Class: 8 KEY ANSWERS TERM : III

Chapter - 1 NUMBER SYSTEM

Page No: 3

Exercise 1.1

I. Simplify the following expressions.

1. 40 2. 69 3. 11 4. 36
5. 21 6. 43 7. 39 8. –5

II. 1. $13(2 + 5)$ 2. $12 \div (1 + 3)$
3. $20 \div (7 - 2)$ 4. $(2 \times 3) - 3$
5. $70 \div \{1 + (9 + 10)\}$

Answers for govnt. Questions that are not added:

Exercise 1.1

1. Fill in the blanks:

i. 9 ii. 48 iii. 5
iv. 2, 3, 7 v. 21

2. Say true or false:

i. True ii. True iii. False
iv. True v. False

3. i. 6 ii. 4 iii. 9

4. i. odd number of zeroes

ii. cannot end with 7

iii. cannot end with 8

5. i. 324 ii. 9801

6. i. 2 15 112 113 ii. 180 + 181

7. i. 1+ 3 + ... + 19 ii. 1 + 3+ ... + 41

8. i. 16, 63, 65 ii. 10, 24, 26

9. i. 12 ii. 16 iii. 28

Page No: 11 and 12

Exercise 1.2

1. a) 2^{12} b) 5^{-21}

2. a) 32 b) $\frac{125}{8}$ c) 1 d) $\frac{243}{392}$
e) $\frac{125}{2}$ f) $\frac{1}{2}$ g) $\frac{216}{125}$ h) $\frac{101}{4}$
i) $\frac{1}{3}$ j) $\frac{256}{6561}$

3. a) $(-7)^{-15}$ b) m^{-12} c) 13^{23}
d) $\frac{1}{2^3}$ or 2^{-3} e) $\left(\frac{-189}{23}\right)^{72}$
f) $(-5)^{12}$ g) $\left(\frac{77}{15}\right)^{6}$ h) $\left(\frac{-2}{3}\right)^{6}$

4. a) $\left(\frac{-1}{15}\right)^{5}$ b) $\left(\frac{7}{2}\right)^{6}$ c) $\left(\frac{1}{3}\right)^{42}$

5. $m = 4$

6. $k = \left(\frac{9}{13}\right)^{2} = \frac{81}{169}$ Hence $(2k)^2 = \left(\frac{162}{169}\right)^{2}$

7 a) $\frac{96784}{3087}$

$$\left\{\left(\frac{9}{7}\right)^{3} + \left(\frac{11}{5}\right)^{-2}\right\} \times \left(\frac{3}{11}\right)^{-2} =$$

$$\left\{\left(\frac{9}{7}\right)^{3} + \left(\frac{5}{11}\right)^{2}\right\} \times \left(\frac{11}{3}\right)^{2} =$$

$$\frac{9^3 \times 11^2 + 7^3 \times 5^2}{7^3 \times \cancel{11^2}} \times \frac{\cancel{11^2}}{3^2}$$

b) $\frac{27}{40}$

8. a) $7^5 = 16807$ b) $27n^{-3} = \frac{27}{n^3}$

9. a) 2.62×10^{-6} b) 4.89×10^{9}
c) 9.91×10^{-5} d) 3.93×10

10. a) 0.000000066 b) 514
c) 0.0000001345

11. The Sun has a greater diameter than Venus.

12. A neutron is heavier than an electron.

Answers for govnt. Questions that are not added:

Exercise 1.2

1. Fill in the blanks:
i. 3 ii. 13, 14 iii. 30
iv. 54 v. 8.1

2. Fill in the blanks:
i. 21 ii. 28 iii. 32

8. Say true or false:
i. True ii. True iii. False
iv. False v. False

Objective type questions:
9. c 10. d 11. a 12. b

Page No: 15

Exercise 1.3

1. 1, 4, 9 ,16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400

2. The digits 2, 3, 7 or 8 cannot be the one's digit of a square number

3. *Examples:* 20, 30, 24, 34, 35, 45, 46, 56, 69, 79

4. The square of 208 cannot be odd. As 208 is an even number, its square also has to be even.

5. 160 and 16000 cannot be perfect squares

6. 4, 4, 5, 9 and 6

7. 112 = 121 Hence
a) 1.12 = 1.21 b) 1102 = 12100

8. 202 = 400 Hence
a) 2002 = 40000 b) 0.022 = 0.0004

9. a) 576 sq. cm b) 19.36 sq. cm

10. a) 49 sq. cm b) 420.25 sq. cm

Questions that were added from government book:

11. 65

12. 3600

Answers for govnt. Questions that are not added:

Exercise 1.3

1. Fill in the blanks:
i. 7 ii. 6 iii. 90
iv. 0.017 v. 42

2. Say true or false:
i. False ii. True iii. True

Page No: 21 and 22

Exercise 1.4

1. a) 2 digits b) 3 digits
c) 3 digits d) 3 digits

2. a). 54 b) 49 c) 78
d) 156 e) 154

3. a) 30 b) 105 c) 40
d) 56 e) 630

4. a) $\frac{11}{15}$ b. $\frac{7}{9}$ c. $\frac{9}{5}$ d. $\frac{8}{15}$

5. a) 124 b) 221 c) 429 d) 308

6. a) 2400 must be multiplied by 6 to get the perfect square 14400 whose square root is 120.
2400 must be divided by 6 to get the perfect square 400 whose square root is 20.

b. 6760 must be multiplied by 10 to get the perfect square 67600 whose square root is 260.
6760 must be divided by10 to get the perfect square 676 whose square root is 26 .

c. 18150 must be multiplied by 6 to get the perfect square 108900 whose square root is 330.
18150 must be divided by 6 to get the perfect square 3025 whose square root is 55 .

d. 29106 must be multiplied by 66 to get the perfect square 1920996 whose square root is 1386.

29106 must be divided by 66 to get the perfect square 441 whose square root is 21.

7. a) 330 is the least number that should be subtracted from 38,746 so that the difference 38416 becomes a perfect square. The square root of 38416 is 196.

   b) 402 is the least number that should be subtracted from 81627 so that the difference 81225 becomes a perfect square. The square root of 81225 is 285.

   c) 66 is the least number that should be subtracted from 1,09,627 so that the difference 1,09,561 becomes a perfect square. The square root of 1,09,561 is 331.

   d) 1611 is the least number that should be subtracted from 7,95,492 so that the difference 7,93,881 becomes a perfect square. The square root of 7,93,881 is 891.

8. a) 203 is the least number that should be added to 20,246 so that the sum 20449 becomes a perfect square. The square root of 20449 is 143 .

   b) 376 is the least number that should be added to 41,240 so that the sum 41616 becomes a perfect square. The square root of 41616 is 204.

   c) 309 is the least number that should be added to 1,62,100 so that the sum 1,62,409 becomes a perfect square. The square root of 1,62,409 is 403.

   d) 1000 is the least number that should be added to 3,73,544 so that the sum 3,74,544 becomes a perfect square. The square root of 3,74,544 is 612.

9. a) 998001 = 9992 is the greatest 6-digit number that is a perfect square. Its square root is 999.

   b) 1000000= 10002 is the least 7-digit number that is a perfect square. Its square root is 1000.

10. 900.

Questions that were added from government book:

11. 3,84

12. 69,37

13. 17,179

Answers for govnt. Questions that are not added:

Exercise 1.4

1. Fill in the blanks:

i. 1 ii. 1 iii. 20^{-1}

iv. $\frac{-1}{128}$ v. -243

2. Say true or false:

i. True ii. True iii. True

iv. False v. True

Objective type questions:

13. d 14. d 15. b

16. d 17. c

H.OTS

1. $4096 = 64^2$. The three smaller squares have their side lengths as 32, 16 and 8.

   The sum of the areas of the 4 squares = $64^2 + 32^2 + 16^2 + 8^2 = 4096 + 1024 + 256 + 64 = 5440$

2. The number of bacteria on day 1 was 3. On day 2, it increased to $3^2 = 9$. On day 3, it increased to $9^2 = 81$. On day 4, it increased to $81^2 = 6561$.

Multiple Choice Questions

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

5. d 6. d

Page No: 24

Exercise 1.5

1. a) 2.15 b) 12.8 c) 50.8 d) 0.47

   e) 6.09

2. a) 1.5 b) 15.7 c) 3.6 d) 0.3

3. a) 5.10 $\sqrt{26}$ = 5.0990195: correct to 2 dp
   b) 9.05 c) 1.91 d) 0.73

Page No: 31 and 32

Exercise 1.6

1. There are 4 perfect cubes: 1, 8, 27 and 64
   $1 = 1^3$, $8 = 2^3$, $27 = 3^3$, $64 = 4^3$

2. a) −729 b) 512 c) -125
   d) $\frac{-27}{343}$ e) 2.744

3. 615, 561, 247 and 427 have their cubes as odd numbers.
   516, 274, 472 and 4270 have their cubes as even numbers.

4. a) 8 b) 9 c) 2 d) 4
   e) 3 f) 1 g) 7 h) 5
   i) 6 j) 0

5. 27000, 64, 1728, 216, 8000000

6. 675 is not a perfect cube. 5 is the smallest natural number by which it needs to be multiplied such that the product 675 × 5 = 3375 is a perfect cube. The cube root of 3375 is 15.

7. 504 is not a perfect cube. 63 is the smallest natural number by which it needs to be divided such that the quotient 504 ÷ 63 = 8 is a perfect cube. The cube root of 8 is 2.

8. a) $8^3 = 57 + 59 + 61 + 63 + 65 + 67 + 69 + 71$
   b) $11^3 = 111 + 113 + 115 + 117 + 119 + 121 + 123 + 125 + 127 + 129 + 131$

9. a) 1141 b) 4921

10. a) 196 b) 36

Multiple Choice Questions:

1. (a) 2. (c) 3. (b) 4. (b) 5. (e)

Page No: 36

Exercise 1.7

1. a) 14 b) 80 c) 63 d) 35

2. a) $\frac{6}{13}$ b) 2.2 c) −5.1 d) $\frac{17}{20}$

3. a) 2 digits b) 2 digits
   c) 3 digits d) 2 digits

4. a) 85 b) 59 c) 68 d) 74
   e) 41 f) 92 g) 103 h) 36
   i) 27 j) 110

5. 5, 25

6. The three numbers are 6, 9 and 15.

7. 8, yes they are the same

8. $11\frac{3}{200}$

Page No: 42 and 43

Exercise 1.8

1. a) 2470 b) 499500

2. a) 127020 b) 338350

Miscellaneous Questions
Objective Type

1. (c) 2. (b) 3. (b) 4. (a)

Questions that were added from government book:

5. 9 cm and 10 cm

6. 93 m

Questions that were added from government book:

7. 15 decimetre

8. 1, 1; 4, 16; 9, 81 etc

9. a) 42 = 16, Square root of 4 is 2

b) $22 = 4$, $\sqrt{2} = 1.414$

Questions that were added from government book:

10. No, 64 11. 58.85

12. $y^2 = \frac{9}{4}$ and $y^3 = \frac{27}{8}$

13. $p = 3$

Questions that were added from government book:

14. 10^{-5} hours

15. $8^{100}, 2^{600}, 3^{500}, 4^{400}, 16^{25}$

16. $\frac{3319}{50}$

17. 7.978×10^5

18. 268 m

19. 90

20. a) 3.9×10^{-1} inches b) 7.8×10^{-1} inches

21. $9^{300}, 3^{500}, 27^{150}, 81^{100}$

Chapter - 2 LIFE MATHEMATICS

Page No: 46

Try these

1. x and y are in direct proportion

x	6	9	15	1.5	54
y	8	12	20	2	72

2. y and z are in inverse proportion

y	6	2	16	0.5	4
z	8	24	3	96	12

Page No: 55 and 56

Exercise 2.1

1. 162

Questions that were added from government book:

2. 310 km

3. 7000

4. 9 days

5. 28 minutes

Questions that were added from government book:

6. 15

7. 4 more lorries

8. 9 days

Questions that were added from government book:

9. 4 hours

10. $14\frac{2}{5}$

Questions that were added from government book:

11. A-30 days B-20 days C- 60days

12. 30 hours

Questions that were added from government book:

13. 180 min or 3 hours

14. 2 days

15. 40 days

Questions that were added from government book:

16. 6 days

Multiple Choice Questions

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

Answers for govnt. Questions that are not added:

Exercise 2.1

1. Fill in the blanks:

i. 25 ii. 2 iii. 8
iv. 5 v. ₹1,20,000

Page No: 58 to 60

Exercise 2.2

Questions that were added from government book:

1. 120 km
2. 8 hours
3. 90 km/hr
4. $9\frac{23}{53}$ m/s = 9.43 m/s approx
5. $1\frac{7}{18}$ m/s = 1.39 m/s approx
6. $3\frac{1}{4}$ hours = 195 minutes .
7. 1600000 miles per day 8. 1.2 minutes or 1 min 12 seconds 9. 200m 10. 54 km/hr
8. 1.2 minutes or 1 min 12 seconds
9. 200m 10. 54 km/hr

HOTS

1. 45 km/hr or 12.5 m/sec
2. 190 m

In the kilometer race, the ratio of the distances covered:

$\frac{A}{B}=\frac{1000}{900}$ and $\frac{B}{C}=\frac{1000}{900}$,

Hence $\frac{A}{C} = \frac{A}{B}\times\frac{B}{C} = \frac{1000}{900} \times \frac{1000}{900} = \frac{1000}{810}$

That is, when A covers 1000 m, C would be covering only 810 m .

