
9. Acid rain
10. All of the above

II. Fill in the blanks:

1. Products
2. Nickel
3. Sunlight
4. Oxygen and water

5. Ammonia
6. Hydrogen and chlorine
7. Catalyst
8. Polyphenol oxydase

III. State True or False. If false, correct the statement:

1. False
2. True
3. False
4. True
5. False
6. True
7. True

IV. Match the following:

1. Rusting - c) Iron
2. Electrolysis - d) Brine
3. Thermolysis - e) Decomposition of limestone
4. Plants - a) Photosynthesis
5. Ammonia - b) Haber's process

1. Rancidity - e) Oxidation
2. Ozone - c) 3 Oxygen atoms
3. Tarnishing - d) Silver
4. Yeast - b) Biocatalyst
5. Calcium Oxide, Water - a) Exothermic

V. Answer briefly:

1. Chemical changes are otherwise called as chemical reactions, because one or more substances (Reactants) undergo a reaction to form one or more new substances(Products).

Characteristics of a chemical reaction:

- a new substance is formed
- change is irreversible
- energy is absorbed or released

2. Chemical reactions can be done through;
   a. Physical contact
   b. Solution of reactants
   c. Electricity
   d. Heat
   e. Light
   f. Catalyst

3. **Exothermic and Endothermic reactions:**

- Exothermic reaction - a chemical reaction in which heat is released.

  Example: burning of a fuel

- Endothermic reaction - a reaction in which heat is absorbed.

  Example: ammonium chloride dissolved in water

4. a. catalyst - is a chemical substances which are alters the speed of a chemical reaction.
   b. enzymes - are biocatalysts that speed up body reactions.

5. When you place a iron nail in a solution of copper sulphate, the blue colour of copper sulphate slowly changes into green due to chemical reaction between iron copper sulphate solution and copper gets deposited on the iron nail.

6. The armful changes in physical, chemical and biological properties of the environment is termed as pollution.

List any 3 causes for pollution:

Pollution is the release of harmful substances into the environment. Pollution may occur in soil, water or air.

- Soil: excessive use of pesticides
- Water: waste from factories discharged into water bodies
- Air: release of exhaust fumes from vehicles

7. Catalyst is chemical substances which are used to alter the speed of a chemical reaction.

Examples of catalyst in chemical reactions:

- In the electrolysis of water, sulphuric acid is used as a catalyst.
- In the laboratory preparation of oxygen, manganese dioxide is used as a catalyst.
- In hydrogenation of vegetable oils, finely divided nickel is used as a catalyst.

8. The sunlight is used by plants to produce starch through the chemical reaction between carbon dioxide and water.

VI. Higher Order Thinking Skills (HOTS):

1. Yeast is used in bakeries to make bread and cakes. It is added to the dough to produce carbon dioxide which makes the dough light and spongy. Bread and cakes are soft due to carbon dioxide gas.
2. Fossil fuels like coal and petroleum are huge reservoirs of carbon and its compounds mainly nitrogen, oxygen, sulphur and hydrogen. When these fuels burn, carbon is converted to carbon dioxide, then the amount of carbon dioxide in the atmosphere is going to increase leading to intense global warming.
3. The exhaust from cars, trucks, and buses releases nitrogen oxides and sulfur dioxide into the air. these gases dissolve in rain water cause acid rain.
4. Rust is formed when an iron surface is exposed to oxygen in the presence of moisture. Several varieties of iron-oxides can be formed. Rust is non-toxic and so presents no biological hazards. The main environmental impacts of rust are the degradation of steel and iron structures, such as bridges, automobiles, etc.
5. Fresh fruit and vegetables normally have enzymes trapped in their tissues. However when the fruit is sliced, or squashed, or when the fruit or vegetable begins to break down with age, the enzymes come in contact with oxygen in the air. This causes the fruit to turn brown.

VII. Answer in detail:

1. Food spoilage may be defined as any change that causes food to become unfit for human consumption. The chemical reactions catalyzed the enzymes result in the degradation of food quality such as development of bad tastes and odor, deterioration and loss of nutrients.

   E.g. 1. Rotten eggs develop a bad smell due to formation of hydrogen sulphide gas

   E.g. 2. Decaying of vegetables and fruits due to microbes

Food Spoilage can be avoided by:

a. Keeping food in airtight containers
b. Keeping leftover food in the refrigerator.
c. Use preservatives such as salt, sugar etc.

2. Generally there are three types of pollutions via air, water and land pollution. Due to increasing human activities lot of chemical substances are produced artificially which harm all the living and non living things.

   We can tabulate the types of chemical substances and their effects.

#	Type of pollution	Chemical substances responsible for the pollution	Effects
1	Air pollution	Carbon dioxide, Carbon monoxide, oxides of sulphur, oxides of nitrogen, Chlorofluorocarbons, methane etc.	Acid rain, Global warming, respiratory problems etc.
2	Water pollution	Waste water containing chemical substances (e.g dyeing industries), detergents, oil spillage etc.	Decrease in quality of water, skin diseases etc
3	Land pollution	Fertilizers like urea, various pesticides, herbicides etc.	Spoilage of land, cancer, respiratory diseases etc.

3. Chemical reactions are characterised by absorption or release of energy.

   During some chemical changes, heat energy is released. These reactions are called exothermic reactions. Some exothermic reactions are:

   - Combustion of LPG burns gives out heat which is used for cooking.

   During some reactions, heat energy gets absorbed. These reactions are known as endothermic reactions.

   - Green plants consume energy for making their food by photosynthesis.

   Some reactions involve energy in the form of heat, light or sound.

For example,

When a candle burns, heat and light are given out.

Some reactions involve the production of heat, light and sound.

For example, when crackers are ignited, heat, light and sound are produced.

4. Three important conditions for a chemical reaction are:

a. Physical conditions of reactants

- Reactants in a powdered state react faster than big lumps of reactants.
- Some reactions undergo chemical change in solid state.

  Example: a piece of coal when heated in air, combines with oxygen to form carbon dioxide
- Some reactants undergo chemical change in liquid state.

  Example: colourless solutions of sodium chloride and silver nitrate react to form a white solid precipitate of silver chloride.
- Chemical reactions also take place with one of the reactant is in solid state while the other maybe in liquid or gaseous state.

  Example: Tarnishing of copper or silver in air is an example of such a reaction.

b. Role of Energy

Energy in the form of heat, light or electricity is absorbed or released.

Different reactions require the presence of different forms of energy.

- Reactions take place on heating.

  Example: When limestone is heated we get quick lime.
- Reactions occur under the influence of light.

  Example: When white coloured silver chloride is exposed to day light, it turns grey.
- Reactions that take place using electrical energy.

  Example: When current in passed through acidified water, it splits into hydrogen and oxygen

c. Role of catalyst

Some reactions take place only in the presence of a catalyst.

Catalysts are substances used to speed up a chemical reaction.

Example: Finely divided Nickel metal is used as a catalyst to convert vegetable oils to Vanaspati.

5. Fermentation is a process of decomposition of carbohydrates such as starch or sugar into an alcohol or an acid by the action of enzymes using yeast or bacteria.

- The process is involved in making alcoholic beverages like wine, beer and other spirits.
- It is the process by which milk changes to curd.

  Dough gets fermented to make *dosas*.

VIII. Value Based Questions:

1. a. Yes.

   b. Rust is formed when an iron surface is exposed to oxygen in the presence of moisture. Several varieties of iron-oxides can form. Rust is non-toxic and so presents no biological hazards. The main environmental impacts of rust are the degradation of steel and iron structures.

   c. Corrosion levels less than 3% present a minor tensile-strength reduction of approximately 3%, whereas the tensile strength may decrease to 75–90% when the corrosion level increases more than 10%. He helped to increase the life of Kumar house and actually he saved Kumar money.

2. a. Yes, son is right.

   b. Our environment must provide us clean air to breathe, water to drink and land to produce food. Due to human activities like industries, the environment is badly affected. Due to the industries the air will be polluted and so affect the health of the people.

   The boy can suggest other places which do not have factories or industries. Places where air, water are clean.

   c. He has helped save his family from living in a polluted area and this will prevent serious health disorders.

Chapter - 6 MICROORGANISMS

I. Choose the best answer:

1. c) micron
2. b) virus
3. d) bacteria
4. c) 4
5. b) thallus

II. Fill in the blanks:

1. Penicillin
2. Prion
3. Virion
4. microscope
5. monotrichous

III. Match the following:

1.	Nitrogen fixing bacteria	Rhizobium
2	Tuberculosis	Bacteria
3.	Kuru	Prion
4.	Probiotics	Lactobacillus acidophilus
5.	Edward Jenner	Vaccine

IV. State True or False. If false, correct the statement:

1. True
2. False
3. True
4. False
5. True

V. Assertion and Reason:

1. b. 2. d.

VI. Answer very briefly:

1. The names of nitrogen fixing bacteria are Rhizobium, Azotobacter and Clostridium.
2. The bacteria used in the production of vinegar is Acetobacter aceti.
3. Three protozoans are amoeba, paramecium and euglena.
4. Sir Alexander Fleming discovered penicillin.
5. The diseases that can be prevented by vaccination are tuberculosis, diphtheria, pertussis, tetanus, polio, measles, mumps, rubella and typhoid.