Hence A would beat C by 1000– 810 = 190 m

Multiple Choice Questions

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

Challenging Questions:

1. 8 days 2. 48 men 3. 6 days
4. $7\frac{1}{2}$ days 5. 8 days

Chapter - 3A GEOMETRY

Page No: 73 to 75

Exercise 3.1

1. a. Incenter and centroid
   b. orthocenter d. median
   c. altitude e. incenter
2. a. Always b. Never c. Always
   d. Sometimes e. Sometimes
3. a. (iii) b. (i) c. (iv) d. (iii) e. (ii)
4. a. (iii) b. (iv) c. (ii) d. (ii) e. (iii)
5. a. EC = 4.5cm AC = 9 cm
   b. x = 10, EC = 10cm, AC = 20 cm
   c. x = 3, d. 20°, 20°, and 40°
   d. $\angle RPL = \angle QPL = 17°, \angle Q = 34°$
   e. 12cm, 18 cm.

Challenging sums:

1. BD = 8 cm, AB= 10 cm GD = 3 cm and CF = 21 cm
2. By finding the circumcenter.
3. carpenter has to fix the leg in the centroid of the triangle.
4. i) AD, ii) altitude
   iii) BF iv) 72°
5. 13 cm, 81.64 cm, 530.66 sq.cm
6. i) incenter ii) 16 cm iii) 5
   iv) 25° v) 76°

Answers for govnt. Questions that are not added:

Exercise 3.1

1. Fill in the blanks:

i. Orthocentre ii. Centroid iii. Incentre
iv. Circumcentre v. 2:1

2. Say true or false:

i. True ii. True iii. False

3. a. i. Interior
ii. Exterior
iii. On the hypotenuse

b. i. Interior
ii. Exterior
iii. On the vertices containing 90°

4. Fill in the blanks:

i. BE ii. AD iii. CF

Page No: 78

Exercise 3.2

1. b. 50 2. a. 31 3. c. 8
4. b. 60 5. c. 3

Chapter - 3B PRACTICAL GEOMETRY

Page No: 89

Exercise 3.3

Students Work

Chapter - 4 STATISTICS

Page No: 91

4.1 Try this

Number of pets	Tally marks	Frequency
0	𝍸	4
1	𝍸 |	6
2	𝍸	5
3	|||	3
4	||	2

1. 20 2. 4 3. 10 4. 33

Page No: 95

4.2 Try these

1) (0 – 4.5), (4.5 – 9.5), (9.5 – 14.5), (14.5 – 19.5), (19.5 – 24.5), (24.5 – 29.5)

2) (9.5 – 19.5), (19.5 – 29.5), (29.5 – 39.5), (39.5 – 49.5), (49.5 – 59.5)

3) (1.5 – 8.5), (8.5 – 15.5), (15.5 – 22.5), (22.5 – 29.5), (29.5– 36.5), (36.5 – 43.5)

Page No: 102 to 106

Exercise 4.1

1. a)

No. of minutes	Tally marks	Frequency
35–40	𝍸 ||	7
40–45	𝍸 𝍸 ||	12
45–50	𝍸 𝍸	10
50–55	𝍸 𝍸	10
55–60	𝍸 |||	8
60–65	|||	3

b) The lower limit of the fourth class : 50
c) The class interval (40 -45) has the maximum number of students
d) 3 out of 50 students take the maximum time.
e) The class mark of the second class is 42.5

2. Student's work

3. a. The class size is 10. The age of patients is represented on the X axis
b. 145 patients used the PHC during the month
c. 20 yrs – 30 yrs
d. 100
e. 75

4. a. Student's work
b. Class size: 10
c. 12
d. (50 – 60) km/hr

5. a. $x = 4$

Height (in cm)	145–155	155–165	165–175	175–185	185–195
Frequency	3	8	10	12	9

b. students work

c. Student work

6. Student's work

7. Student's work

Questions that were added from government book:

8. Student's work

9. Student's work

10. //Note to teacher: correction in question. Draw histogram for the data.// Student's work

11. Student's work

12. Student's work

Questions that were added from government book:

13. 1) 330 2) 150 3) No

14. Student's work

15. Student's work

H.O.T.S:

More often, Kumar is late by 5-10 minutes. He is never late by more than 20 minutes when he travels by bus

Page No: 111 to 113

Exercise 4.2

1. The student would draw the pie chart .

The angles of the sectors would be: Bus: 180°, Bicycle: 90°, On foot: 72°, Car: 18°

Fraction: Bus: $\frac{1}{2}$, Bicycle: $\frac{1}{4}$, On foot: $\frac{1}{5}$,

Car: $\frac{1}{20}$

2. //Correction in question : change miscellaneous as machines//

The student would draw the pie chart .

The angles of the sectors would be: Salary: 162°,

Electricity: 72°, Conveyance: 36°, Machines: 90°

Fraction for each expenditure: Salary: $\frac{9}{20}$,

Electricity: $\frac{1}{5}$, Conveyance: $\frac{1}{10}$, Machines: $\frac{1}{4}$

3. The students would construct the pie chart

4. //Correction in question: Find the fraction for each type of consumption//

Fraction for each type of energy consumption:

Oil: $\frac{36}{100} = \frac{9}{25}$,

Coal: $\frac{28}{100} = \frac{7}{25}$,

Natural Gas: $\frac{24}{100} = \frac{6}{25}$,

Nuclear: $\frac{6}{100} = \frac{3}{50}$,

Hydro: $\frac{6}{100} = \frac{3}{50}$

5.

Flavour	Number of children	Angle of sector
Vanilla	12	90°
Mint	6	45°
Strawberry	14	105°
Chocolate	16	120°

Questions that were added from government book:

6. a) 20% b) 75 c) $\frac{1}{4}$

d) 400 e) 275 f) 500

7. Students work

Miscellaneous problem:

1-5 Students work

Answers for govnt. Questions that are not added:

Exercise 4.2

1. i. Yes ii. No

iii. No iv. Yes

v. Yes

2. Fill in the blanks

i. Frequency ii. Proportional
iii. Histogram iv. grouped

Objective type questions

9. (d) all the three
10. (c) Frequency
11. (a) range
12. (b) grouped
13. (b) discontinuous
14. (b) Exclusive
15. (c) pie chart
16. (a) continuous
17. (a) frequency polygon

Page No: 118

Exercise 4.3

1. a. Mean: 9 Median: 7 Mode: 7
   b. Mean: 2.1 Median: 2.5 Mode: 4

2. Mean: 17.75 Median: 17 Mode: 17

3. $x = 9$

4. The smallest number = 3.67 approx

5.

Class interval	40-45	55-70	70-85	85-100
Class mark	47.5	62.5	77.5	92.5

The estimated mean mark = 68.75

6. Estimated number of letters delivered per house: 6

HOTS

1. 34 yrs

   (Hint: In 2019, $\frac{A+N+S}{3} = 30 \Longrightarrow A + N + S = 90$

   In 2024, $\frac{(A+5)+(S+5)}{2} = 33 \Longrightarrow A + N + 10 = 66 \Longrightarrow A + N = 56 \setminus S = 90 - 56 = 34$

2. The four numbers are 6, 6, 8 and 10

Chapter - 5 INFORMATION PROCESSING

Page No: 128 to 133

1. i. a ii. b
2. a) true b) true c) false d) false
3. Stainless steel
4. Cotton 5. Supermarket
6. a) 5 notebooks for ₹ 250
   b) 2 ½ kg rice for ₹ 115
   c) a source of pencils for ₹64
7. c 8. a) 28.57% b) 25%
9. 2.59% 10. ₹321
11. //Correction in question : Shop A 12% discount on all the products //
    a) Mustard, cumin seeds, Fenugreek, Black pepper, tamarind and turmeric.
    b) Shop A
12. Shop B 13. ₹30
14.

Store - A						
	Product	Original price	Offer %	Amount saved	Rounding	Sale price
1.	Bathsoap	140	40%	56	56	84
2.	Hand wash	70	35%	24.5	25	45
3.	Detergent powder	520	28%	145.6	146	374
4.	Liquid detergent	180	17%	30.6	31	149
					Total =	652

Store B						
	Product	Original price	Offer %	Amount saved	Rounding	Sale price
1.	Bathsoap	160	51%	81.6	82	78
2.	Hand wash	65	30%	19.5	20	45
3.	Detergent powder	560	26%	145.6	146	414
4.	Liquid detergent	170	22%	37.4	37	133
					Total =	670

Product	Best offer to buy
Soap	Store B
Hand wash	Store A and B
Detergent Powder	Store A
Liquid detergent	Store B

Class: 8 KEY ANSWERS TERM : III

Chapter - 1 SOUND

Page No. 14 - 16

Evaluation:

I. Choose the best answer:

1. b – metals
2. c – iii and iv
   Explanation: Pitch of a sound is a sensation depending on frequency and so it is characteristic of frequency and hence vibration. While loudness is related to intensity of sound and hence amplitude, so it is characteristic of vibration. But frequency denotes no of vibrations per second and time period denotes time to complete one vibration. So pitch and loudness are characteristic of vibrations.
3. c – loudness
4. a – string instrument
5. d – violin
6. d – irregular and non-periodic vibrations
7. c – 20 Hz to 20000 Hz
8. a – loudness increases and pitch is higher

II. Fill in the blanks:

1. vibrating bodies
2. oscillations
3. mechanical waves
4. ultrasonics
5. frequency of the
6. decreases

III. Match the following:

1. d – frequency more than 20000 Hz
2. c – 330 m/s
3. a – frequency below 20 Hz
4. b – needs material medium

IV. Answer briefly.

1. Vibration is a to and fro motion of the particles coming from the source
2. The most common example of showing that light travels faster than sound is lightning. Whenever a lightning strikes, we see the lightning first and then hear the thunder after some time.
3. The relation between loudness of a sound and amplitude of the vibration is:

   $$loudness \propto (amplitude)^2$$

   So to increase the loudness by 4 times, the amplitude should be increased to the 'square of amplitude'.
4. A sound with a frequency greater than 20000 Hz is called ultrasonic sound.
5. **Differences between music and noise:**

MUSIC	NOISE
The sounds that are pleasing to the ears are called musical sounds.	The unpleasant sounds or any unwanted, irritating, louder sound is called noise.
Music is produced by playing regular patterns of vibrations in an instrument.	It is the sound produced by irregular and non-periodic vibrations.
Examples: Music from flute, sitar, harmonium, table.	Examples: Bursting crackers, sound of airplanes, busy roads, various household electrical appliances.

6. **Health hazards due to noise pollution:**

i. Noise pollution causes stress and irritation.

ii. Continuous exposure to noisy environments leads to loss of hearing ability.

iii. Sudden exposure to loud noises leads to deafening of the ear and sometimes heart attack too. It alters sleep patterns hugely.

iv. Persistent noises lead to lack of concentration while working and it even leads to high blood pressure or short-tempered nature.

7. (a) **Amplitude:** It is the maximum displacement of a vibrating particle from its mean position is called the amplitude. Its units are metres (m).

   (b) **Loudness:** It is the characteristic of a sound that enables us to distinguish between weak and feeble sound from a loud sound. It mainly depends upon the amplitude of sound. Its units are decibels (dB).

8. Tree parts such as thick branches, leaves and wood effectively absorb sound. By planting a variety of both hedges or shrubs and taller trees to create a wall of foliage from the ground up. The rough bark and thick, fleshy leaves absorbs sound due to their dynamic surface area and reduces sound pollution.

9. Hearing loss is otherwise known as hearing impairment. It is the inability to hear partially or totally. This can happen to one or both the ears.

Symptoms of hearing loss	Reasons for hearing loss
• Muffling of speech and other sounds. • Need to turn up the volume of the TV or radio. • Difficulty in hearing words clearly. • The need to ask others to speak loudly and clearly.	• Ageing. • Continuous exposure to noisy environments. • Severe blow in the head. • Loud noises. • Not treating ear infections properly.

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

VI. Answer in detail.

1. **Experiment to show that sound cannot travel through a vacuum:**

i. Take a bell jar and an alarm clock.

Sound requires a Medium for Propogation

ii. Switch on the alarm clock and place it in the jar.

iii. Now, pump out the air from the bell jar using a vacuum pump.

iv. As more and more air is removed from the jar, the sound from the alarm clock becomes feebler and finally, very faint.

v. It is clear from this experiment that sound cannot travel in vacuum and it needs a medium like air.

2. **Properties of sound:**

Loudness: It distinguishes between weak and feeble sound. It mainly depends upon the amplitude of sound. Higher the amplitude louder will be the sound and lower the amplitude lower will be the sound. Unit of loudness is decibels (dB).

E.g.: When a drum is softly beaten, a weak sound is produced. However, when it is beaten strongly, a loud sound is produced.

Pitch: It distinguishes between flatter and shriller sound. It mainly depends upon the frequency of sound. Higher the frequency of sound, higher will be the pitch. High pitch adds shrillness to a sound. Unit of pitch is hertz (Hz).

Examples of high pitch: The sound produced by a whistle, a bell, a flute and a violin are high pitch sounds.

Examples of low pitch: Roaring of a lion and the beating of a drum.

Quality or Timbre: Timbre is the perceived sound quality of an instrument. It is what makes a particular sound different from another sound.

E.g.: Take two different kinds of instruments, like a violin and a piano, and play the same note on both at the same time. Though the pitch and loudness are the same, you will be able to easily differentiate the sound quality of a violin with that of the piano.

3. **Steps needed to be taken to reduce the effects of noise pollution:**

i. By setting and following strict guidelines for the usage of loudspeakers for political, religious and social purposes.

ii. By fitting effective silencers in all automobiles.

iii. By consciously avoiding honking loudly or repeatedly.

iv. By completely refraining heavy vehicles from residential areas.

v. By maintaining industrial machines and household appliances properly.

vi. By consciously using low volumes in communication systems.

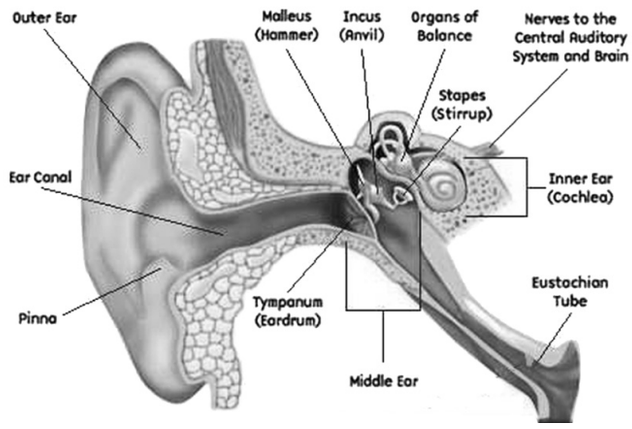
vii. By using earplugs when exposed to noisy environments like industries and busy roads.

viii. By establishing green belts in and around urban and industrial areas as per Environmental Policies and Acts of India.

ix. By covering thin windows with long curtains or covering floors with carpets or mats.

x. By planting a variety of both hedges or shrubs and taller trees to create a wall of foliage from the ground up. The rough bark and thick, fleshy leaves absorbs sound due to their dynamic surface area and reduces sound pollution.

4. The ear is an important organ that enables us to hear the sounds around us. The human ear picks up the audible frequency vibrations in the air and perceives them as sounds. Though the ear is what picks up the vibrations, the brain is the prime organ that interprets the vibrations into the various sounds we hear.



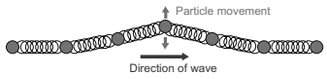
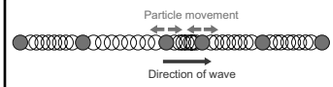
Functioning of the human ear:

Divisions of Ear	Parts and Functioning of Ear
Outer Ear	**Pinna:** It is curved in shape. Collects and directs sound wave to ear canal.
	Ear Canal: It is also called auditory canal. Directs the sound waves to ear drum.
Middle Ear	**Ear Drum:** It is also called tympanic membrane. Vibrates when the sound wave hits it.
	Ossicles: These are very small bones. They amplify vibrations.
	Oval Window: Transfers vibrations to cochlea.
	Eustachian Tube: Equalizes air pressure
Inner Ear	**Cochlea:** These are special type of cells that have fluid within them. These cells convert vibrations into nerve impulses.
	Auditory Nerve: It carries nerve impulses to brain, only when the nerve impulses reach the cerebral cortex, the listener is aware of sound produced.
	Semicircular Canal: It helps in balancing of body.

5. **Differences between pitch and loudness:**

PITCH	LOUDNESS
It distinguishes between flatter and shriller sound.	It distinguishes between loud and feeble sound.
It mainly depends upon the frequency of sound.	It mainly depends upon the amplitude of sound.
Higher the frequency of sound, higher will be the pitch. High pitch adds shrillness to a sound. As the voice of a female has a higher pitch than that of a male; a female's voice is shriller than a male's voice.	Higher the amplitude of the sound louder will be the sound and vice-versa.
Unit of pitch is hertz (Hz).	Unit of loudness is decibels (dB).
Examples of high pitch: The sound produced by a whistle, a bell, a flute and a violin. Examples of low pitch: Roaring of a lion and the beating of a drum.	Examples: When a drum is softly beaten, a weak sound is produced. However, when it is beaten strongly, a loud sound is produced.

6. **Differences between transverse waves and longitudinal waves:**

TRANSVERSE WAVES	LONGITUDINAL WAVES
The particles of the medium vibrate in a direction that is perpendicular to the direction of propagation of the wave.	The particles of the medium vibrate in a direction that is parallel to the direction of propagation of the wave.
These waves are produced only in solids and liquid surface.	These waves are produced in solids, liquids and also in gases.
They propagate as crests and troughs.	They propagate as compressions and rarefactions.
E.g. Waves in strings, light waves. 	E.g. Waves in springs, sound waves. 

7. **Differences between infrasonics and ultrasonics:**

INFRASONICS	ULTRASONICS
A sound with a frequency below 20 Hz is called subsonic or infrasonic sound.	A sound with a frequency greater than 20000 Hz is called ultrasonic sound.
Animals like elephants, rhinoceros and some fishes can hear to such low frequencies of sound.	Animals such as bats, dogs, dolphins are able to hear such high frequencies of sound.
It is used in the study of the mechanism of the human heart called seismocardiography (recording of vibrations produced by the beating heart).	It is extensively used in medical applications like ultrasonography (visual images of organs, tissues, or blood flow inside the body) and echocardiogram (to take pictures of your heart).
It is employed in the earth monitoring system.	It is used in the SONAR system to detect the depth of the sea and to detect enemy submarines.
Seismic sounds exist in the infrasonic range. So people monitor earthquakes by monitoring infrasonic sounds.	Galton's whistle exists in the ultrasonic range. It can be heard by dogs and is used to train dogs for investigation.

VII. Solve the numerical:

1. Given: Velocity of the sound in the air (V) = 330m/s, time (t) = 2 s

Using the formula, speed=distance/time $\Rightarrow$ 330 = distance/2 $\Rightarrow$ 660 m.

2. Given: Displacement = 2000 m, time = 8 s
Time = 8 s
Using the formula, velocity=displacement/time
= 2000/8 = 250 m/s

3. Given: Velocity of wave (v) = 25 m/s,
Wavelength (λ) = 12.5 m
Using the formula, $v = n\lambda \Rightarrow 25 = n\ (12.5)$
$\Rightarrow n = 2$ Hz

4. Given: Speed of the wave (v) = 200 m/s, Frequency (n) = 500 Hz
Using the formula, $v = n\lambda \Rightarrow 200 = 500\ (\lambda)$
$\Rightarrow \lambda = 0.4$ m

Chapter - 2 FUN WITH MAGNETS

Page No. 29 and 30

Evaluation:

I. Choose the best answer:

1. d – iron and steel
2. a – attract each other
3. d – neodymium
4. d – bar magnet
5. a – Magnetic Resonance Imaging
6. d – all of these

II. Fill in the blanks:

1. maximum
2. two
3. dynamos
4. Electromagnets
5. geographic north-south

III. Match the following:

1. b – Natural magnet
2. c – Compass box
3. d – Ferromagnetic material
4. a – Magnetic lines
5. e – Diamagnetic material

IV. Answer briefly:

1. Magnetic field is a region around a magnet or a magnetic material within which the force of magnetism acts. CGS unit is gauss and SI unit is tesla.
2. The property of a magnet which allows it to attract certain metals or alloys is called magnetism.

3. **Differences between natural and artificial magnets:**

Natural Magnets	Artificial Magnets
Found in nature i.e. in the sandy deposits of the earth at different places.	Man-made i.e. by people in laboratories or factories.
Have many impurities. They have irregular shapes and sizes and have less usage.	Have fewer impurities. They are made in various shapes and sizes and have a vast usage in day to day life.
They have long lasting magnetic power and are permanent magnets. Their strength is well determined and difficult to change.	Can be made with required and specific strength and their properties are time bound. Stronger than the natural magnets.
Examples: magnetite (iron oxide), pyrrhotite (iron sulphide), ferrite, columbite.	Examples: based on shapes - bar magnets, U-shaped magnets, horseshoe magnets, cylindrical magnets, disc magnets, ring magnets and based on nature of magnetisation - electromagnets.

4. **Reasons behind earth acting as a huge bar magnet:**

i. A freely suspended magnetic needle at a point on the Earth comes to rest approximately along the geographical north - south direction.

ii. This shows that the Earth behaves like a huge magnetic dipole with its magnetic poles located near its geographical poles.

iii. Usually, when a compass needle points north it means that it is pointed towards the geographic north (G_N). Thus, the magnetic north pole of the needle is attracted to the magnetic south pole of the earth (M_S) as unlike poles attract each other. Thus, G_N and M_S are the same points.

iv. Similarly, when the compass needle points south, it is pointed towards the geographic south (G_S). This means that the magnetic south pole of the needle is attracted to the magnetic north pole of the earth (M_N). Thus, G_S and M_N are the same points.

v. However, some theories suggest that concentration of magnetic substances (like iron, nickel) in earth's core, radiations from the sun, action of the moon towards the earth could be the cause of the Earth's magnetism.

5. Those materials which are not attracted by a magnet are called non - magnetic materials. Examples of non-magnetic materials are rubber, wood, leather.

6. Materials that are attracted to a magnet are called magnetic materials. Example: iron, cobalt and nickel.

7. (a) **Attractive property of a magnet:** Magnet attracts other magnetic materials towards it. This attraction of a magnet is more at its two poles namely – North Pole and South Pole.

(b) **Directive property of a magnet:** A freely suspended bar magnet always aligns itself in the geographical north – south direction. This property of a magnet is called directive property of a magnet.

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

1. (c) Assertion is true, but reason is false.

Correct Explanation: The attractive property of a magnet is more at poles.

2. (d) Assertion is false, but reason is true.

Correct Explanation: The earth's magnetic field is due to the molten charged metallic fluid at its inner core.

VI. Answer in detail.

1. **Uses of magnets:**

a. Magnets are used to generate electricity in dynamos.

b. Electromagnets are used in electric bells and electricmotors.

c. They are used in loudspeakers and microphones.

d. An extremely powerful electromagnet is used in the fast moving Maglev train to remain floating above the tracks.

e. In industries, magnetic conveyor belts are used to sort out magnetic substances from scraps mixed with non-magnetic substances.

f. Magnets are used in computer in its storing devices such as hard disks.

g. In banks, the magnets enable the computers to read the MICR numbers printed on a cheque.

h. The tip of the screw drivers are made slightly magnetic so that the screws remain attached to the tip.

i. At hospitals, extremely strong electro magnets are used in the MRI (Magnetic Resonance Imaging) to scan the specified internal organ.

2. **Earth's Magnetism:**

i. The bar magnet points in the north-south direction, is because of the influence of earth's gigantic magnetic field. Our planet's magnetic field is believed to be generated deep down in the earth's core.

ii. Right at the heart of the earth is a solid inner core, two thirds of the size of the moon and composed primarily of iron. At 5700°C, this iron is as hot as the sun's surface, but the crushing pressure caused by gravity prevents it from becoming liquid.

iii. Surrounding this is the outer core, 2250 km thick layer of iron, nickel, and small quantities of other metals. Lower pressure than the inner core means the metal here is fluid. The core of the earth is also an electromagnet. The magnetic field of the earth is caused by the charges that flow in the molten core. These charges flow at thousands of miles per hour as the earth rotates.

iv. Some theories suggest that concentration of magnetic substances (like iron, nickel) in

earth's core, radiations from the sun, action of the moon towards the earth could be the cause of the Earth's magnetism.

3. **Differences between the characteristics of dia, para and ferro magnetic materials:**

Diamagnetic Materials	Paramagnetic Materials	Ferromagnetic Materials
When suspended in an external uniform magnetic field, they will align themselves perpendicular to the direction of the magnetic field.	When suspended in an external uniform magnetic field, they will align themselves parallel to the direction of the magnetic field.	When suspended in an external uniform magnetic field, they will align themselves parallel to the direction of the magnetic field.
They have a tendency to move away from the stronger part to the weaker part when suspended in a non-uniform magnetic field.	They have a tendency to move from the weaker part to the stronger part when suspended in a non-uniform magnetic field.	They have a tendency to move quickly from the weaker part to the stronger part when suspended in a non-uniform magnetic field
They get magnetised in a direction opposite the magnetic field.	They get magnetised in the direction of the field.	They get strongly magnetised in the direction of the field
Magnetic character of these substances is not affected by the external temperature.	Magnetic character of these substances is affected by the external temperature.	Magnetic character of these substances is affected by the external temperature. When they are heated, they become paramagnetic and this temperature is called the curie temperature.
Examples for diamagnetic substances are bismuth, copper, mercury, gold, water, alcohol, air and hydrogen.	Examples for paramagnetic substances are aluminium, platinum, chromium, oxygen, manganese, solutions of salts of nickel and iron.	Examples for ferromagnetic substances are iron, cobalt, nickel, steel and their alloys.

4. **Demagnetisation of a magnet:**

A magnet loses its strength or gets demagnetised

i. if left isolated for a longer time.

ii. when it is dropped from a height, heated to a high temperature or hammered continuously.

iii. passing a variable current in a coil that encloses the magnet.

To prevent demagnetisation

i. magnets should be handled with care when in use.

ii. should be stored with magnetic keepers (iron bars) placed across the poles after the use.