VII. Answer briefly:

1. Based on their shape bacteria have been classified as Cocci (spherical shaped), Bacilli (rod shaped), Spirilla (spiral shaped), Vibrio (comma shaped).
2. Antibiotics are drugs or medicines which inhibit the growth of microorganisms. These chemicals are extracted from microorganisms like bacteria, fungi, etc.
3. Organisms which cause diseases are called pathogens. Virus, bacteria, fungi, protozoa and some worms are such disease causing organisms.
4. Disease causing bacteria enter the body through different means; through the skin, the nose, the mouth, etc.
5. Microorganisms like bacteria and fungi play an important role in maintaining soil fertility in agriculture. Saprophytic bacteria play an essential role in converting dead plants and animals into nitrates, nitrites and ammonia. Examples of bacteria that enrich the soil are nitrifying bacteria, ammonifying bacteria and nitrogen fixing bacteria. Bio fertilizers, are bacteria like Rhizobium, Azotobacter and other organisms like fungi, that enrich the nutrient content and quality of the soil.

VIII. Answer in detail:

1. A bacterium is a single-celled prokaryote. A rigid cell wall gives it shape and encloses nuclear material and cytoplasm. A thin cell membrane lies beneath the non-living cell wall. Since it is a prokaryotic cell, it lacks membrane binding organelles like mitochondria, golgi bodies, etc. Ribosomes are present and they carry out protein synthesis. A nucleus is absent.

The nuclear material is bacterial DNA, which is present in the cytoplasm, without any nuclear membrane. It is a single strand of circular DNA found in a region of the cytoplasm called the nucleoid. Some bacteria also contain extra rings of DNA called plasmids in the cytoplasm.

2. Microorganisms are used in the manufacture of medicines, antibiotics and vaccinations. Antibiotics are drugs or medicines which inhibit the growth of microorganisms. These chemicals are extracted from microorganisms like bacteria, fungi etc. Today antibiotics are used widely to treat all types of diseases. Vaccines are preparations of dead or weakened microbes. They help your body identify an infection and stimulate the body to use its natural defence system against it. The body produces its own antibodies to fight the microbes.

3. Organisms which cause diseases are called pathogens. Virus, bacteria, fungi, protozoa and some worms are such disease causing organisms. They cause diseases like cholera, pneumonia, swine flu and rat fever. Disease causing organisms must first enter the body in order to cause any infection.Bacteria causing tuberculosis, and viruses causing cold and influenza enter through the nose and reach the respiratory tract. Bacteria causing typhoid enter through the mouth and go to the gut. Some organisms directly go through the skin like the spores of the fungus which causes ringworm. Some microorganisms are carried by carriers or 'vectors'. For example, mosquito is a vector which carries the malarial parasite Plasmodium.

4. We improve the beneficial bacterial count in human beings by taking probiotics. Probiotics are live microorganisms very similar to the good bacteria that are found in the intestine. They are either taken as food supplements or are found naturally in foods like yogurt and fermented milk products. Eg. Lactobacillus acidophilus, Bifidobacterium bifidum and Bifidobacterium breve.

5. Probiotics are live microorganisms very similar to the good bacteria that are found in the intestine. They are either taken as food supplements or are found naturally in foods like yogurt and fermented milk products. Eg. Lactobacillus acidophilus, Bifidobacterium bifidum and Bifidobacterium breve. Because they improve the microbial spectrum in the gut they are useful in the treatment of various gastrointestinal disorders like irritable bowel syndrome, childhood constipation, etc. They also help to decrease the risk of colon cancer and decrease cholesterol absorption. Bifidobacterium bifidum has been found to be useful in treating stomach ulcers.

Chapter - 7 PLANT KINGDOM

I. Fill in the blanks:

1. taxis, nomos
2. Carolus Linnaeus
3. Bentham and Hooker
4. One
5. Phaeophyta
6. Red
7. Glycogen,oil
8. Pteridophytes
9. Bryophytes
10. Dicots

II. Choose the best answer:

1. b) Genus
2. c) Volvox
3. c) Rhodophyceae
4. b) Agaricus
5. c) Bryophytes
6. b) Pteridophytes
7. b) Pteridophytes
8. d) 1623
9. b) Fungi

III. Match the following:

1. Which of the following pairs are incorrect?

2) c, d

2. Find out the correct pairs
4) a, b, d

3. Which of the following characters are not suitable to angiosperms?
2) b, c

4. Which of the following sequences are correct:
1) a, b, c

5. Match column I with column II:
1) a-4, b-5, c-2, d-3, e-1

IV. State True or False. If false, correct the statement:

1. True	5. False	9. False
2. False	6. False	10. True
3. False	7. True	11. True
4. True	8. True	12. False

V. Answer very briefly:

1. A thallus is when the plant body is not well differentiated, i.e. it does not possess a well developed root, stem and leaves.

2. Carolus Linnaeus, introduced the system of Binomial nomenclature. Local names were substituted with scientific names. A two part name is used for each species. The first part of the name is the genus and the second part is the name of the particular species of the genus. Example - the name for tiger is *Panthera tigris*.

3. Plants with seeds having two cotyledons are known as dicotyledonous plants or dicots. Leaves have reticulate venation. They have a fibrous root system.The flowers are pentamerous, calyx and corolla well differentiated. Pollination is mostly by insects. Vascular bundles are in rings. (*any three of the above are correct*)

4. Seeds of gymnosperm plants are naked because the ovules are not enclosed in an ovary.

5. Two economic importances of fungi are as follows: mushrooms are widely cultivated and eaten as they are a rich source of protein and minerals. Penicillin is an antibiotic obtained from the fungus, *Penicillium notatum*. Cephalosporin, Neomycin, Erythromycin and Gentamycin are other antibiotics derived from fungi.

VI. Answer briefly:

1. In the Natural system of classification plants with many similar characteristics are grouped together. By simply listing out the different characteristics of a plant you will be able to identify the natural group to which it belongs. Natural similarities, differences and relationships are considered in this system that is used to classify plants in herbariums and botanical gardens.

   The Bentham and Hooker's classification, based on morphological and reproductive characters of seeded plants, is an example of this system.

2. Three economic importances of algae are:
   - Marine algae or sea weeds are a source of food and form the basis of the aquatic food chain.
   - Algae are also eaten by people in different parts of the world.
   - Algae release a good amount of oxygen through their food manufacturing activity.
   - Agar-agar is a gelatinous substance derived from red algae, Gelidium and Gracilaria.
   - The mineral iodine, essential for the normal functioning of the thyroid gland, is obtained from Laminaria, a brown algae and also from Gracilaria.
   - Algae, are grown in long term space flights, to recycle the CO_2 in the air, turning waste generated into fuel, etc.
   - Blue green algae (BGA) are grown in rice fields to fix atmospheric nitrogen.
   - Algae act as bio filters and are used to treat waste water.
   - Spirulina (*Arthrospira platensis*), a blue green algae is cultivated for its nutritional value. (*any three of the above are correct*)

3. The differences between algae and fungi are as follows:

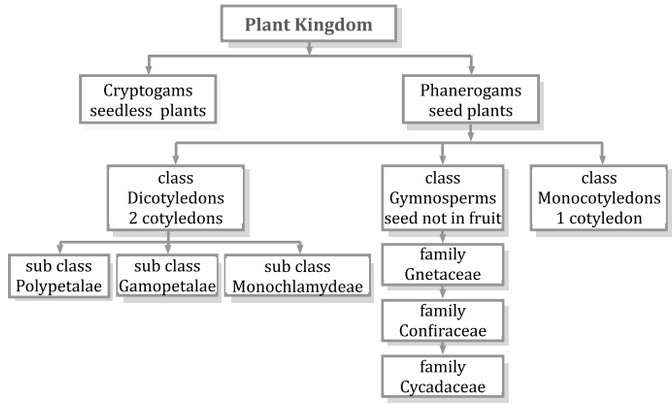
Fungi	Algae
Heterotrophic organisms	Autotrophic organisms
Belong to their own Kingdom Fungi	Belong to Kingdom Protista
Terrestrial	Mostly aquatic
Most are parasitic	Not parasitic
Don't contain any photosynthetic pigments	Contain chlorophyll for photosynthesis
Cell wall mainly of chitin	Cell wall mainly of cellulose
Reserve food stored as glycogen and oil globules	Reserve food stored as starch

4. Bryophytes are classified into three main types, Hepaticopsida, Anthoceropsida and Bryopsida.

5. The four characters of pteridophytes are as follows:
   The main plant body, the sporophyte, is differentiated into stem, roots and leaves. This is the dominant phase. They show alternation of generations; the sporophyte producing spores, which alternates with the gametophyte producing gametes. The gametophytic generation does not depend on the sporophytic generation. They have leaves known as 'fronds' (sporophylls). In certain plants theleaves can reach upto 6 metres in length.The lower surface of the leaves have sori(singular-sorus), which are like pockets, inside which sporangia are present. Sporophytes produce spores which may be homosporous or heterosporous. Leaves may be microphylls as in Selaginella, or macrophylls as in ferns. They have a special stem called a 'rhizome' which grows horizontally below the ground. (*any four of the above are correct*)

VII. Answer in detail:

1. The Bentham and Hookers system of classification is as follows:



2. The differences between monocot and dicot plants are as follows;

	Monocots	Dicots
Seeds	One cotyledon	Two cotyledons
Leaves	Parallel venation	Reticulate venation
Root system	Tap root system	Fibrous root system
Flowers	Trimerous, calyx and corolla not well differentiated	Pentamerous, calyx and corolla well differentiated
Pollination	Mostly by wind	Mostly by insects
Vascular bundles	Scattered	In rings

(*any five of the above are correct*)

3. The differences between Gymnosperms and Angiosperms are as follows:

   Angiosperms can be herbs, shrubs, trees,climbers, creepers, etc. They have well developed root and shoot systems with conducting tissues (xylem and phloem). Xylem conducts water and minerals, and phloem translocates the prepared food from leaves to the other parts of the plant. They show secondary growth due to the presence of cambium tissue. Seeds are enclosed inside the fruit. The ovules develop into seeds and the ovary into the fruit. Plant embryos inside the seeds have cotyledons.