VII. Higher Order Thinking Skills (HOTS):

1. The magnetic character of ferromagnetic materials is affected by the external temperature. When they are heated they become para magnetic. The temperature, at which the ferromagnetic material becomes paramagnetic, is called the Curie temperature. Increased thermal motion at higher temperature can disrupt and randomize the orientation and the size of the domains.

2. When we slide the magnet along the iron bar it is an artificial situation of magnetization. But when we slide back and forth then each of the magnetizing strokes is demagnetized back.

3. Here, Thamizh Dharaga and Sangamithirai have broken a single magnet into four pieces and hence each piece acts as a magnet having north and south poles which exists in pairs. Hence there will four north poles and four south poles – total of eight poles.

Chapter - 3 UNIVERSE AND SPACE

Page No. 44 and 45

Evaluation:

I. Choose the best answer.

1. d – all of the above
2. b – Mars
3. a – 22nd October 2008
4. d – Mars
5. c – Newton's third law
6. c – very low temperature
7. b –Apollo 8
8. a – 13.7 billion

II. Fill in the blanks.

1. astronomy
2. Milky Way
3. 687
4. Mars Orbiter Mission
5. Neil Armstrong

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

1. True
2. True
3. False – Mars is the second smallest planet in the solar system and Mercury is the smallest planet.
4. True
5. False – The propellants may be in the form of asolid or liquid.

IV. Match the following.

1. b – Moon 2. e – Mars 3. a – Fuel
4. c - First manned mission to the moon
5. d - First man landing mission to the moon

V. Answer briefly.

1. The stars, the planets, the Moon and many other objects like asteroids and comets in the sky are called celestial objects.
2. A collection of billions of stars, held together by mutual attraction, is called galaxy.
3. **Objectives of Chandryaan-1:**

a. Simultaneous topographical, chemical and mineral mapping on the surface of the Moon at a high spatial resolution.
b. 3-dimensional mapping of the lunar surface.
c. High resolution imaging of the permanently shadowed north and south poles of the moon.
d. Search for the presence of water or ice on the surface or especially at the South Pole of the moon.
e. Study the origin and evolution of our solar system.

4. **Objectives of Mangalyaan:**

a. The primary objective of the mission was to develop the technologies to design, plan, manage and operate an interplanetary mission.
b. To explore the constituents of Martian atmosphere.
c. To study the surface features of Mars.
d. To study the upper atmosphere and the dynamics of Mars.
e. To understand the life possibilities on Mars.

5. **Cryogenic fuels:** Cryogenic fuels are fuels that require storage at extremely low temperatures in order to maintain them in a liquid state. These fuels are used in machinery that operates in space (e.g. rocket ships and satellites) because ordinary fuel cannot be used there, due to absence of an environment that supports combustion and space is a vacuum. Example: liquid hydrogen, liquid methane.

6. **Indians at NASA:**

i. **Kalpana Chawla** from Punjab state of India joined the NASA in 1988 and selected to take part in the Colombia Shuttle Mission in 1997 and became the first Indian woman astronaut to go to space.
ii. **Sunitha Williams** another Indian started her career as an astronaut in 1998 made two trips to the International Space Station. She is one of the crew members of NASA's manned Mars mission.

7. Group of starts forming a recognizable pattern is called a constellation. Example: Orion, Leo, Cassiopeia etc.

8. MOM refers to Mars Orbiter Mission which is India's first interplanetary mission. India is the fourth country to carry out this mission.

Achievements:

i. India is the only country that has succeeded in an interplanetary mission on its maiden attempt.

ii. Mangalyaan completed all its primary objectives i.e. to develop the technologies to design, plan, manage and operate this mission.

iii. This mission was planned for only six months. But, it is still working perfectly over three years now, sending incredible photos and scientific data.

9. **Milky Way galaxy:**

i. Our Sun and all the planets in the solar system are in the Milky Way galaxy which appears as a milk band of light in the sky.

ii. It is made up of approximately 100 billion stars and its diameter is 100000 light years.

iii. It is spiral in shape which has a linear, starry bar at its centre.

iv. Sagittarius A*, a supermassive black hole is a bright and very compact astronomical radio source at the centre of our Milky Way galaxy, near the border of the constellations Sagittarius and Scorpius.

VI. Answer in detail.

1. **Achievements of Chandrayaan–1:**

a. It discovered the presence of water molecules on the surface of the moon.

b. It discovered that the moon was completely molten at some point of time.

c. It recorded six moon mission landing sites including Apollo 15 and Apollo 17.

d. The mineral content of the surface moon has been mapped including iron and various compositions of the rocks.

e. It discovered lunar caves that could act as human shelters.

f. It completed 3000 orbits around the moon and sent around 70000 images of the lunar surface.

g. It sent images of peaks and craters of the lunar surface, which surprised the scientists as they saw that it has mostly craters.

h. The presence of silicon, aluminium and magnesium were detected using an X-ray camera on board.

2. A rocket has a powerful system which helps in carrying not only the satellites but also people from the earth to the space. It is made up of four main parts namely - structural system, payload system, guidance system and propulsion system.

i. **Structural system:** This gives the structure to the rocket and is basically the frame that covers the rocket. This system should be able to withstand the extreme conditions of the space. So, it is made up of strong but light weight metals like aluminium or titanium. At the base of the rocket are the fins that provide stability to the rocket during its flight.

ii. **Payload system:** It is cargo that is to be carried to space. This may vary based on the type of the mission of the rocket. It can either be astronauts who carry out various missions in the space and space stations or it can be satellites that might be used for communication, weather monitoring, security and planetary explorations. The pointed nose carries the payload of the rocket.

iii. **Guidance system:** This is like the brain of a rocket. It is this unit that guides the rocket to its destination. This may have radars, on board computers, sensors, communication equipment etc.

iv. **Propulsion system:** It takes up most of the space in a rocket. It includes all the parts that make up the rocket's engine. The main purpose of this system is to provide thrust to the rocket. There are two main types of propulsion/ systems. They are liquid propulsion system and solid propulsion system. Depending on the propulsion system or the engine, a rocket is also called a liquid rocket or a solid rocket.

3. **Apollo Missions of NASA:** Apollo Missions are the most popular missions of NASA. It consists of totally 17 missions of which Apollo-8 and Apollo-11 are remarkable.

- Apollo-8 was the first manned mission to go to the Moon. It orbited around the Moon and came back to the Earth.
- Apollo-11 was the first 'Man Landing Mission' to the moon. It landed on the Moon on 20th July 1969. Neil Armstrong was the first man to walk on the surface of the Moon. The members present in the crew during the Man Landing Mission were Neil Armstrong, Buzz Aldrin and Michael Collins.

4. **Big Bang expansion of the universe:**

i. Scientists consider that the universe began with the start of a massive explosion called the Big Bang.

ii. According to the Big Bang theory, all the matter in the universe was concentrated in a single point of hot dense matter.

iii. About **13.7 billion years ago**, an explosion occurred and all matter was ejected in all directions in the form of galaxies.

iv. Nearly all of the matter in the universe is made of **hydrogen and helium**, created in the Big Bang. The core of the stars contains other gases or elements like oxygen, carbon, calcium, iron and silicon.

v. The gravity that holds these stars together generally keeps these elements deep inside their interiors. When these stars explode, these fundamental building blocks of planetary systems are liberated throughout the universe.

5. **Stars:** They are the fundamental blocks of galaxies which produce heat, light, ultraviolet rays, x-rays, and other forms of radiation.

Composition and formation of a star:

- Formed when the galaxies were formed during the Big Bang.
- Largely composed of gas and plasma (a superheated state of matter).
- Built by hydrogen gases. Hydrogen atoms fuse together to form Helium atoms and in the process they produce large amount of heat.
- The brightness of a star depends on their intensity and the distance from the Earth.
- Stars also appear to be in different colours depending on their temperature. Hot stars are white or blue, whereas cooler stars are orange or red in colour.

6. **Types of rocket propellants:**

Type of Propellant	Functioning
Liquid Propellants	In liquid propellants, fuel and oxidisers are combined in a combustion chamber where they burn and come out from the base of the rocket with a great force. **Fuel(s) used:** Liquid fuels like hydrogen, hydrazine and ethyl alcohol. Ox**idizer(s) used:** Oxygen, ozone, hydrogen peroxide and fuming nitric acid.
Solid Propellants	In solid rocket propellants, fuel and oxidiser compounds are already combined. When they are ignited they burn and produce heat energy. Combustion of solid propellants cannot be stopped once it is ignited. **Fuel(s) used:** Solid fuels like polyurethanes and polybutadienes. **Oxidizer(s) used:** Nitrate and chlorate salts are used as oxidizers.
Hybrid Propellants	Hybrid propellant engines represent an intermediate group between solid and liquid propellant engines. One of the substances is solid, usually the fuel, while the other, usually the oxidizer, is liquid. The liquid is injected into the solid, whose fuel reservoir also serves as the combustion chamber. **Fuel(s) used:** Solid fuel - HTPB rubber (Hydroxyl-terminated polybutadiene). **Oxidizer(s) used:** Liquid Oxidizer - nitrous oxide

7. **Chandrayaan-2:** This mission used an Orbiter, Lander and Rover with the goal of exploring the

South Pole of the moon. The aim of this mission was not to study just one area of the moon, but to study the exosphere, the surface and the sub-surface of it as well. It was launched on July 22, 2019 and was successfully inserted into the lunar orbit on 20 August 2019.

a) **Orbiter:** It orbits around the moon. It is capable of communicating with Indian Deep Space Network (IDSN) as well as with the lander. The mission management has ensured that it will continue to work for seven years instead of the previously planned one year.

b) **Lander:** It was named Vikram after Dr. Vikram A Sarabhai, the father of the Indian space programme. It was designed to work for 1 lunar day, which equals 14 earth days. In the final stage of the mission, just 2.1 km above the surface of the moon, it lost communication with the ground station on 7 September 2019. But the orbiter continues to work successfully. India had planned a soft landing but it crash-landed on the moon.

c) **Rover:** This is a six-wheeled robotic vehicle named 'pragyan' meaning 'wisdom' in Sanskrit. It was designed to move 1 cm per second performing onsite analysis and then send the data to the Vikram lander which would have relayed the information to the mission control room at ISRO.

8. (a) **Hubble Space Telescope:** Hubble Space Telescope (joint mission of NASA and Space Telescope Science Institute) showed us the new horizons of the universe. It is in the low Earth orbit from 1990 and has sent a wealth of information about the vast cosmos we are in.

(b) **The International Space Station:** It is the joint mission of NASA with four other space organisations namely Roscosmos (Russia), CSA (Canada), JAXA (Japan) and ESA (Europe). It is in the low Earth orbit which allows the astronauts to conduct various experiments and study the earth.

VII. Higher Order Thinking Skills (HOTS):

1. The near side of the Moon is the lunar hemisphere that is permanently turned towards Earth, whereas the opposite side is the far side. Only one side of the Moon is visible from Earth because the Moon rotates on its axis at the same rate that the Moon orbits the Earth which is about 29.5 days. This situation is known as synchronous rotation or tidal locking. Due to this, it is impossible for someone on Earth to see the other side of the moon.

Chapter - 4 WATER

Page No. 67 - 69

Evaluation:

I. Choose the best answer:

1. a) 0°C
2. b) pressure is high
3. b) hydrogen
4. a) lead
5. a) sulphates and chlorides

II. Fill in the blanks:

1. tasteless
2. 100°C
3. boiling
4. 4°C
5. electrolysis

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

1. True
2. False – About 90% of the available surface water has already been tapped mainly for agriculture and irrigation. The salt in the sea water would affect the crops.
3. True
4. False – Water that is used for drinking or fit for drinking is calledpotable water.
5. False – Soap doesn't lather well in hard water due to the presence of chloride and sulphate salts of calcium and magnesium in the water.

IV. Match the following:

1. d – Water
2. e – Digestive ailments
3. b – Kills germs
4. c – Ozonisation

5. a – Water pollutant

V. Give reasons for the following:

1. Potash alum is added to water, to speed up the process of sedimentation. This process is called loading. The particles of potash alum combine with the suspended impurities and make them settle down at a faster rate.
2. Water can dissolve several more substances than any other solvent. Therefore, it is called as universal solvent.
3. Generally, liquids contract on cooling and the density increases. However, water is special. It contracts when cooled, down to a temperature of 4°C but thereafter begins to expand as it reaches 0°C and turns into ice. Water attains its maximum density at 4°C. This is called anomalous expansion of water. It is because of this property that ice floats in water.
4. Air dissolved in water contains approximately 35.6% oxygen along with nitrogen and carbon dioxide. Fish extract the oxygen from the water which enters their body through the gills. Fish can survive in water only by utilising the oxygen dissolved in water.
5. Every litre of sea water contains about 35 grams of dissolved salts most commonly known as sodium chloride (NaCl). Sea water also contains several other dissolved salts which are harmful to humans. Such water is called saline water. It is not suitable for drinking and is said to be non-potable water. The water suitable for drinking is called potable water. Every litre of potable water contains 1-2 grams of dissolved salts, mainly common salt withsmall amounts of calcium (Ca), magnesium (Mg), potassium (K), copper (Cu) and zinc (Zn).
6. Hard water consists of carbonate and bicarbonate salts of calcium or magnesium/ chloride and sulphate salts of calcium and magnesium which damages the utensils and containers in which it is stored and forms a hard layer.