Gymnosperms are evergreen and woody, like pine and fir. The plant body is well differentiated into stem, roots and leaves. They have a well developed tap root system.They are heterosporous, i.e. they produce different male and female spores. They bear male and female cones, which are reproductive structures.

Gymnosperms have sporophytic and gametophytic phases in their life cycle.

Trees from this group undergo secondary thickening.

4. The economic importance of gymnosperms is as follows:
   - Soft wood comes from pine, fir, cedar,etc., which is used in construction and for making planks, packing cases, match sticks and wood pulp for the paper industry.
   - Turpentine oil and resin are extracted from Chir pine.
   - Thuja, Cycas and Araucaria are grown as ornamental plants.
   - Ephedra is used in treating bronchitis and asthma.
   - Resins obtained from gymnosperms are used in varnishes, enamels and medicines. Some inferior grade resins are used in printing ink, insecticides, adhesives, shoe polish, etc.
   - 'Sago' is obtained from some species of Cycas.
   - Thuja oil obtained from the leaves is used in room sprays, insecticides and disinfectants.
5. The leaves of Aloe vera are used in the treatment of burns, skin diseases, inflammatory skin conditions, gum disease, piles and peptic ulcers.
   - Basil leaves are used to treat cold, cough, skin diseases.
   - Neem (Vembu) leaves are used as an antiseptic, to destroy worms and to prevent skin diseases.
   - Turmeric (Manjal) an underground stem is said to prevent cancer, and used as a cosmetic and an antiseptic.
   - Acalypha indica (kuppameini)leaves with lemon juice cures ringworm.
   - Aegle marmelos – Indian Bael is used to treat indigestion, fever, diarrhoea, body pain.
   - Amla (Nelli) fruit is a rich source of Vitamin C, cures mouth ulcers.
   - Solanum trilobatum (Thoodhuvalai) the leaf and fruit are used in the treatment of coughs, colds, asthma, bronchitis.
   - Ginger (Inji) used in treatment of digestive disorders.
   - Cinchona Bark cures malaria.
   - Phyllanthus amarus Carry Me Seed (Keezhanelli) leaves used to treat jaundice and other liver diseases.
   - Climbing Brinjal (Thuthuvalai) leaves are used to cure cold and cough.
   - Eucalyptus leaves are used to cure cold and sinus problems.
   - Poppy seeds are used as pain killers.
   - Pepper seeds are used to treat coughs and throat infection.

VIII. Assertion and Reason:

1. a) Both A and R are true, R explains A
2. c) A is correct R is incorrect
3. c) A is true, R explains A
4. c) A and R correct R explain A
5. b) Both A and R are true, R doesn't explain A

Chapter - 8 ORGANISATION OF LIFE

I. Fill in the blanks:

1. Cell
2. Ostrich
3. Yeast
4. Optic
5. Micron

II. Choose the best answer:

1. a) Sclera
2. a) Homeostasis
3. a) Lactic acid

4 b) Stem

5. c) Breathing

6. a) Higher concentration to a region of lower concentration

7. a) Hypotonic

8. d) 1623

9. b) Fungi

III. Arrange the following words in correct sequence:

Cell, Tissues, Organ Organ system, Organism

IV. Match the following:

1. Match the following examples for catabolism.

   a. Carbohydrates- glucose

   b. Glucose - CO_2, water and heat

   c. Protein - amino acid

2. Match the following examples for anabolism:

   a. Glucose -glycogen and other sugars

   b. Amino acids - enzymes, hormone, protein

   c. Fatty acids - cholesterol and other steroids

V. State True or False. If false, correct the statement:

1. False - In hypotonic condition, concentration of the external solution is lower than the internal solution of the organism.

2. False - Diffusion is the movement of particles from an area of higher concentration to Lower concentration.

3. True 4. True

5. False - Vitreous humour plays an important role in maintaining the shape of the eye.

VI. Answer briefly:

1. The foetus is made up of a multitude of cells, each with a different size, shape, and content. These cells within the foetus gradually undergo a change in structure and function. This is termed cell differentiation.

2. Animal tissues can be broadly classified into four types based on their function. They are:

   - Epithelial tissue
   - Muscular tissue
   - Connective tissue
   - Nervous tissue

3. The bronchioles that enter the lungs finally end in bunches of tiny air sacs called alveoli. These alveoli are large in number and are closed, thin-walled and richly supplied with blood capillaries. The thin walls of the alveoli allow the exchange of gases to take place through them.

4. Breathing, consisting of inspiration and expiration, are the processes by which air enters and comes out of our lungs.

5. Osmoconformers are organisms that try to maintain the osmolality of their body to match with their surroundings. Most invertebrates and marine organisms are osmoconformers. Osmoregulators are organisms that maintain their internal osmolality, which could be extremely different from that of the surrounding environment through physiological processes.

6. Metabolism refers to all the chemical reactions that occur in living organisms. Metabolism involves utilization or release of energy. Metabolism is usually divided into two categories – anabolism and catabolism.

VII. Answer briefly:

1. Organims in which no true nucleus is seen are called prokaryotic. Ex: Bacteria.

2. Organisms in which true nucleus is seen (presence of nuclear membrane) are called eukaryotic. Ex. Higher plants.

3. **Aerobic:**

   - Aerobic respiration takes place in the presence of oxygen.
   - The end products of aerobic respiration are carbon dioxide and water.
   - Common in all higher plants and animals.

   Anaerobic:

   - Anaerobic respiration takes place in the absence of oxygen.
   - The end products of anaerobic respiration are CO_2 and ethanol or lactic acid.
   - Common in certain microorganisms and human muscle cell.

4. The epithelial tissue is a tissue which acts as a covering and protects the underlying tissues. It is classified into the following types.

   i. Squamous epithelium

   ii. Cuboidal epithelium

   iii. Columnar epithelium

   iv. Ciliated epithelium

   v. Glandular epithelium

5. The human eye can be compared to a camera as both functions by gathering, focusing and transmitting the light through the lens for creating an image of an object.

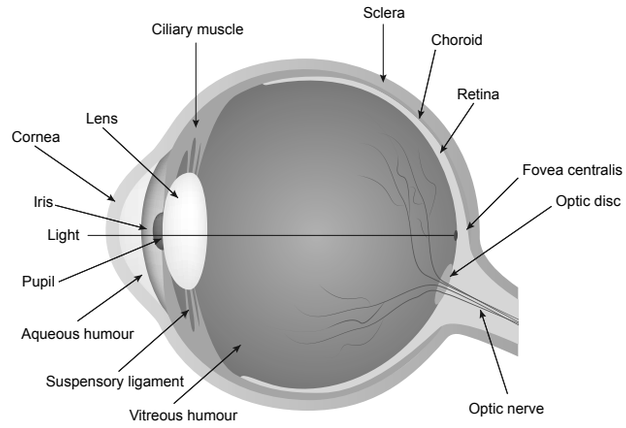
   - The iris of the eye controls the size of the pupil depending on the amount of light entering it.
   - The pupil is like the eyehole of a camera which allows light to come in.
   - **Lens:** It is a transparent, biconvex and an adjustable part of an eye, made the retina, therefore creating images on it.
   - The retina consists of photoreceptors and converts light rays into impulses to be sent to the brain. It is light sensitive.
   - The retina is compared to the film in a camera.

6. Homeostasis is a property of a human biological system where the self-regulating process tends to maintain the balance for the survical.

   - Behavioural and physiological responses are two important regulating mechanisms that maintain the stability of homeostasis.
   - All the processes of integration and co-ordination of function are mediated by nervous and hormonal system. The liver, kidneys and brain (hypothalamus), autonomic nervous system and the endocrine system help to maintain homestasis.

VIII. Answer in detail:

1. V.S of human eye.



2. Osmosis is the movement of solvent molecules from a region of higher concentration of solvent molecules to a region of lower concentration of solvent molecules across a semi permeable membrane. Water moves in and out of cells across the cell membrane which is semi permeable due to osmosis. Example-When human cells like red blood cells are placed in a concentrated solution, they lose water and shrink and when they are placed in a dilute solution they gain water and can even burst. In normal water they remain the same.

3. Oxygen is taken in by the respiratory system from the air and is carried to different parts of the body by blood. The process of taking in air is called inhalation or inspiration. Oxygen, which is taken in during respiration, is used to break the digested food to produce energy. Carbon dioxide, which is produced during this process, is eliminated out of the body. Giving out air that is rich in carbon dioxide is called exhalation or expiration.

4. Metabolism refers to all the chemical reactions that occur in living organisms.

   Metabolism involves utilization or release of energy. Metabolism is usually divided into two categories – anabolism and catabolism. Anabolism is a constructive metabolic process, which is used to synthesize complex molecules from simpler components. Plants can construct complex substances like glucose from simple molecules like carbon dioxide and water. Growth and increase in muscle mass are examples of anabolism.

   Catabolism is a process of breaking down of things. Here, complex molecules are broken

down into smaller units with the release of energy. Catabolism provides energy for various activities in our body. The food that we eat is broken down into simpler substances with the release of energy, which is a catabolic process. Some other examples are the breaking down of fats into fatty acids and glycerol.

5. Breathing involves both inspiration (inhalation) and expiration (exhalation). During inspiration the diaphragm goes down, and the ribs move forward and expand. These two changes increase the volume of the chest cavity, which reduces the pressure inside the lungs and air rushes in. When we breathe out, the diaphragm moves up to its original position thereby, the ribs move down, decreasing the volume of the chest cavity. Due to this, the pressure inside the lungs increases and air is pushed out of the lungs through the trachea and nostrils of the nasal cavity.

6. **Read the given paragraph about human eye carefully and correct the mistakes.**

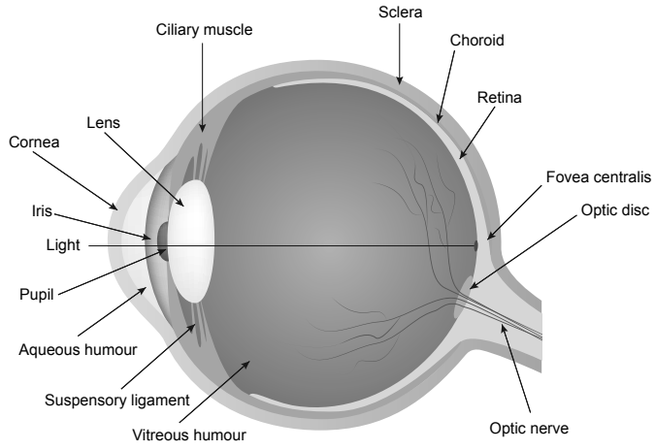
   Our eye is spherical shaped. The wall of the eyeball is composed of three layers. The outermost layer is sclera. The innermost layer is called retina. The eyeball consists of fibrous tissue and a biconvex lens. The pupil is a small opening at the centre of the iris. Retina has rod and cone shaped cells. Aqueous humour is present between cornea and lens.

   The vitreous humour is present between lens and retina. The retina changes the light into nerve impulses and sends them to the brain.

IX. Consider the statements labelled as Assertion and Reason and choose the correct option:

1. c) A is true, R is false
2. a) Both A and R are true, R explains A

X. Label the given diagram:



Class: 8 KEY ANSWERS TERM : I

HISTORY

Chapter – 1 ADVENT OF THE EUROPEANS

I. Choose the correct answer:

1. c. Alfonso de Albuerque
2. b. Portugal
3. b. The Turks
4. c. England
5. b. Fort. ST. George
6. c. The Danish
7. d. The Danish

II. Fill in the blanks:

1. New Delhi
2. King John II
3. Portuguese
4. Jehangir
5. Colbert
6. King Christian IV

III. Match the following:

1. The Dutch – 1600
2. The British – 1602
3. The Danish – 1616
4. The French – 1664

IV. Answer the following in one or two sentences:

1. This is the place where historical documents are preserved. It is located in New Delhi. It is the chief storehouse of the records of the government of India. The Tamil Nadu Archives building is located diagonally opposite to Chennai Egmore railway station.
2. The important factories in India by the Dutch were at Pulicat, Surat, Chinsura, Kasim bazaar, Patna, Nagapatnam.
3. Surat, Agra, Broach and Ahmedabad.

V. Answer the following in detail:

1. From the very beginning, the Portuguese, the Dutch, the French, the Danes and the English recorded their official transactions in India on state papers. The archives at Lisbon, Goa, Pondicherry and Madras were store houses of historical informations.

Kinds of Sources:

Written sources and Material sources are different kinds of sources.

Written sources: After the advent of the printing press, numerous books were published in different languages.The Europeans came to know about the Wealth of India from this. Written sources are maintained in the Archives.

National Archive is at New Delhi and Tamilnadu Archive is at Chennai.

Material sources:

Coins are a good source to know about administration of India. The first coinage in modern India under the crown was issued in 1862. Edward VII ascended after Queen Victoria and the coins issued by him bore his model. The Reserve Bank of India was formally set up in 1935 and was empowered to issue Government of India notes.

2. The European invasion of India began in the 15th century with Vasco Da Gama's discovery of India through the Cape of Good Hope. He reached ashore Calicut, India on May 20, 1498 and was welcomed by the King Zamorin. Cochin was made the first capital of the Portuguese East India Company.

   Nino da Cunha (1529-38) established factories at San thome (Madras) and Hughli (Bengal). In 1534 AD, he captured Diu and Bassein from the Sultan of Gujarat, Bahadur Shah and enjoyed good trade benefits.

   The Portuguese brought the cultivation of tobacco to India. Due to the influence of the

Portuguese, Catholic religion spread in certain regions on India's western and eastern coasts.

3.
- In 1608, Captain Hawkins visited Mughal Emperor Jehangir to attain certain benefits for the English East India Company. He was permitted to raise a settlement in Surat.
- In 1612, Captain Thomas Best defeated the Portuguese near Surat and the British were permitted to develop a factory in 1613.
- Captain Nicholas Downton achieved another momentous victory against the Portuguese in 1614, elevating British status in the Mughal court.
- King James I of England sent Sir Thomas Roe to sign a commercial treaty with the Mughals establishing centers of trade at Agra, Ahmedabad, Surat and Broach.
- Thus, the British establish their trading centres in India.

VII. Higher Order Thinking Skills:

1. The Fall of Constantinople also contributed European trade links with Asia which lead many to seek routes east by sea and ignite the Age of Exploration.

   The turks become powerful.

   Turks established their territories in East and West.

Chapter – 2 FROM TRADE TO TERRITORY

I. Choose the correct answer:

1. Siraj-ud-daulah
2. 1757
3. Treaty of Allahabad
4. Second
5. 1761
6. Tippu Sultan and French
7. Lord Cornwallis
8. Sambhaji Bhonsle
9. Baji Rao II
10. Hyderabad

II. Fill in the blanks:

1. 1757
2. Mir-Jafar
3. Dupleix's Ambition
4. Lord Dalhousie
5. Lord Cornwallis
6. Hyder Ali
7. Lord Wellesley

III. Which one of the following is correctly matched?

1. Battle of Adyar – 1748

IV. Answer the following in one or two sentences:

1. Siraj-ud-daulah marched with 30,000 soldiers and captured Calcutta in June 1756. 146 British prisoners were held captive in a small room at the Fort, many of whom died of suffocation. This is called as 'Black hole tragedy'.
2. In the treaty of Alinagar, the Siraj-ud-daulah admit all his claims to the British.

   The British captured Chandranagore, the French settlement on March 1757.

   This was the first major victory of the Company in India.
3. In 1760, the British replaced Mir Jafar with Mir Qasim as the new Nawab of Bengal. Mir Qasim tried to establish his control over Bengal. A conflict arose between British and him. He formed alliance between Nawab of Oudh. This is the main cause of Battle of Buxar.
4. In 1761, Haider Ali seized control of Mysore and made it a powerful state. The growing power of Mysore and its friendship with French was a threat to the English trade in the Malabar Coast. This led to Anglo Mysore wars.
5. The English under Lord Hastings defeated Marathas. Peshwa was dethroned and pensioned off, their territories annexed by the British. The Maratha Empire came to an end.

6. Hyderabad, Mysore, Tanjore, Gwalior, Oudh, Indore, Jaipur, Udiapur Bhosle and Scindia are the states annexed by Subsidiary alliance.

V. Answer the following in detail:

1. Second Carnatic War:
   The Second Carnatic War was the result of Dupleix's ambition and the battle of succession in Hyderabad and Carnatic.

   After the death of the Nizam of Hyderabad in 1748, a civil war of succession broke out between his son Nasir Jung and his grandson Muzaffar Jung.

   Similarly in Carnatic there was a conflict between Anwaruddin and Chanda Sahib. Dupleix pledged his support to Muzaffar Jung for Hyderabad and Chanda Sahib for Arcot. Naturally, Nasir Jung and Anwaruddin and his son Mohammad Ali turned to the English for assistance.

   The French troops succeeded in killing Anwaruddin and Nasir Jung and placed Chanda Sahib as Nawab of Arcot and Muzaffar Jung as Nizam of Hyderabad in the Battle of Ambur (1749). The French received Northern Circas.

   Robert Clive from British defeated Chanda Shahib and besieged Arcot. Mohammed Ali was made as the Nawab of Arcot. This war ended with the Treaty of Pondicherry was signed(1754).

2. Tipu's resistance to Lord Wellesley's Subsidiary Alliance and his secret alliance with the French angered the English and resulted in a battle at Srirangapatnam in which Tipu was defeated and was killed defending his city.

   The British seized a major part of Tipu's territories and restored the rest of the Mysore state to the Wodeyar dynasty who joined the Subsidiary Alliance.

   Thus one more 'rebellious' state was brought under the folds of the British Empire. The French assistance to Tipu Sultan in 1798 was the last instance of active intervention of any other European power in India.