VI. Define the following:

1. Freezing Point: The temperature at which a liquid changes to solid at normal atmospheric pressure is called freezing point.
2. Boiling Point: The temperature at which a liquid changes to vapours at normal atmospheric pressure is called boiling point.
3. Specific heat capacity: It is defined as the amount of heat needed to raise the temperature of 1 gram of a substance by 1 degree Celsius (°C).
4. Latent heat of fusion: The amount of heat energy required to change 1g of ice to water is called latent heat of fusion of ice.
5. Potable water: Water that is safe for humans to drink is called potable water.

VII. Answer briefly:

1. The gas evolved at cathode is hydrogen and the gas evolved at anode is oxygen gas when water is electrolysed. The volume of hydrogen gas collected atthe cathode is two times the volumeof oxygen gas collected at the anode i.e.the ratio of hydrogen to oxygen is 2:1.
2. Importance of dissolved oxygen in water: Oxygen dissolved in water is important for the living organisms to survive. Fish absorb oxygen dissolved in water as the water flows through the gills. Fish can survive in water only through the dissolved oxygen present in water.

   Importance of dissolved carbon dioxide in water: Aquatic plants make use of dissolved carbon dioxide for photosynthesis. Carbon dioxide dissolved in water reacts with limestone to form calcium bicarbonate. Marine organisms such as snails, oysters, etc., extract calcium carbonate from calcium bicarbonate to build their shells.
3. Temporary hardness is due to the presence of carbonate and bicarbonate salts of calcium and magnesium, and permanent hardness results due to the presence of chloride and sulphate salts of calcium and magnesium.
4. The amount of heat energy required to change 1g of water to gas at atmospheric pressure at its boiling point is called latent heat of vaporization of water. For water, its value is 22.60×10^5 J/Kg in SI units or 540 calories per gram in CGS units.
5. Temporary hardness of water can be removed by boiling the water or treating with lime water

whereas permanent hardness of water can be removed by treating with washing soda or by ion exchange method. Distillation is another process through which both temporary and permanent hardness can be removed.

6. Some substances absorb a definite amount of water and remain as hydrated salts. The water present in crystals, gives them their shining appearance and geometrical shapes. This water is called water of crystallization or water of hydration.

   For example, blue copper sulphate crystals contain five water molecules per mole. So the molecular formula of copper sulphate is written as, $CuSO_4 . 5H_2O$.

Some hydrated salts are:

Copper Sulphate $CuSO_4.5H_2O$ Blue Vitriol

Sodium Carbonate $Na_2CO_3.10H_2O$ Washing soda

Ferrous Sulphate $FeSO_4.7H_2O$

7. Temporary hardness of water can be removed in any of the following ways:

i. <u>By boiling:</u>

When hard water is boiled, the bicarbonate decomposes to give the insoluble carbonate which can be removed by filtration.

$$Ca(HCO_3)_2 \xrightarrow{\Delta} CaCO_3 + H_2O + CO_2$$

$$Mg(HCO_3)_2 \xrightarrow{\Delta} MgCO_3 + H_2O + CO_2$$

ii. <u>By adding lime (Clark process):</u>

Hard water is treated with lime solution. The bicarbonates are converted into insoluble calcium carbonate which is then removed by filtration.

iii. <u>By adding washing soda: (Sodium Carbonate)</u>

Adding washing soda to hard water removes temporary hardness. The bicarbonates of calcium and magnesium are converted into their insoluble carbonates.

8. Generally, liquids contract on cooling and the density increases. However, water contracts when cooled, to a temperature of 4°C but thereafter begins to expand as it reaches 0°C and turns into ice. Water attains its maximum density at 4°C. This property of water is called anomalous expansion of water. It is because of this property that ice floats on water.

VIII. Answer in detail:

1. The water from various sources is unfit for drinking, cooking, washing or bathing because it contains suspended and dissolved impurities. It also contains micro-organisms such as bacteria. If this water is consumed without purifying, it can cause water-borne diseases such as typhoid and cholera. Therefore, before water reaches our homes, it is treated and purified to make it potable. In conventional water treatment plants, water is subjected to different processes for purification. These processes are discussed below:

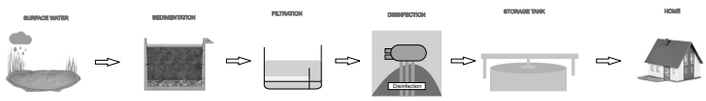
   Sedimentation: Water from lakes or rivers is collected in large sedimentation tanks. There, it is allowed to stand undisturbed so that suspended impurities settle down at the bottom of the tank. Sometimes, a potash alum is added to water, to speed up the process of sedimentation. This process is called loading. The particles of potash alum combine with the suspended impurities and make them settle down at a faster rate.

   Filtration: Water from the sedimentation tanks is then, pumped to the filtration tanks. Filtration tanks contain filter beds made up of gravel, sand, pebbles, activated charcoal and concrete. Water passes through these layers and becomes free from any remaining dissolved or suspended impurities.

   Sterilisation or disinfection: The filtered water is treated chemically to remove the remaining germs or bacteria. This process is called sterilisation. The chemicals that are used in this process are chlorine and ozone. The process of adding chlorine, in adequate amounts, to water is called chlorination.

   The water from filtration tanks is pumped into chlorination tanks, where chlorine is added to remove harmful bacteria and other germs. Ozonisation is a process in which water is treated with ozone gas to kill the germs present in it.

The sterilisation of water can also be done by exposing it to air and sunlight. Oxygen from the air and sunlight destroy the germs present in water. Aeration is the process in which air under pressure is blown into filtered water. This also helps to kill the germs.



Storage tank: The water is then passed into large storage tanks and left for a while for the action of disinfection to be complete. At the tail end of this storage tanks, huge pipes are connected to transport water to our homes and workplaces.

2. Permanent hardness of water is due to the presence of chloride and sulphate salts of calcium and magnesium.

   It can be removed by following processes:

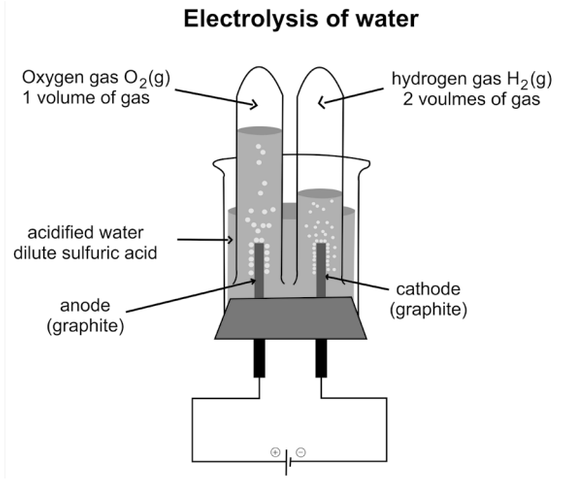
   Adding washing soda: Washing soda is used to remove permanent hardness of water. Adding washing soda converts chlorides and sulphates into insoluble carbonates. These insoluble carbonates are removed by filtration.

   Ion-exchange method: Another method used to remove the hardness of water is to pass it through a column of ion-exchange resins where calcium and magnesium ions get replaced by sodium ions. This converts hard water into soft water.

   Distillation: Temporary and permanent hardness both can be removed by the method ofdistillation. The water obtained afterdistillation is called distilled water. It is thepurest form of water.

3. When an electrical current is passed through water, it is broken up into hydrogen and oxygen gases. This process of decomposition of water into hydrogen and oxygen gas due to passage of electric current is called **electrolysis of water**.

   The set-up of an apparatus for electrolysis of water is shown in the figure.



Procedure:

i. In this set-up, a beaker is fixed with two graphite (*carbon*) rods using a rubber stopper. These rods acts as electrodes (*a conductor through which electricity enters or leaves*) are connected to a battery of 6V.

ii. The electrode connected to the positive terminal of the battery is the anode and the electrode connected to the negative terminal of the battery is the cathode.

iii. The beaker is filled with water such that the two graphite rods are immersed in it.

iv. Add a few drops of dilute sulphuric acid which acts as an electrolyte. The electrolyte is necessary because pure water will not carry enough charge due to the lack of ions.

v. Take two test tubes filled with water and invert them over the two graphite electrodes.

vi. It is observed that bubbles are formed at both the electrodes. This shows that gases are collected in both the test-tubes.

Observation:

i. If a candle is brought near the anode, it burns more brightly showing that it is oxygen gas. If the candle is brought near the cathode, it burns with a popping sound showing that it is hydrogen gas.

ii. The volume of hydrogen gas collected at cathode is two times than the volume of oxygen gas collected at anode i.e., the ratio of hydrogen to oxygen is 2:1.

Inference:

This concludes that water is made up of hydrogen and oxygen.

The reaction is: $2H_2O \xrightarrow{\text{(passage of current)}} 2H_2 + O_2$

4. Water pollution is the pollution of bodies of water, such as groundwater, lakes, rivers, seas, and the oceans. It occurs whenpollutants of domestic, agricultural and industrial wastages reach these bodies of water, without treatment which results in the contamination of water. Let us see some of the sources of the water pollution.

   Household Detergents: Most of us use synthetic detergents, shampoos, shower gels, soaps at our homes for cleaning utensils, washing clothes, wiping the floors, and cleaning ourselves. They have small round pieces of plastic added to them called microbeads.Further, they cannot be broken and end up polluting both surface and ground water.Excessive use of these detergents affects fish and other animals when they enter water bodies.

   Domestic Sewage: Domestic Sewage means waste water produced due to human activities in households; i.e. wastewater from the kitchen, shower, wash basin, toilet and laundry.

   This untreated sewage contains impurities such as organic matter from food waste and toxic chemicals which may also contain disease causing microbes.

   Domestic Waste and Plastics: Domestic waste is waste that is generated by humans in their day today life. The plastic items lying on the side of the roads eventually drains into different water bodies. They end up choking the water bodies and aids in spreading vector borne diseases such as malaria and dengue.

   Agricultural causes: Fertilizers, pesticides and insecticides used in agricultural fields dissolve in rain water and flow into water bodiessuch as rivers and lakes. Excess accumulation of nutrients such as nitrates and phosphates as well asother toxic chemicals in water bodies leads to eutrophication, which is harmful for aquatic life and life in general.

   Thermal pollution: Thermal pollution occurs when powerplants and factories discharge hot or cold water into nearby water bodies, causing rapidly changing water temperature. Most marine organisms have specific temperature needs and are unable to survive sudden changes. Even small temperature changes result in thermal shock to aquatic life, causing reproduction difficulties and lower disease resistance.

   Industrial Waste: Industrial water pollution is caused by the discharge of harmful chemicals and compounds into water like sulphur, asbestos, lead, mercury, cyanides and cadmium. If this is not regulated before releasing into waterbodies it impacts aquatic life and makes water unfit for consumption by living beings.

   Oil Spills: Contamination of seawater due to oil spills either during exploration or transportation causes a serious threat to aquatic life. As oil floats on water, the surface blocks sunrays reducing the oxygen levels and suffocates marine life.

   Note: *Any four of the above reasons can be written as an answer.*

5. Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include lakes, rivers, oceans and groundwater. Water pollution results when contaminants are introduced into the natural environment.

Agricultural operations and industrial wastes contaminate water.

a. Agricultural operation

- Fertilizers, pesticides and insecticides used in agriculture dissolve in rain water and flow into water bodies such as rivers and lakes.
- Excess accumulation of nutrients such as nitrates and phosphates as well as other toxic chemicals in water bodies leads to eutrophication, which is harmful for aquatic life.
- Most marine organisms have specific temperature needs and are unable to survive sudden temperature changes. Even small temperature changes result in thermal shock to aquatic life, causing reproduction difficulties

and lower disease resistance capacity of marine life.

b. Industrial Waste

- Industries cause water pollution by the discharge of harmful chemicals and compounds sulphur, asbestos, lead, mercury, cyanides and cadmium into water bodies. These chemicals are very dangerous and water becomes toxic.

  Besides, many of the chemicals maybe at high temperature and can destroy all plant and animal life in the water bodies.

6. The safest and most beneficial drinking water is distilled water. It is free of toxins, chemicals, bacteria and viruses.

   Distilled water is found to be 99.9% pure. It is by far the cleanest water available for consumption. It is used to make crystal clear ice cubes, for diluting medicines, for baking and cooking, for cleaning wounds, in car batteries and radiators.

Preparation of Distilled water

Water to be distilled is taken in a distillation flask that is connected to a Liebig condenser. This condenser is further connected to a receiving flask.

Now, the distillation flask is heated so that the water in the flask starts boiling and gets converted to steam. The vapour passes into the Liebig condenser, where it is cooled and condenses to water and is collected in the receiving flask.

The water in the receiving flask is pure water free of contaminants and any impurities. This is one of the easiest methods of water purification.

IX. Higher Order Thinking Skills (HOTS):

1. Distilled water is about 99% pure water. It does not contain any dissolved impurities. Hence distilled water freezes at 0°C.

   Impurities lower the freezing point of a liquid.

   River water contains several dissolved salts. These impurities in the water lower the freezing temperature of river water.

   Hence distilled water freezes first and river water freezes later.

2. Crystals of ferrous sulphate are greenish in colour and have a definite crystalline shape. On heating, the crystals lose water of crystallisation and crumble to a white powder.

3. Pure water is colourless, odourless and tasteless. However potable water contains traces of compounds that are not harmful but impart a slight taste to water. The type of salts and quantity of these in water varies from place to place. Hence water tastes different in different places.