3. Policy developed by the English for further annexation of territories was Doctrine of Lapse. It was developed by Lord Dalhousie, Governor-General of India from 1848 to 1856. According to the doctrine, if an Indian ruler died without a male heir then his kingdom would become a part of the Company's territory.

   By this policy Satara was annexed in 1848, Sambalpur in 1850, Udaipur in 1852, Nagpur in 1853, Jhansi in 1854 and Awadh in 1856.

4. In 1798, Lord Wellesley introduced the system of Subsidiary Alliance. It was a treaty between the Company and the Indian rulers. The native rulers would pay a subsidy to the Company for which the Company would provide garrison troops. The Indian ruler would also have a permanent English official as resident in his court. Hyderabad followed by Awadh were the first to sign the treaty.

VI. Higher Order Thinking Skills:

1. Their alliance with the Nawabs and Nizams.

   Annexation of states by the Doctrine of Lapse and Subsidiary Alliance.

   British Administration like introducing Civil and Police System.

   Leaders like Dalhousie, Wellesley, Munro and Robert Clive. These are the causes for the success of British in India.

Chapter – 3 RURAL LIFE AND SOCIETY IN BRITISH INDIA

I. Choose the correct answer:

1. Zamindari
2. Lord Hastings
3. Village
4. Punjab
5. Lord William Bentinck
6. Bengal
7. Digambara Biswas and Bishnu Biswas
8. Sardar Vallabai Patel

II. Match the following:

1. Permanent Settlement – Bengal
2. Mahalwari Settlement – North west province
3. Ryotwari System – Madras
4. Nil Darban – Misery of the Indigo cultivators
5. Santhal Rebellion – First Peasant revolt

III. Fill in the blanks:

1. Permanent Settlement
2. William Bentinck
3. 1859
4. Malabar
5. 1916

IV. Consider the following statements and tick (✓) the appropriate answer:

1. c. This system secured a fixed a stable income for the cultivators.
2. b. Dinabandhu Mitra wrote a drama called Nil Darban.

V. Answer the following in one or two sentences:

1. Salient features of Permanent Settlement:
   - This system recognised the Zamindars as the land owners if the revenue was paid to the Company and held them accountable to collect the revenue from the cultivators.
   - The Zamindars were to give 10/11th of their revenue from the cultivators to the British.
2. Salient features of Ryotwari System:
   - The government set the demand at 45% – 55% of the produce.
   - Measurement of the field was done along with an estimate of produce.
3. Effects of the Mahalwari System:
   - This system exploited the peasants with several benefits to the upper class.
   - The Lambardars exploited the privileges they were given.
4. **Cause of Indigo Revolt***:*
   The ryots of Nadia district gave up indigo cultivation in September 1859. Factories were burnt down and this was the main cause of this revolt led by Digambar Biswas and Bishnu charan Biswas.
5. The Champaran Satyagraha of 1916 was the first Satyagraha movement inspired by Gandhi and a major revolt in the Indian Independence Movement.

   When Gandhi returned to India from South Africa in 1915, and saw peasants in Northern India oppressed by indigo planters, he organised mass uprisings by people to protest against injustices.
6. In 1928, the peasants of Bardoli (Gujarat) started their agitation under the leadership of Sardar Vallabhbhai Patel, in protest against the government's proposal to increase land revenue by 30 percent.

VI. Answer the following in detail:

1. **Merits of the Permanent Settlement:**
   - The wastelands and forest areas were used for cultivation under this system, which provided the British with a fixed and stable income.
   - Zamindars were given ownership of the land and were relieved from their judicial duties.

Demerits of the Permanent Settlement:

- The British had no communication with the cultivators who were left at the mercy of the Zamindars.

This exploitation and effortless revenue made the Zamindars lethargic and live lavishly.

- The system paved the way for severe conflict between the peasants and the Zamindars

Sufferings of Indian Farmers

- It benefited only the landlords and the condition of the farmers could not be improved as much as was expected.

The poor farmers continued to be the victims of the harassment of the landlords who exploited them for their own selfish motives.

- The settlement also proved harmful for the landlords who failed to deposit the required revenue in the royal treasury in time. As a result, their land was sold off.

2. Impact of Land Revenue on the Cultivators:

- The need to increase profit led to dispossession and the sale of the lands of several native cultivators.

Peasants started borrowing money from the lenders to pay the huge tax by selling their land.

- The Zamindars and lawyers also exploited the poor peasants
- The village economies were made fragile and unstable
- Cotton industries disappeared due to imported British goods. The peasants could not compete.
- New laws, courts, and fees were established
- The systems were created with the sole intention of benefiting the British rule by the exploitation and manipulation of the peasants.

3. Moplah Rebellion:

- The Muslim Moplah (or Moplah) peasants of Malabar (Kerala) were suppressed and exploited by the Hindu zamindars (Jenmis) and British government. This is the main cause for the Revolt.
- The Malabar District Conference held in April 1920 supported the tenats cause and demanded legislation for regulating landlord-tenant relations.
- In August 1921, the Moplah tenants rebelled against the oppressive zamindars.
- In the initial phase of the rebellion, the Moplah peasants attacked the police stations, public offices, communications and houses of oppressive landlords and moneylenders.
- By December 1921, the government ruthlessly suppressed the Moplah rebellion. According to an official estimate, as a result of government intervention, 2337 Moplah rebels were killed, 1650 wounded and more than 45,000 captured as prisoners.

VII. Higher Order Thinking Skills:

British exploitation:

Other than the huge tax in the following ways British exploited the Peasants:

1. British started importing the Cotton, the Peasants could not compete with it.
2. The old agriculture system was spoilt.
3. Peasants were often evicted from land on the pre-text of non-payment of the land.

Chapter – 4 PEOPLE'S REVOLT

I. Choose the correct answer:

1. 1529
2. Pulitevan
3. Ramanathapuram
4. Panchalamkurichi
5. Sivagangai
6. Marudhu Pandiyars
7. Odanilai
8. Central India

II. Fill in the blanks:

1. Kattabomman
2. Ariyanatha Mudaliyar
3. Andhra
4. Velu Nachiyar
5. Chinna Marudhu
6. V. D. Savarkar

III. Match the following:

1. Delhi – Bahadur Shah II
2. Kanpur – Nana Sahib
3. Jhansi – Lakshmi Bai
4. Bareilly – Khan Bahadur Khan
5. Bihar – Kunwar Singh

IV. State True or False:

1. True
2. False
3. True
4. False

V. Consider the following statements and tick (✓) the appropriate answer:

1. d. i, ii and iv are correct

VI. a. Find out the wrong pair:

1. Marudhu Pandiyar – Ettayapuram

b. Find out odd one:

Tippu Sultan

VII. Answer the following in one or two sentences:

1. Palayakkarars are the head of the Palayams. Some of the palayakkarars are Pulithevar, VeluNachiyar, Virapandya Kattabomman, Marudhu brothers.
2. She fought the British face to face and became the first queen in India to fight against the British.She exploded entire British garrison. She has such desire for freedom. The freedom today we are enjoying now is a result of those sacrifices.
3. Marudhu Pandiyars were the leaders of Palayakkarar confederacy in the south Indian rebellion.
4. Tiruchirapalli Proclamation was the first call to unite the Indians against the British.

VIII. Answer the following in detail.

1. Pulithevar:

- He was one of the Palayakkar who fought against British.
- He controlled the Palayam at Nerkattumseval.
- Pulithevar was born in a martial clan and rejected the supremacy of the Nawab Mohammed Ali and the British and refused to pay taxes.
- He defeated the British.Due to this victory, Pulithevar tried to rally the Polygars against the Nawab and the British.
- However, sensing trouble the Nawab of Arcot launched a second attack against him in 1759 under the leadership of Yusuf Khan.
- Pulithevar lost the war and the Narkattumseval fort was captured in 1761. Refusing to accept defeat, he recaptured his fort in 3 years only to be defeated by Captain Campbell in 1767.
- Pulithevar however escaped and died in exile. His resistance was the first set of a series of rebellions against the british by the Polygars.

2. Conflict between Dheeran chinnamalai and the British:

- Dheeran Chinnamalai could not bear the sufferings of the farmers, recovered taxes from the Diwan and redistributed to the farmers.
- Dheeran fought with Tipu in all the four Anglo-Mysore wars and was responsible for the victory of first three wars.
- After the fall of Tipu, Kongunadu technically came under the British who demanded taxes, which Dheeran prompty refused.
- Infuriated by his refusal, the British waged two wars against him.
- Though he escaped during the war, british had heavy causalities .
- Dheeran Chinnamalai was probably one of the few rebels who constantly had victories against the British.

3. Causes for the 1857 Revolt:

The issue of greased cartridges and military

grievances has been over-emphasised, as the factor for the Revolt of 1857.

1. Social and Religious Causes:
   The British had abandoned its policy of noninterference in the socio-religious life of the Indians.

   Christian missionaries were allowed to enter India.

   The Religious Disabilities Act of 1850 modified the traditional Hindu law.

2. Economic Causes:
   British rule led to breakdown of the village self-sufficiency, commercialisation of agriculture that burdened the peasantry, adoption of free trade imperialism from 1800, de-industrialisation and drain of wealth.

3. Military Grievances:
   The extension of British dominion in India had adversely affected the service condition of the Sepoys.