X. Analyse the following:

1. Generally, liquids contract on cooling and the density increases. However, water contracts when cooled till 4°C but thereafter, water begins to expand till it reaches 0°C and turns into ice. Water attains its maximum density at 4°C. This property is called anomalous expansion of water. When water cools below 4°C, it expands, becomes lighter and floats on the surface. When water on the surface freezes, it becomes ice and floats on the surface. Below the layer of ice, water is at 4°C and is in the liquid state. So fish continue to live in this water, just below the layer of ice.

Chapter - 5 ACIDS AND BASES

Page No. 86 - 88

Evaluation:

I. Fill in the blanks:

1. benzoic
2. acidus
3. bitter
4. CaO
5. Alkaline
6. Indicators
7. deep pink or deep red

II. Choose the best answer:

1. a) sour
2. c) a, b, c – acids, bases, salts
3. c) red
4. a) OH^-

5. d) alkali
6. d) formic acid
7. a) acidity
8. a) salt and water
9. a) basic
10. d) red

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

1. False – Most acids are soluble in water as acids are ionic compound and ionic compound have property of solubility in water.
2. False – Acids are sour in taste and bases are bitter in taste
3. False – Bases give soapy touch only in aqueous media not in dry nature.
4. True
5. False – Alkalis are bases because they all alkalies are soluble in water. However not all bases are alkalis because not all bases dissolve in water.
6. True

IV. Answer briefly:

1. Acids are defined as those chemical substances which release hydrogen ions when dissolved in water.

   Example:

   Hydrochloric acid + Water $\rightarrow$ Hydrogen ion + Chloride ion

   $HCl + H_2O \rightarrow H^+ + Cl^-$

2. **Physical Properties of Acids:**

i. Acids are sour to taste and colourless.

ii. Most acids exist as liquids whereas some acids like benzoic acid exist in solid state.

iii. Strong acids are corrosive in nature. They act on metals, cloth etc. They are corrosive on the skin.

iv. They dissolve in water and their solutions conduct electricity.

3. **Similarities between acids and bases:**

i. They both are corrosive in nature.

ii. They both ionise in aqueous solution.

iii. They conduct electricity in aqueous solution.

iv. They undergo neutralization reaction.

4. **Differences between acids and bases:**

Acids	Bases
Acids produce H^+ ions in aqueous solution.	Bases produce OH^- ions in aqueous solution.
Acids are sour to taste.	Bases are bitter to taste.
Most of the acids are in liquid state and a few are in solid state.	Bases are in solid state and a few bases are in liquid state.
Acids turn blue litmus paper to red.	Bases turn red litmus to blue.
Acids give a tingling sensation when touched.	Bases in aqueous solution give a slippery feel when touched.

5. An indicator is a chemical substance (either natural or artificial) which indicates the end of a chemical reaction by a suitable colour change.

   Example: Extracts of turmeric powder, hibiscus, beetroot and vegetables are used as natural indicators. Phenolphthalein and methyl orange are artificial indicators.

6. When acids and bases are mixed together in aqueous solution, they react chemically to produce salt and water. This is known as neutralisation reaction.

   Example: $NaOH + HCl \rightarrow NaCl + H_2O$

7. **Physical properties of bases:**

i. Bases are slippery to touch in an aqueous media.

ii. They usually taste bitter and colourless and corrosive in nature.

iii. They exist mostly in solid state but some exist in liquid state.
   Eg. Ammonium hydroxide

iv. They change the colour of red litmus paper into blue, turn methyl orange, yellow and turn phenolphthalein indicator, pink.

v. They conduct electricity in aqueous medium. This is because they ionize in water to form cations (+ ve) and anions (– ve).

V. Answer in detail.

1. Uses of Acids:

i. The acid (Hydrochloric acid) present in our stomach helps in breaking down and digestion of food.

ii. Diluted acetic acid (vinegar) is used in processing and preservation of food.

iii. Benzoic acid is also used as a preservative for food items like pickles.

iv. Hydrochloric acid is used in the production of PVC, a type of plastic.

v. Nitric acid and sulphuric acid are used to manufacture fertilisers.

vi. Citric acid is used in the food industry as lemon flavouring.

vii. Tartaric acid is used in food industries to give tart flavour to food.

viii. Carbonic acid gives fizz to carbonated drinks.

ix. Ethanoic acid is used for cleaning purposes like cleaning metals before electroplating, processing leather, maintaining swimming pools, etc.

x. Sulphuric acid is used in batteries.

xi. All living organisms have cells that contain fundamental elements called nucleic acid. Animals have DNA (Deoxyribonucleic acid) and plants have RNA (Ribonucleic Acid).

2. Uses of Bases:

i. Sodium hydroxide and potassium hydroxide are used in the manufacturing of soaps and detergents.

ii. Sodium hydroxide is also used in paper industries, textile industries and in the preparation of medicines.

iii. Calcium hydroxide is used to neutralize acidity in soil and in white washing. It is also used in manufacturing bleach.

iv. Aluminium hydroxide and magnesium hydroxide (milk of magnesia) are used as antacids.

v. Ammonium hydroxide is used as a laboratory reagent. It is also used in the manufacturing of rayon, rubber, plastic, dye, etc.

3. Neutralisation reactions in our daily life:

Ant bite or bee sting:

i. When an ant bites or a bee stings, it injects a venom that is acidic in nature (formic acid). It causes pain and irritation.

ii. A base is applied typically to neutralise the acid.

iii. Usually, calcium hydroxide (slaked lime), which is readily available in households, or baking soda is used to neutralise the acid.

Wasp bite:

i. When we are bitten by wasp, we feel the burning sensation and pain. It is due to an alkaline substance injected by the insect.

ii. To neutralise the alkalinity we use vinegar which is an acid.

Tooth decay:

i. Bacteria present in food particles get stuck in the gaps between teeth. They produce acids when decomposing. Such acids are the reason for tooth decay.

ii. So we use toothpaste to brush our teeth every day. All toothpastes have weak bases such as sodium fluoride, sodium carbonate, etc. Such bases neutralize the acids and protect teeth.

Antacids:

i. We know that our stomach has concentrated hydrochloric acid to digest food. Sometimes, due to various reasons, the acidity increases.

ii. When the acidity is increased, it burns the food pipe and causes ulcers.

iii. To neutralize this, antacids like milk of magnesia (magnesium hydroxide) and aluminium hydroxide are used.

Soil treatment:

Plants do not tolerate acidic soil much. Nature of the soil is very important for agriculture. So, lime (CaO) or limestone ($CaCO_3$) or wood ash is added to the soil by farmers to neutralise the acidity.

Effluent treatment:

i. The sewage or liquid wastes that are produced from industries are called 'effluents'. This is highly acidic in nature. Lime is added to it to neutralise it before adding it to the waterbodies like rivers.

ii. In power stations, fossil fuel (coal - carbon) is burnt to produce electricity. While burning, sulphur dioxide is released. This gas is acidic in nature. So, this gas is treated with powdered lime (CaO) or limestone ($CaCO_3$) before letting it mix with air. This prevents air pollution.

Note: *Any of the above four reactions can be chosen for the answer.*

4. Natural indicators are chemical substances which are obtained from the natural resources. Litmus, turmeric juice, China rose petals, red cabbage, grape juice and beetroot juice are the indicators obtained from natural resources.

Preparation of a natural indicator from turmeric powder:

i. Mix turmeric powder with water to make into a paste.

ii. Soak a filter paper or blotting paper in this paste and dry.

iii. These strips are used as indicators to find the nature of the solution.

iv. When these strips are immersed in an acidic solution, this does not show any change in colour.

v. But with a basic solution, the colour changes from yellow to red.

5. Refer question no. 3 for answer

VI. Higher Order Thinking Skills (HOTS):

1. Lemon rice has citric acid and curd rice has lactic acid, giving them a sour taste as acids are sour to taste.

2. The tooth caries is formed due to action of acids on enamel surface. Dental caries (cavities) are the most common form of oral disease known to man, and the process of getting caries is called tooth decay.

   Tooth decay is the destruction of your tooth enamel -- the hard, outer layer of your teeth. This issue can affect children, teens and adults.

   Plaque, a sticky film of bacteria, is constantly forming on your teeth. When you eat or drink foods or beverages containing sugars, the bacteria in plaque produce acids that attack tooth enamel. The stickiness of the plaque keeps these acids in contact with your teeth, and over time the enamel can break down.

   So we use toothpaste to brush our teeth every day. All toothpastes have weak bases such as sodium fluoride, sodium carbonate, etc. Such bases neutralize the acids and protect teeth. So, due to the tooth decay, Heshna has teeth with caries.

3. $2HNO_3(aq)$ and

   $Ba(OH)_2(aq) \longrightarrow Ba(NO_3)_2 + 2H_2O$

   $H_3PO_4(aq)$ and

   $Ca(OH)_2(aq) \longrightarrow Ca_3(PO_4)_2 + 2H_2O$

Chapter - 6

CHEMISTRY IN EVERYDAY LIFE

Page No. 111 and 112

Evaluation:

I. Choose the correct answer:

1. d) mercaptan
2. b) water gas
3. c) kilo joule per kilo gram
4. d) Anthracite
5. a) methane

II. Fill in the blanks:

1. carbon monoxide and nitrogen
2. methane
3. rock oil
4. destructive distillation of coal
5. coal

III. Match the following:

1. c – petrol
2. a – diesel
3. b – methane
4. e – first stage of coal
5. d – brown in colour

IV. Answer briefly:

1. The property of carbon atom to form bonds with itself resulting in asingle large structure or chain is called catenation.

2. **Advantages of natural gas:**
   i. Natural gases are environmental friendly gases as they burn cleaner compared to other fossil fuels.
   ii. It is cheaper and easy to extract.
   iii. It is safer when transported and stored.

3. CNG – Compressed Natural Gas.

Uses of CNG:

   i. It is the cheapest and cleanest fuel.
   ii. Vehicles using this gas produce less carbon dioxide and hydrocarbon emissions.
   iii. It is less expensive than petrol and diesel.

4. Water Gas, a gaseous mixture of carbon monoxide and hydrogen is known as syngas. It is called so as it is used to synthesise methanol and simple hydrocarbons.

5. Being the higher grade coal with fewer impurities, Anthraciteis a dark black and hard coal containing 86% -97% of carbon content.
   i. It has a higher heat capacity and a lighter weight.
   ii. Due to their stronger property, in contrast to the other types, this coal burns longer producing more heat with less dust.
   iii. It is a high value product making it more expensive to be used in power plants. Therefore, it is used only as a domestic fuel.
   iv. On the strength of its purity, anthracites can be categorized into high grade (HG) and ultra-high grade (UHG).

6. **Differences between octane number and cetane number:**

Octane Number	Cetane Number
Octane rating is used for petrol.	Cetane rating is used for diesel.
It measures the amount of octane present in petrol.	It measures the ignition delay of the fuel in diesel engines.
Octane number of petrol can be increased by adding benzene or toluene.	Cetane number of diesel can be increased by adding acetone.
The fuel with a high octane number has a low cetane number.	The fuel with a high cetane number has a low octane number.

7. Wind energy is obtained with the help of wind mills. When wind blows, they rotate the blades of the wind mills and current is produced in the dynamo. Wind mills are mostly located at Kayathar, Aralvaimozhi, Palladam and Kudimangalam in Tamil Nadu producing 1,500 MW in capacity.

8. Solar energy is the only viable fuel source of non-depleting energy as

i. it is derived from the sun that makes life possible on our earth and the radiations are continuous or never ending.
ii. it is a renewable source of energy as the Sun is source of this energy.
iii. it a potential source of energy that doesn't endanger the environment and can replace the fossil fuel to meet the needs of the world.

V. Answer in detail:

1. Coal is a fossil fuel formed from peat, a plant matter which was compressed to high temperature and pressure. It is a non-renewable source of energy as its formation takes several decades.

On the basis of amount of carbon content and amount of heat energy produced, coal can be classified into four major categories namely lignite, sub-bituminous, bituminous and anthracite.

Lignite: It is a low grade, brown colour coal containing a very less amount of carbon content of about 25 % – 35%. This coal is considered to be the most harmful to health, compared to the other types. It has higher moisture content and ash ranging from 6 % – 19% from the other types. Due to its volatility it can be easily converted to gas and liquid petroleum products.

Unfortunately, the presence of high moisture content makes it susceptible to spontaneous combustion, making it difficult to transport. On the other hand, due to their specific properties lignite is environmentally beneficial for cultivation and as alternates to chemical pesticides.

Sub-bituminous: As a result of hardening and darkening of lignite coals sub-bituminous coal is formed. It is a black and dull coal containing more carbon content of about 35%–44% than lignite.

Moisture content of this coal ranges from 15% - 30% with relatively less density, and it is more susceptible to spontaneous combustion. However, it has lower sulphur content than the other types, which allow sit to burn clearly. Thus, this unique property of sub-bituminous coal allows it to be used in certain power plants, aiming to reducethe SO_2 emission considering acid rain.

Bituminous: It is a tar like dark and densese dimentary rock formed as a result of changes in physical and chemical composition of sub-bituminous rock.

It often appears with sharp bands of bright and dull material. The carbon content is higher than that of the lignite of about 45 to 86 % and has a higher heat capacity. Thus, this coal is used to progenerate electricity in steam electric power stations. In addition, coke used to manufacture steel and iron is obtained from bituminous coal.

Anthracite: Being the higher grade coal with fewer impurities, Anthraciteis a dark black and hard coal containing 86%-97% of carbon content.

i. It has a higher heat capacity and a lighter weight.

ii. Due to their stronger property, in contrast to the other types, this coal burns longer producing more heat with less dust.

iii. It is a high value product making it more expensive to be used in power plants. Therefore, it is used only as a domestic fuel.

iv. On the strength of its purity, anthracites can be categorized into high grade (HG) and ultra-high grade (UHG), which are majorly found in countries like Russia, Ukraine, South Africa and USA.

2. **Destructive distillation:** Coal when heated in the absence of airdoes not burn but produces many by-products.This process of heating coal in the absence ofair is called destructive distillation of coal.

Products obtained from petroleum:

The crude petroleum obtained from the well is a dark colored viscous liquid which contains many impurities such as water, solid particles and gases like methane and ethane. To make it useful for different purposes, it must be separated into various components. The process of separating petroleum into useful by-products and removal of undesirable impurities is called refining. The steps involved in this process are given below.

1. Removal of water
2. Eliminating sulphur content
3. Fractional distillation

Products obtained from petroleum after fractional distilling it are

i. Liquefied Petroleum Gas or LPG is used in houses as well as in industries.

ii. Petrol is used as a solvent for dry cleaning.

iii. Diesel and petrol are used as fuels for vehicles. They are also used to run electric generators.

iv. Kerosene is used as a fuel for stoves and also in jet planes.

v. Paraffin wax is used to make candles, ointments, ink, crayons, etc.

vi. Bitumen or asphalt is mainly used to surface roads.

vii. Lubricating oil reduces wear and tear and corrosion of machines.

3. Any material that can be used to produce heat and energy on burning or reacting with other substances is called fuel.

Fuels can be classified into three major types based on the physical state they exist in. Physical state includes solid, liquid and gas.

Solid Fuel

Fuels that exist in solid form are called solid fuels. These include wood and coal that produce heat when burnt. Solid fuels are the first type of fuel used by mankind. It is considered to be the cheapest and easily portable fuel as it can be transported and produced easily with less cost.

Liquid Fuel

Almost all the liquid fuels are derived from fossils of dead plant and animal matter. These fuels give more energy on heatingcompared to solid fuels and burn withoutash. Some examples of liquid fuels includepetroleum oil, coal tar and alcohol.

Gaseous Fuel

Gaseous fuels are pollution free gases. It can be transported easily though pipes to the place of consumption. Some common gaseous fuels include hydrogen, coal gas, oil gas and producer gas. In addition, gaseous fuels are considered sources of potential heat or light energy.

Alternative fuels

i. **Bio diesel** is a fuel obtained from vegetable oils such as soya bean oil, jatropha oil, corn oil, sunflower oil, cotton seed oil, rice-bran oil and rubber seed oil. Some applications of bio-diesel include usage in trains and cars.

ii. **Wind energy:** When the wind blows it mechanically activates the turbine and rotates. When the turbines of the wind mills rotate this mechanical energy is converted to electric energy in the dynamo. It is a more sustainable and renewable source of energy and has a much smaller impact on the environment.

iii. **Gobar gas** is obtained by the fermentation of cow dung in the absence of air (anaerobic conditions). It mainly contains methane and a little ethane. It is widely used in rural areas for cooking and operating engines.

iv. **Solar Energy:** The sun is the major source of energy that supports life on Earth. Energy flow starts from obtaining heat and light energy from the sun. Solar energy is a clean, non-depleting, free and renewable source of energy as the energy flow is continuous.

The light and heat from the sun is harnessed from the sun using evolving technology, which has now become easily affordable. It is the most efficient way of harvesting energy as minimum effort using various equipment can produce immense energy.

VI. Higher Order Thinking Skills (HOTS):

1. When coal is heated in the absence of air it does not burn, but it produces a few by-products. This process is known as destructive distillation of coal. The important by- products of the reaction are coke, oils, coal gas and ammonia.

   Ultimately, only a black residue called coke is left.

   Coke is a black porous solid and contains 98% of carbon. It is the purest form of coal. It is an excellent fuel as it burns without smoke and has high calorific value if high. Its industrial application includes extraction of metal from its ores as it is a reducing agent.

2. Coal is another form of fossil fuel formed from peat, a plant matter. Over million years ago, when this peat, the precursor of coal, was subjected to high temperature and pressure underground, it decayed to convert itself to coal.

   Coal appears in brownish-black or black rock coal seams, which is highly combustible. Coal is mainly carbon with varying amount of hydrogen, sulphur, oxygen, and nitrogen. The varieties of coal are:

   lignite - is a low grade, brown colour coal containing a small amount of carbon content of about 25%–35%. This coal is considered to be the most harmful to health, compared to the other types of coaI as it has higher moisture content and ash ranging from 6–19%*l*.

   Besides being used as a low grade fuel, it can be easily converted to gas and liquid petroleum products.

   Sub-bituminous - hardening and darkening of lignite forms sub-bituminous coal. It is a black and dull coal containing carbon content of about 35%–44%.

   Moisture content of this coal ranges from 15%–30%. This variety is more susceptible to spontaneous combustion. However, it has lower sulphur content than the other types of coal which allows it to burn clearly.

   Bituminous - is a tar like dark and dense sedimentary rock formed as a result of changes in physical and chemical composition of sub-bituminous rock. It often appears with sharp bands of bright and dull material. The carbon content is higher than that of the lignite

of about 45 to 86 % and it also has a higher heat capacity. This coal is used to generate electricity in steam electric power stations.

Anthracite is a dark black and hard coal containing 86%–97% of carbon content. It has a higher heat capacity and a lighter weight. Anthracite burns longer producing more heat with less dust. It is more expensive and suitable as a domestic fuel.

3. Fossil fuels such as coal, petroleum, natural gas are carbonaceous. Burning of fossil fuels produces gases like CO, CO_2, SO_2, NO_2. This causes air pollution. Also if we burn any fossil fuel in the presence of insufficient supply of oxygen carbon monoxide and unburnt hydrocarbons get released into the atmosphere which is harmful for human health. If we burn fossil fuels in the presence of sufficient supply of oxygen it releases Carbon dioxide which absorb harmful radiation which is emitted by the earth which increase temperature of earth and cause Global Warming.

   (i) Presence of CO_2 in large amount leads to global warming.

   (ii) Presence of SO_2 and NO_2 in larger amount causes acid rains which damages both crops and buildings made-up of marble.

VII. Value based question:

1. a. If it is not possible to walk, riding a bicycle is the best mode of transport.

   b. By seeking non-conventional fuels such a wind, water and solar energy.

   c. Radha is helping to preserve the environment. She is a responsible citizen.

Chapter - 7

CROP PRODUCTION AND MANAGEMENT

Page No. 133 and 134

Evaluation:

I. Choose the best answer:

1. b) sowing
2. a) bio-pesticides
3. b) surface irrigation
4. d) Sugar
5. c) soil treatment

II. Fill in the blanks:

1. transplanting
2. weed
3. herbicides
4. heirloom seeds
5. Krishi Vigyan Kendras
6. Indian Agricultural Research Institute

III. Match the following:

1. b - Bacillus thuringiensis
2. c - Control white flies
3. d - Improves soil fertility
4. e - Quality of environment
5. a - Neem Leaves

IV. Answer briefly:

1. It is the process of loosening and mixing the soil from within. Also known as tilling, the soil is turned up and down to allow the nutrients to be available in the root zone of the plant.
2. The methods followed for sowing seeds are sowing by hand, sowing with a seed drill and dribbling.
3. A foliar spray is a liquid fertilizer applied directly to the foliage (leaves).
4. Farm science centres that serve as links between ICAR (Indian council of Agricultural research) and farmers are the Krishi Vigyan Kendras. They aim at applying agricultural research findings to practical localized settings.
5. Bio indicators or biological indicators are organisms like birds, bacteria lichens, etc., that are used to monitor the health of the environment. They may be a species or a group of species whose function or status reveals the qualitative status of the environment. They help us understand changes in the living systems on earth, especially changes caused due to human activities and an increase in population and characterise the state of an ecosystem and its modifications.
6. Weeds are unwanted plants that grow naturally along with a cultivated crop in agricultural fields. Removal of weeds from a crop field is called weeding.
7. Crop rotation is a method of growing a series of different crops on the same piece of land in succession or following a defined order.

8. Green manure is any green undecomposed material that is used as manure. It is obtained by either growing green manure crops or by collecting the green leaves and twigs from trees grown in forests or wastelands.

V. Answer in detail:

1. Students can refer to the chapter for this answer.

2. Water is essential for the proper growth and development of plants. Irrigation is the process of watering crops in the field at regular intervals according to their need. The frequency and the type of irrigation used depend on various factors like the type of crop, the season and the nature of the soil. Irrigation is essential at various stages of the growth of crops like development of aerial branches, flowering, fruiting, etc. Some of the sources of irrigation are wells, rivers, dams, canals, tube wells, lakes, ponds and reservoirs. For irrigation to be effective the supply of water to the crops must be controlled, uniform, in the required amount, at the right time and with the minimum expenditure. In our country, we use both traditional and modern methods of irrigation depending on the availability and the amount of water needed for the crops. Traditional methods of irrigation are usually carried out manually. They include the moat system, the lever or Rahat system, the dhekli system and the chain pump system. The main advantage of traditional methods of irrigation is that they are cheap. Modern methods facilitate the even distribution of water and moisture in the field. They are the sprinkler irrigation, drip irrigation, furrow irrigation and basin irrigation.

3. Weeds are unwanted plants that grow naturally along with a cultivated crop in agricultural fields. Growth of weeds in a field is harmful because they compete with the desired crop for water, sunlight, space and nutrients. Removal of the weeds from a crop field is called weeding. Some of the methods of weed control are as follows:

   Mechanical methods: In this method weeds are manually removed by hand or by using a trowel or hand fork.

   Tillage method: In this method the weeds are buried in the soil or exposed to sunlight by deep ploughing.

   Crop rotation: Crop rotation is another method of getting rid of weeds that are associated with particular crops and parasitic weeds.

   Chemical methods: Weeds are destroyed by spraying them with chemicals like 2, 4-D (2, 4-Dichlorophenoxy-acetic acid), Metachlor, Butachlor, etc. which are known as weedicides.

   Biological methods: Bio agents like insects, pathogens or other organisms are put into crop fields with weeds. They eat the weeds, but do not harm the crops.

   Integrated weed management: A new practice called 'integrated weed management' that combines different agronomic practices, and the use of weedicides and herbicides to manage weeds is now being used. This ensures that the farmers' dependence on any one weed control technique is reduced.

Chapter - 8

CONSERVATION OF PLANTS AND ANIMALS

Page No. 155 and 156

Evaluation:

I. Choose the best answer:

1. d) none of these
2. c) endemic
3. d) none of these
4. b) on site conservation
5. b) 1972

II. Fill in the blanks:

1. World Wildlife Fund
2. Endemic
3. International Union for Conservation of Nature
4. The Nilgiris
5. March 3

III. Match the following:

1. b - Gujarat
2. c - West Bengal
3. e - Tamil Nadu
4. b - Uttarakhand
5. a - Madhya Pradesh

IV. Answer in one or two sentences:

1. When solar energy falls onto the earth's surface, it is reflected back into the atmosphere. Part of this energy is trapped by the green house gases and sent back to the earth, keeping it warm. A part goes back into space. When green houses gases like carbon dioxide and methane accumulate in the atmosphere they trap more heat energy leading to an increase in temperature called global warming.
2. Extinct species are those like the dinosaurs, dodo, and some varieties of ferns and gymnosperms which no longer exist on Earth. These species may have disappeared because of shortage of space, food or most probably due to climatic changes
3. Dinosaurs, Dodo are examples of extinct species.
4. Students can name any two from the chapter.
5. IUCN stands for International Union for Conservation of Nature. It is an international organization working in the field of nature conservation and sustainable use of natural resources. It maintains the Red Data Book.

V. Answer briefly:

1. Biosphere reserves are protected areas of around 5000 square kilometres where the human population also forms a part of the system. Set up mainly for economic development, they conserve the eco system, species and genetic resources.
2. Tissue culture is the technique of cultivating or the growing of plant or animal cells, tissues, organs, seeds or other plant parts in a sterile environment on a specially formulated nutrient medium. An entire plant can be regenerated from a single cell under the right conditions.
3. Animals and plants that are on the verge of extinction since their number is constantly decreasing are called endangered species. There are only few of them left on Earth, and soon even they may become extinct.

   Deforestation and loss of habitat, environmental pollution, human interference, hunting and poaching have resulted in many species in India becoming endangered and some even extinct. Examples of endangered plants are malabar lily, Umbrella tree, Indian mallow, Rafflesia flower, Musli plant and of endangered animals are Snow leopard, Lion tailed macaque, Asiatic lion, Indian rhinoceros and Nilgiri tahr.
4. The advantages of the Red Data Book are it can be used to

- Evaluate the population of a particular species.
- Evaluate the species at the global level.
- Estimated the risk of a species becoming globally extinct.
- Provide guidelines to implement protective measures for endangered species.