   They were required to serve in areas away from their homes without the payment of extra bhatta.

   The General Service Enlistment Act, 1856, which made it compulsory for the sepoys to cross the seas, whenever required.

   The Post Office Act of 1854 withdrew the free postage facility for them.

4. Political Causes:
   The last major extension of the British Indian territory took place during the time of Dalhousie.

   Dalhousie wanted to apply the Doctrine of Lapse to Karauli (Rajputana).

4. Causes for the failure:

1. Some of the local rulers like Scindia of Gwalior, the Holkar of Indore, the Nizam of Hyderabad, the Raja of Jodhpur, the Nawab of Bhopal, the rulers of Patiala, Sindh and Kashmir and the Rana of Nepal provided active support to the British.
2. The military equipment of the rebels was inferior and they lacked efficient leadership.
3. The modern intelligent Indians also didn't support the cause.

IX. Higher Order Thinking Skills:

There were several causes like Social-religious cause, Economic cause, Military grievance and political causes for the revolt.

Different leaders fought for the different reasons in different regions.

For example,
Mangal Pandey, a young Sepoy from the Bengal Regiment, refused to use the greased cartridge. Lakshmibai was given a pension and told to leave the palace and fort. So she Joined the 1857 revolt in Meerut.

GEOGRAPHY

Chapter – 1 ROCKS AND SOILS

I. Choose the correct answer:

1. lithosphere
2. 5th December
3. Sedimentary rocks
4. Partially weathered rock
5. Black soil
6. Minerals
7. Alluvial soil

II. Fill in the blanks

1. Petrology
2. Black soil
3. Crust
4. White Marble
5. Igneous rock

III. Match the following:

1. A. a - 2, b - 1, c - 4, d – 3
2. A. a - 2, b - 4, c - 1, d - 3

IV. Choose the incorrect statement from the following:

1. c) Sedimentary rocks are the hardest ones.
2. c) Soil is a renewable resource.

V. Consider the following statements and choose the right option from the given ones:

1. a) 1 and 2 are correct and 2 explains 1.

VI. Give reasons for the following

1. Sedimentary rocks are carried by agents like river. Chemical sedimentary rocks are formed after the evaporation the minerals are left on the river bed.
2. The word 'ignis' means fire. Igneous rocks are formed by the cooling of magma from the Volcano. Hence, they are found in the region of Volcanoes.

VII. Distinguish the following:

1.

Sedimentary rocks	Metamorphic rocks
Sedimentary rocks are derived from igneous or metamorphic rocks. Existing rocks are broken down to finer particles by the process of weathering and gradation.	When any igneous or sedimentary rocks undergo a change physically or chemically or both due to great temperature and pressure.
Eg. Sand stone	Eg. Granite

2.

Soil conservation	Soil erosion
It is the protection of soil by taking appropriate measures while using it for various purposes like agriculture.	It is the process of removal of top soil particularly in the absence of plant cover and under heavy rainfall conditions.

VIII. Answer the following in detail:

1. The first formed rocks or primary rocks were cooled from the hot magma inside the earth. This magma was so hot that it was like fire. The word 'ignis' means fire. The rocks directly cooled from Magma are called igneous rocks. They are also called as parent rocks.
2. Composition of the soil:
   It is made up of the following:
   - Broken down rock grains
   - Major and minor minerals like NPK (nitrogen, phosphorous and potassium respectively and others like calcium, magnesium, etc.)
   - Atmospheric gases and water in the pore spaces.
   - Bacteria and other living things like earthworms and snails that help in recycling the soil nutrients.
   - Dead and decaying matter called humus found on the top soil.
3. Rocks are the hard substance that make up the outer crust of the earth. 'Lithos' means rock. The outer crust of the earth is made of hard substances called rocks, hence its name 'lithosphere'.
4. Alluvial soil, black soil, red soil, laterite soil and Desert soil are the few types of soils.

IX. Answer for the following in detail:

1. Soil formation:

Soils is the loose, weathered rock material that is found on the surface of the crust and therefore called the 'skin of the earth'. It is called the 'regolith'. It is very essential for plant growth and therefore provides food for all other living creatures. The minerals in the soil are derived from the parent rock. If the rock has been exposed to the elements of weather for a long time, the finer the soil grains. If the rocks are hard and resistant, it takes a longer time to form soil. The climate of a place determines the soil. Heat (temperature) extremes, humidity and rainfall (or snowfall) determine the rate at which weathering takes place. Roots of plants can break rocks and aid in weathering to take place faster. Bacteria break down the minerals and also help in faster chemical breakdown. All these together are called factors of soil

formation. Thus, we have nature of parent rock, climate of a place, the time and biological factors that determine soil formation.

2. Types of rocks:

Rocks are formed in different ways and we identify three main types based on formation: 1. Igneous 2. Sedimentary 3. Metamorphic

Igneous rocks*:*

The first formed rocks or primary rocks were cooled from the hot magma inside the earth. The rocks are called igneous rocks or parent rocks. (Ignis means fire)

They were formed as the earth was cooling 3.5 billion years ago.

Types of igneous rocks are intrusive, extrusive, Volcanic, Hypabassal and plutonic rocks.
Eg. Granite, gabbro, Basalt

Sedimentary rocks*:*

Sedimentary rocks are derived from igneous or metamorphic rocks. Existing rocks are broken down to finer particles by the process of weathering and gradation. The sedimentary rocks reveal the history of the earth and the evolution of life forms through millions of years.
Examples are Conglomerate, Sandstone and Shale.

Metamorphic*:*

When any igneous or sedimentary rocks undergo a change physically or chemically or both due to great temperature and pressure changes, the resultant rock formation is called a metamorphic rock. Meta means 'change' and morph means 'form', therefore metamorphis in change in form completely.
Eg., soapstone, gneiss

3. Different layers of soil*:*

The layering of soil is known as Soil profile.

The layers of soil are called 'horizons' and are denoted by the alphabets O, A, B, C and R.

O - Organic surface layer also called humus. Upper part of the soil formed by plant residues.

A - Surface soil: Layer of mineral soil with most organic matter accumulation and soil life. Clay minerals, iron, aluminium, organic compounds, and other constituents are soluble and move downwards by eluviation.

B - Subsoil: This layer has normally less organic matter than the A horizon, so its colour is determined by iron oxides. The process of accumulation of clay minerals, iron, aluminium and organic compounds is referred to as illuviation.

C - Substratum: Layer of non-indurated poorly weathered or unweathered rocks. This layer may accumulate the more soluble compounds like $CaCO_3$.

R - Bedrock: R horizons denote the layer of partially weathered or unweathered bed rock at the base of the soil profile.

4. In India, we have the following broad classification of soil:

i. Alluvial soil- River deposited found along the Northern Plains and the river valleys of south India; is composed of silt transported and deposited by rivers; is the most fertile soil.

Crops grown- rice, wheat, sugarcane, jute and cotton.

ii. Black soil or regur – is the soil that is formed on the lava sheets of north western Deccan; is clayey and also very fertile; good for cotton and so also called black cotton soil.

iii. Red soil – found on the eastern part of Deccan on ancient crystalline rocks; long years of weathering has resulted in presence of iron oxide that gives it the red colour; not very fertile but does well with manure and irrigation; is good as garden soil.

iv. Laterite soil – found on the mountains and plateau tops of south and eastern India; is the result of alternate wet and dry climate where excessive rainfall has leached away the nutrients; blocks of hardened laterite make good construction material in Kerala.

v. Desert soil – found in the deserts of north-western India; they are wind blown loess deposits; are very fine in texture; irrigation has helped raise different crops even in the desert.

Chapter – 2 WEATHER AND CLIMATE

I. Choose the correct answer:

1. 78% and 21%
2. Climate
3. heat
4. Isohytes
5. Hygrometer

II. Fill in the blanks:

1. Temperature
2. Meteorology
3. 56.7°C
4. Relative humiditiy
5. Direction of the wind and Speed of the wind
6. Isotherms

III. Match the following:

1. Climate - Long term changes
2. Isonif - Equal Snowfall
3. Hygrometer - Humidity
4. Radar - Locating and Tracking Storms
5. Low Pressure - Cyclone

IV. Answer the following in one or two sentences:

1. The heat received as solar radiation comes to us as 'insolation'. Insolation denotes incoming solar radiation.
2. Trade Winds, Westerlies and Polar Easterlies in both hemispheres are called planetary winds or permanent winds or prevailing winds. They blow in the same direction throughout the year.
3. Isolines:
   Isolines are the lines on a map joining the places which have same temperature/ pressure/rainfall/sunshine etc.
   Eg Isobars - Lines joining the places having same pressure.

V. Distinguish between the following:

1.

Weather	Climate
The atmospheric conditions at a given time and place are called the weather. These change over a period of time.	Climate is the average state of the weather of a place or a region. The average of atmospheric conditions are calculated by measuring the weather elements for a long period of time.

2.

Absolute humidity	Relative humidity
The weight of the water vapour in the air.	This is given as a percentage in relation to the water holding capacity of the air at every given temperature.
As temperature and water holding capacity of the air are related, the absolute humidity is not a useful measure.	The most common measure.

3.

Permanent winds	Seasonal winds
Trade Winds, Westerlies and Polar Easterlies in both hemispheres are called planetary winds or permanent winds or prevailing winds.	Seasonal winds blow from one direction in some months and from another direction in a few other months.
They blow in the same direction throughout the year.	Monsoons are a classic example

VI. Give reasons for the following:

1. The weather and climate in different regions vary because both are depend on the conditions like temperature, pressure, humidity, winds, oceanic conditions, cloud cover, upper atmospheric condition of the particular region.

2. The atmosphere gets heated by the earth or terrestrial radiation rather than directly by insolation. Higher the altitude, lesser the terrestrial radiation.
   Eg. Shimla (at higher elevation) is cooler than the Delhi (at plains).

3. Atmospheric Pressure (which determines the amount of oxygen) decreases as we go higher in the atmosphere. So, Mountain climbers carry oxygen cylinders while ascending peaks.

VII. Answer the following in detail:

1. • Temperature is measured with a maximum-minimum thermometer.
   • It is placed in a weather station and the readings are taken down every six hours in a day and noted.
   • Temperature may be measured in degrees Celsius or degrees Fahrenheit.
   • In India, we use the Celsius measure.
   • Highest temperature recorded so far is 56.7°C.
   • Lowest temperature recorded so far is -89.2°C.
   • Isotherms are lines on a map joining places having the same temperature.

2. Wind is air in motion. We cannot see air but we can feel it.

   Winds blow horizontally.

   Breeze - slow moving wind.

   Gust - Fast moving wind.

   The Wind systems are broadly classified into three as:
   1. Planetary winds
   2. Seasonal winds
   3. Local winds

   Planetary winds:
   Trade Winds, Westerlies and Polar Easterlies in both hemispheres are called planetary winds or permanent winds or prevailing winds. They blow in the same direction throughout the year. They blow in the same direction throughout the year.

   Seasonal winds:
   Seasonal winds blow from one direction in some months and from another direction in a few other months. Monsoons are a classic example.

   Local winds:
   Local winds blow over smaller areas due to localised pressure differences. Land and sea breeze, mountain and valley winds are good examples.

3.

Weather elements	Measuring Device
Temperature	Thermometer
Pressure	Barometer (aneroid and mercury barometer)
Humidity	Hygrometer
Winds	Anemometer

VIII. Give any three suggestions to reduce global warming.

Reduce, Reuse, Recycle

Use Less Heat and Air Conditioning.

Plant a tree.

Chapter – 3 HYDROLOGICAL CYCLE

I. Choose the correct answer:

1. Hydrological cycle
2. 2.8
3. Condensation
4. Run-off
5. Transpiration
6. Potable water

II. Fill in the blanks:

1. Humidity
2. four
3. Precipitation
4. drizzle
5. Water

III. Match the following:

1. Vegetation - Transpiration
2. Condensation - Clouds
3. Snow and rain drops - Sleet
4. Infiltration - At the surface

IV. Choose the correct statement:

1. II and III are correct

V. State True or False:

1. True
2. False
3. True

VI. Answer the following in one or two sentences:

1. A water bearing layer of rock or soil is called an 'aquifer'.
2. Dew and frost occur on the earth's surface or on objects like trees, grass, walls, vehicles, etc. When water vapour condenses at a temperature above 0 degree Celsius, it forms water droplets on objects, and we call this dew.

VII. Give reasons for the following:

1. Infiltration refers to the ability of the soil to allow water to move into and through the soil profile. Non-porous soil has lesser ability to allow water, infiltration is low.
2. The oceans covers the 70 % of the earth surface. The ocean water is salty. Fresh water is less on the earth.
3. Snow fall occurs when temperature are below freezing. Since the temperature of mountainous and polar regions are low, snow fall is common in these regions.

VIII. Answer the following in detail:

1. The water cycle consists of many parts. They can be summarised as evaporation, condensation, precipitation, runoff, seepage or percolation and completion of cycle. Transpiration and snow melt is also part of this cycle

Evaporation*:*
The conversion of liquid water to gaseous state is called evaporation. In nature, it takes place by the heat of the sun.

Condensation*:*
Condensation is the opposite of evaporation. It involves the conversion of gaseous vapour back to liquid. It happens when the vapour is cooled. In the water cycle, the evaporated water added to the atmosphere is lifted by heat or convection. As it rises, it cools.

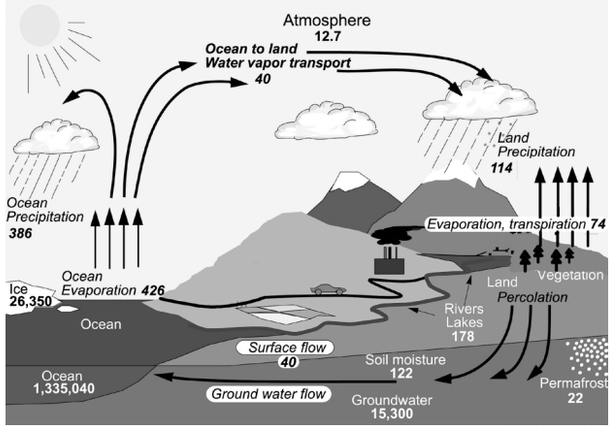
Precipitation*:*
Precipitation is the process by which condensed water droplets come down to the earth. This means that cloud formation must take place for precipitation to occur. The other forms of condensation namely dew, frost, mist and fog do not lead to precipitation as they are at ground level or at very low altitude.

Infiltration:
Water entering the soil at the surface of the ground is termed as infiltration. This allows the soil to store water temporarily and make use of plants and organism in the soil.

Seepage or percolation refers to the water that soaks into the ground through porous soil and rocks.

Snow melt and run off refer to the surface flow of precipitated water. Some of the evaporated waters from the oceans travel long distances to colder latitudes and high mountains.

Transpiration refers to the release of water by plants through pores in their leaves called stomata. This keeps the humidity levels around the leaves high.



2.

Evaporation	Transpiration
The conversion of liquid water to gaseous state is called evaporation.	Transpiration refers to the release of water by plants through pores in their leaves called stomata.
In nature, it takes place by the heat of the sun.	This keeps the humidity levels around the leaves high and this is important for plants to carry on their functions.
The process of evaporation is higher when water surface is large and temperature is high.	Transpiration adds to the humidity level in the air.
Tropical ocean surfaces are where maximum evaporation takes place.	
When more and more water vapour is added, the atmosphere reaches a saturation level.	

3. Precipitation:
Precipitation is the process by which condensed water droplets come down to the earth. This means that cloud formation must take place for precipitation to occur. The other forms of condensation namely dew, frost, mist and fog do not lead to precipitation as they are at ground level or at very low altitude. When clouds gather and get heavy, they precipitate.

There are four types of precipitation.

i. Rainfall is the most common of them. Light rain is drizzle. Sometimes ice may form at high altitudes in the clouds, but they melt on their way down and we get them as rain.

ii. Snow occurs when temperatures are below freezing. Snow is made of microscopic ice crystals and they come down as fluffy flakes. It occurs in mountain tops of high altitude mountains in tropics and at ground level to greater heights in temperate and polar regions.

iii. Hail is the form when the condensed water droplets are uplifted to greater heights in clouds and grow as ice pellets. Water vapour uses the existing ice crystals as hygroscopic nuclei and form layers of ice around them. They may grow as large as an orange and they come down when they can no longer be held by the clouds or uplifted.

iv. Sleet is a kind of precipitation in which rain, snow and sheets of ice come intermixed. It occurs when a layer of cold air cuts through rain, creating sheets of ice. Above this layer of freezing air must be a layer of warmer air. As the melted snow falls through the cold layer of air, it re-freezes. It forms ice pellets, or sleet, before hitting the ground.

4. Runoff may be classified into three types.

i. Surface runoff: The rain water enters the stream immediately after the rainfall. It happens when the rainfall is long and heavy. Excess water goes underground.

ii. Sub-surface runoff: Water that has entered the subsoil moves laterally, without joining the water table, to the streams, rivers or oceans.

iii. Base flow: A flow of underground water from a saturated ground zone to a water channel.

CIVICS

Chapter – 1 THE FUNCTIONING OF THE STATE GOVERNMENT

I. Choose the correct answer:

1. a) President
2. b) Chief Minister
3. d) The Governor
4. b) Chief Minister
5. a) 62

II. Fill in the blanks:

1. 29
2. Five
3. Governor

4. Constitutional
5. 25

III. Match the following:

1. Governor	Nominal Head
2. Chief Minister	Real Head
3. Legislative Assembly	Lower House
4. Legislative Council	Upper House

IV. State True or False:

1. True
2. False
3. True

V. Choose the correct statement:

1. b) i & iii are correct

VI. Answer the following in one or two sentences:

1. The two houses of the State legislature are the upper house called the Legislative Council (Vidhan Parishad) and the lower house called the Legislative Assembly (Vidhan Sabha).
2. To qualify to be a member of the Legislative Assembly, a candidate
   - must be a citizen of India
   - must be at least 25 years old
   - must not hold an office of profit under the central or State government
   - must be of sound mind
   - must not be an undischarged insolvent
   - must have his name on the State voters list
3. The Governor appoints the leader of the majority party in the State Legislative Assembly as the Chief Minister.
4. The party which gets the majority seats in the election forms the government. The Chief Minister chooses his ministers from among the MLAs of his party.

VII. Answer the following in detail.

1. The powers and functions of the Chief Minister are as follows:
   - The Chief Minister is the Chief Executive head of the State. All major decisions of the State government, though taken in the name of the Governor, are exercised under his leadership.
   - The Chief Minister plays an important role in the appointment of the Council of Ministers. The Governor asks him to submit a list of colleagues he would like to admit in his Ministry. On his advice, the Governor appoints the other Ministers. He decides the size of the Council of Ministers, allocates portfolios, determines the ranks of Ministers, presides over their meetings, and advices the Governor on their dismissals.
   - He supervises and coordinates the activities of different ministries and advises them accordingly.
   - He is the leader of the Legislative Assembly and the chief spokesperson of the government. Important policy announcements of the State are made by the Chief Minister. He introduces Bills, plays an important role in the policies and programmes of the government, and ensures that the policies of the government are not against public interest. He has the final say in policy decisions of the State government.
   - Higher officials of the State government are appointed by the Governor on the advice of the Chief Minister and his Council of Ministers.
2. The powers and functions of the Legislative Assembly are as follows:
   - The main function of the Legislative Assembly is to make laws for the state. It can make law on 66 subjects mentioned in the State list and 47 subjects in the Concurrent list. These laws however are operational only within the boundaries of the state. During a General Emergency, the Parliament can make laws on all the State subjects.
   - The Legislature has control over the State Council of Ministers and they are

answerable to the Assembly for all their activities. If it is not satisfied with the performance of the Council of Ministers, the Legislative Assembly can pass a No confidence motion against the Council of Ministers and they have to resign.

- The Legislative Assembly has control over the State's finances. The Budget of the State government is passed by the Legislative assembly. A Money Bill can be introduced only in the Assembly. No tax can be imposed, increased, lowered or withdrawn by the government without the approval of the Assembly.
- The elected members of the Legislative Assembly are a part of the electoral college for the election of the President of India. All members also take part in the elections of the Rajya Sabha members from the State. In certain cases the Assembly takes part in amendments of the Constitution.

3. The powers and functions of the High Court are as follows:
   - The Constitution provides the High Courts to exercise supervisory powers over all the lower courts and tribunals within its jurisdiction. It controls all the Subordinate courts. It however has no powers over Military courts and tribunals.
   - The High Courts have the power to issue writs to protect the Fundamental Rights of its citizens. These writs are Habeas corpus, Certiorari, Mandamus, Prohibition, and Quo Warranto .
   - Like the Supreme Court the High Court is also the guardian of the Constitution. It has the power to declare laws null and void if they are not as per the Constitution.
   - If a case is pending in a Subordinate court and the High Court is satisfied that it involves a substantial question of Constitutional law, it can withdraw the case from that court and take up the case itself.
   - The High Court acts as a Court of Record. Like the Supreme Court its judgements are recorded for evidence and testimony. The lower courts are bound to give similar judgements in similar cases.

Chapter – 2 Citizens and Citizenship

I. Choose the correct answer:

1. b. acquiring property
2. b. Part II Article 5-11
3. b. The President

II. Fill in the blanks:

1. Citizens
2. Single
3. NRI or Non-resident Indian
4. Duties
5. Global citizenship

III. State True or False:

1. False
2. False
3. True
4. False

IV. Consider the following statements. Tick (✓) the appropriate answer.

1. c. I, III, IV are correct
2. a. R is the correct explanation of A.

V. Answer the following in one or two sentences.

1. Citizens are of two types; Natural and Naturalised citizens. A Natural citizen is a citizen by birth. Naturalised citizens on the other hand are people who are not citizens of the country but who acquire citizenship.
2. According to the Indian Constitution the following rights are conferred on every citizen of India:
   - Fundamental Rights.
   - The Right to vote in the elections to the State Legislature and the Lok Sabha.
   - The Right to become an MP (Member of Parliament) or an MLA (Member of the legislative Assembly).

- The Right to hold certain public offices.

3. Honesty, responsibility, goodness, courage, being just in ones ways, respecting oneself and others, and compassion for our fellow citizens and other living things, are the key characteristics of a good citizen. One must also obey the laws and have respect for the diversity that we see around us. Finally, contributing both to the community and to society by doing ones civic duties is also very essential. (any three of the above are correct)
4. India citizenship can be acquired in five ways, by birth, by descent, by registration, by naturalisation, by incorporation of territory.
5. Part II of the Constitution of India, Articles 5 – 11 deals with the Citizenship of India.

   The Indian Citizenship Act, 1955, is an Act that provides for the acquisition and termination of Indian citizenship. According to the provisions of the Citizenship Act of 1955, India citizenship can be acquired in five ways, by birth, by descent, by registration, by naturalisation, by incorporation of territory.

VI. Answer the following in detail:

1. According to Part II of the Constitution of India (Article 5-11) there are three ways of losing Indian citizenship:

   Renunciation is when a citizen of India, after acquiring citizenship of another country gives up his/her Indian citizenship (this is a voluntary act).

   Termination is when a citizen of India voluntarily acquires the citizenship of another country; he/she automatically ceases to be an Indian citizen (this takes place by operation of law).

   Deprivation is when a citizen of India is deprived of citizenship based on an order of the Government of India in cases involving acquisition of Indian citizenship by fraud, false representation, or being disloyal to the Constitution (this is a compulsory termination).

ECONOMICS

Chapter – 1 MONEY, SAVINGS AND INVESTMENT

I. Choose the correct answer:

1. d; 2. c; 3. d; 4. d; 5. c

II. Choose the correct statement:

1. c. I, III and IV is correct

III. Fill in the blanks:

1. Medium of exchange
2. Italian word 'banca'
3. Purchasing power
4. 1949

IV. Match the following:

1. Exchange of goods
2. 1935
3. Electronic money
4. Consumer's disposable income
5. Tax evaders

V. Find out the odd one:

1. Barter System 2. No effects on production

VI. Answer the following in one or two sentences:

1. Exchanging goods for goods is called barter system, without using a medium of exchange such as money.
2. Some of the recent forms of money are plastic money lie credit or debit card, bank cheques, near money like bonds, debentures and savings certificates.
3. The word Money is derived from Roman word 'Moneta Juno.'
4. Money is essential for all the savings and expenses we make. Only with money several needs and requirements of individuals, families, business units, state or central governments are taken care.
5. Value of money refers to the purchasing power of money over goods and services

in a country. It may be internal value of money that refers to the purchasing power of money over domestic goods and services or external value of money that refers to the purchasing power of money over foreign goods and services.

6. Commercial banks give both short term and long-term loans

7. Savings represents the part of person's income not spent on consumption. They are low-risk funds which yields less returns. Investments are for wealth building which involve greater risk and yields higher returns.

8. Black money refers to the money got from illegal transaction that is not exposed for taxation. Unaccounted money maintained for evading tax is known as black money.

VII. Answer the following in detail:

1. Disadvantages of barter system:
   a. If barter has to happen, both the buyer and seller should have requirement for what the other has. In many cases, it may not happen.
   b. Absence of common measure of value
   c. In case of perishable goods, storing wealth for the future is impracticable.

   Hence, for the above reasons barter system is not in use.

2. Money has evolved over time. The earliest forms of money were cowrie shells, compressed tea bricks or even dog's teeth. These were known as commodity money. As there were many difficulties in understanding the value of commodity money, most nations started using fiat money. The most familiar fiat money are coins and currency. Coins refers to metallic forms of money and currency refers to paper money. In the present time, with development of banking activity, modern money forms like e-money are in use which to make transactions cashless.

3. Money is the most interesting financial asset. Every country has its own system of money in general use and this is called currency. The four main functions of money are as follows:
   a. It should be accepted as a means of payment.
   b. It is seen as a means to discharge debts.
   c. It is seen as a convenient form of storing one's wealth and can be easily converted into marketable asset like land, machinery etc.
   d. It is seen as a standard of common measure.

4. The banks that offers services to the general public and to companies are known as commercial banks. Some of the types of deposits are:
   a. Students Savings account: This refers to deposit made in the account opened by the young people in high schools and colleges. The features are more flexible and requires a very minimum balance to be maintained in the account.
   b. Savings Deposit account: The deposit made from one's current income is known as savings deposit account. The banks pay a small interest for the amount deposited in such accounts.
   c. Current Account Deposit refers to accounts generally opened by traders or business firms. Such accounts help the trader to get loans against the deposits made and hence helps in smooth business transactions.
   d. Fixed deposit refers to the deposits made for a fixed period of time. This may be a short term or long-term deposit. Generally, the interest paid by banks for such deposits are higher than the savings deposit accounts.

5.

Savings	Investments
Part of income saved which is not used for consumption	Refers to savings done for wealth building
Low risk funds	High risk funds
Yields less returns	Yields higher returns
Savings are made to fulfil short term or urgent requirements	Investments are made to provide returns and help in capital formation.

6. Some of the effects of black money:

   The money got through the hidden form of medium of transaction that is illegal are known as black money. Some of the effects of black money on the nation are as follows:

   a. The Dual economy: the economic system where the black money economy operating side by side with the official economy of the country.

   b. Under – estimation: The growth of black income lead to under estimate the true size of the economy.

   c. Loss of revenue to the Government: Black money is largely attributed to tax evasion hence its direct impact is loss of the Government revenue.

   d. Widens the gap between rich and poor as growth of black economy causes concentration of income in few hands.

   e. Deteriorates the general moral standards of the society.