5. The main reasons for the conservation of forests are:

- Forests provides a habitat, a place of protection and a source of food for several plant and animal species as well as people who live in forests. They provide fodder for cattle and other animals.
- Forests provide us with vital products that we use in our daily lives, directly or indirectly, like wood for timber, paper, fuel, firewood, sandalwood and a variety of medicines.
- They increase the amount of oxygen in the atmosphere.
- The water vapour in the atmosphere increases due to transpiration, and this helps in the water cycle and rainfall.
- Trees reduce the amount of carbon dioxide in the atmosphere. This effects air pollution, and the amount of green house gases and global warming are controlled.
- The roots of trees prevent the top soil along with the nutrients from being washed away during heavy rainfall preventing soil erosion.

6. Our environment contains many toxic chemicals and contaminated substances. These include heavy metals like mercury and arsenic, and pesticides such as

polychlorinated biphenyls and DDT (Dichlorodiphenyltrichloroethane). When organisms consume food they take in these substances. Biomagnification is the process in which toxic chemicals and other contaminated substances build up within organisms. It takes place across entire food chains and affects all organisms. For example, when a predator consumes its prey it consumes all the toxic substances in it. Animals higher up in the chain are therefore more affected as they feed on organisms lower down in the food chain and the toxic chemicals accumulate in them. There are therefore increasing concentrations of these toxic chemical in the tissues of organisms at successively higher levels in the food chain.

7. The People's Biodiversity Register is a document that contains complete information on availability and knowledge of locally available bio-resources of a particular area or village. It includes their medicinal or any other use, any traditional knowledge about them, as well as the landscape, demography.

   According to the provisions of the Biological Diversity Act, 2000, each local body has a Biodiversity Management Committee set up that prepares the People's Biodiversity Register. This is done with the guidance and technical support of the National Biodiversity Authority and the State Biodiversity Boards.

   The purpose of preparing this register is to promote conservation, preservation of habitat and breed of animals and microorganisms, and gather knowledge related to biological diversity.

   It is a very useful tool in the management and sustainable use of bio resources and is also useful for teaching students environmental studies.

VI. Answer in detail:

1. The destruction of forests to make land available for different purposes is known as deforestation. Deforestation may be the result of human activities or due to nature.

   Deforestation can be caused naturally due to forest fires, cyclones, floods and severe drought.

Human activities responsible for deforestation are:

- to make space for agriculture
- urbanisation-building houses and infrastructure development
- industrialisation
- demand for wood as timber and for construction
- illegal logging
- producing firewood
- for fuel, and forest products like paper, sandalwood, etc.
- cattle breeding
- mining and oil extraction
- dam construction

Deforestation has rendered several species of animals homeless. Many species of flora and fauna have been lost, and some are on the verge of extinction.

Cutting trees and destroying forests increases the amount of carbon dioxide in the atmosphere and it starts to accumulate there leading to global warming. It has also led to climate changes and several ecological imbalances like increasing temperatures, decreasing rainfall, etc. Cutting of trees results in soil erosion, and the soil along with its nutrients are lost. Continued erosion makes the land hard and infertile, leading to desertification; the land becomes unfit for the growth of any plants. When trees are cut down, excess runoff leads to decreased infiltration into the soil and depletion of ground water levels. The flow of water leads to natural calamities like floods in many areas. Cutting of trees decreases the amount of water vapour released through transpiration and there is a corresponding decrease in the amount of rainfall. Deforestation also affects the lives of the indigenous tribes of people.

2. The advantages of in-situ conservation are as follows:

- The natural habitat is maintained and the species can adapt to their habitats.
- The species can interact with each other.
- It costs less to set up and is easy to manage.
- The interests of the indigenous people are protected.

The advantages of ex-situ conservation are as follows:

- Several endangered animals can be bred through these conservation methods.
- Threatened species can also be bred and released into their natural environment.
- The decline of a species is prevented.
- This conservation technique is extremely useful for conducting scientific and research work.

3. There are two types of conservation, in-situ conservation which is within the habitat and ex-situ conservation which is outside the habitat.

   Conservation of living organisms within the natural ecosystem where they occur is called in-situ conservation. This is carried out by protecting the natural habitat and maintaining endangered species in protected areas like national parks, wildlife sanctuaries, bird sanctuaries and biosphere reserves. Conservation of wildlife outside their habitat is called ex-situ conservation. Some of the strategies followed in this method include setting up botanical gardens, zoos and zoological parks, aquariums, captive breeding, conservation of genes, seed banks, seedling and tissue culture, etc.

4. In 1897, a group of animal lovers founded an organisation called 'Our Dumb Friends League' to care for working horses on the streets of London. Today it is known as the Blue Cross, and it is a registered animal welfare charity in the United Kingdom. Their aim is to make sure that every pet enjoys a healthy life in a happy home.

   In 1959, in Chennai, Captain V. Sundaram started the Blue Cross of India. It has all the amenities like shelters, hospitals, ambulance services, animal birth control services, etc.

Some of the activities of the organization are as follows:

- Providing shelters and homes for unwanted pets.
- Adoption and re-homing cats, dogs, small pets and horses.
- Animal birth control.
- Maintaining animal hospitals and mobile animal dispensaries to treat sick and injured pets (especially owners who can't afford private veterinary treatment).
- Providing ambulance services for sick and injured animals.
- Educating the people on the responsibilities of animal ownership.
- Spread animal right awareness.

Class: 8 KEY ANSWERS TERM : III

HISTORY

Chapter - 1
URBAN CHANGES DURING THE BRITISH PERIOD

Page No. 168 and 169

Evaluation:

I. Choose the correct answer:

1. a) Harappa and Mohenjodaro
2. d) All of these
3. a) All of the above
4. a) For trading
5. c) Madras
6. c) Fort St. George

II. Fill in the blanks:

1. 1853
2. Ripon
3. Dyarchy
4. Sir Joriah Child
5. 1639

III. Match the following:

1. Bombay	d. Seven island
2. Cantonment towns	e. Kanpur
3. Kedarnath	a. Religious centres
4. Darjeeling	b. Hill stations
5. Madurai	c. Ancient town

IV. Choose the correct statement:

1. c) A is correct and R explains A
2. a) I only
3. c) A is correct and R explains A

V. Answer the following in one or two sentences:

1. An urban area is one that has a high population density engaged in occupations other than food production, living in a highly built environment.
2. Hill stations became strategic places for billeting troops, guarding frontiers and launching campaigns.
   - Hill stations were developed both these hill stations were also developed as Sanatoriums. (places for soldiers for rest and recovery from illness)
   - The introduction of railways made hill station more accessible.
3. Calcutta, Bombay and Madras are Presidency cities.
4. The causes for the new trend of urbanization in the 19th century.

   Opening of Suez canal, introduction of steam navigation, Construction of railways, Canals and harbours.

   Growth of factory industries etc.
5. Cantonment towns:

   The British set up defence establishments known as cantonments or cantonment towns

   (eg. Delhi, Kanpur, Bangalore, Secunderabad).

   These towns were new kind of urban centres that had barracks, bungalows and tree-lined avenues with their own laws and administration, independent of civilian municipalities.
6. The regions covered in the Madras presidency during the British regime:
   – Modern day Tamilnadu
   – The Lakshadweep island
   – Northern kerala
   – Rayalaseema
   – Karnataka and Odisha

VI. Answer the following in detail:

1. **Colonial urban development**

Port Cities:

The English East India Company set up trading posts or factories initially along the coasts in Calcutta, Bombay and Madras. In course of time, the Company bought land around these trading posts from Indian rulers and built settlements. At the heart of these settlements was a fort. The fort in Madras was named Fort St. George and the one in Calcutta, Fort St. Williams.

Cantonment Towns:

The British set up defence establishments known as cantonments or cantonment towns

(eg. Delhi, Kanpur, Bangalore, Secunderabad).

These towns were new kind of urban centres that had barracks, bungalows and tree-lined avenues with their own laws and administration, independent of civilian municipalities

Hill Stations:

Hill stations that were designed to evoke the ambience of the British countryside. The hill stations served as alternate capitals in the summer. They also became strategic locations for billeting troops, guarding frontiers and launching military campaigns. They were used as sanatoria for ailing soldiers, as well.

The first hill station was established in Shimla in 1815.

Railway Towns:

New urban centres called railway towns emerged around major railway stations and around colonies set up to accommodate railway administrative and engineering staff (eg. Jamalpur - Bihar, Waltair - Andhra, Bareilly and Meerut - Uttar Pradesh, Nagpur- Maharastra, Perambur-Tamilnadu)

2. **Origin and growth of Madras:**

The foundation for the modern city of Madras was laid by the English East India Company in 1639. East India Company set up its first factory in India in Surat (1612) on the western coast. Since trade prospects seemed dim in Machilipatnam, the Company began to look for an alternative site on the eastern coast in 1637. Company representatives Francis Day and Andrew Cogan purchased a strip of land along the present Marina Beach from the ruler of Chandragiri in 1639 to build a fort and a factory

Chennai was a cluster of villages and weaving hamlets then. The Company completed building the fort in 1640 and called it Fort St. George. Fort St. George remained the Company's principal settlement till 1774.

The British settlement around Fort St. George grew over time by absorbing the adjacent villages. The area was divided into White Town, where the English and Europeans stayed and Black Town, where Indians stayed. The Raja of Chandragiri, who provided land to the Company, wished that the British name the fort and the settlement after his father, Chennappa Nayaka. But the British named it Madras instead. Subsequently, Madras developed into Madras Presidency. It covered a large area including Tamil Nadu, northern Kerala, Rayalaseema (Andhra), parts of Karnataka and Orissa and the Lakshadweep islands. Post-independence, the Presidency was reorganised as states of Madras, Andhra Pradesh, Kerala and Karnataka on the basis of language through an Act in 1956. In 1969, the Madras state was renamed Tamil Nadu. In 1996, thecity was named as Chennai.

3. The Company's policy of one way free trade – that is, unrestricted entry of British goods into India – resulted in Indian goods competing with machine made goods.

Indian goods lost their markets in India and abroad.

With the onset of the industrial revolution, England witnessed rapid economic development with increased demand for raw materials and need for fresh markets.

Indian peasants were forced to grow commercial crops such as cotton, jute and indigo for export to Britain.

India was disallowed from producing goods she needed on her own soil and was forced to buy machine-made cheap goods imported from Britain. This made India an agricultural colony of Britain.

Chapter - 2 STATUS OF WOMEN IN INDIA THROUGH THE AGES

Page No. 179 - 180

Evaluation:

I. Choose the correct answer:

1. a) Human
2. b) Muthulakshmi Ammaiyar
3. c) 1829
4. d) journalist
5. d) all the above
6. b) 1849
7. c) Hunter
8. d) 14

II. Fill in the blanks:

1. Calcutta Female Juvenile
2. Velunachiyar
3. Gopala Krishna Gokhale
4. Periyar E.V.R
5. Viveka Vardhani

III. State True or False:

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

IV. Match the following:

1. Theosophical society – Annie Besant
2. Sarada Sadan – Pandita RamaBhai
3. Wood's Despatch – 1854
4. Niccolo Conti – Italian traveler
5. Dowry – Social evil

V. Assertion and Reasoning questions:

c) A is correct and R explains A

VI. Answer the following in one or two sentences.

1. The prominent leaders who fought for the women upliftement are Raja Ram mohan Roy, Dayananda Saraswati, Keshab Chandra sen, Ishwara Chandra vidya sagar, Pandita Ramabai, Dr. Muthulakshmi.

2. **Social evils:**

   Sati, Childmarriage, Pardah system, Female infanticide, Devadasi system are some of the social evils against Indian women.

3. Razia Sultana, Chandbibi, Rani Durgavati, Nur Jahan, Rudramadevi,Jijabai, Jahannara, and Mirabai were the notable women during the Medieval period.

4. Some of the notable women freedom fighters are Sarojini Naidu, Lakshmi Sehgal, Aruna Asaf Ali, Sucheta Kripalani, Gaidiuliu and Kamaladevi Chattopadhyay.

5. Sati or self-immolation of women on the funeral pyre of the husband was practised by some communities in the western, eastern and southern parts of India.

   Raja Ram Mohan Roy and William Bentinck, the governor - general of India, passed Regulation XVII in 1829 which declared the practice of burning or burying widows along with their husband a crime and punishable by law.

VII. Answer the following in detail:

1. **WOMEN IN THE FREEDOM MOVEMENT:**

   The best known among women freedom fighters are Velu Nachiyar of Sivaganga, Chennamma of Kittur (Karnataka) and, Tarabai of Maharashtra.

   Begum Hazrat Mahal of Avadh and Lakshmibai of Jhansi led the 1857 Revolt against the British. Women participated in thousands in the freedom movement. They boycotted foreign goods, marched in processions, defied laws, faced lathi charge and courted arrest. Their participation gave the movement a mass character.

   Some of the notable women freedom fighters are Sarojini Naidu, Lakshmi Sehgal, Aruna Asaf Ali, Sucheta Kripalani, Gaidiuliu and Kamaladevi Chattopadhyay.

2. **ROLE OF SOCIAL REFORMERS:**

Ram Mohan Roy:

He is remembered for his relentless work against Sati. He was instrumental in getting the governor-general William Bentinck to pass the law abolishing sati in 1829. He also took up issues such as child marriage and women's education.

Ishwar Chandra Vidyasagar:

He advocated widow remarriage, women's education and polygamy in Bengal. He set up several schools for girls in Bengal. He played an

active role in getting the British government to pass the Hindu Widows' Remarriage Act, 1856.

Kandukuri Viresalingam:

He was the first social reformer in South India. He create awareness on the problems women faced.

M. G. Ranade, B. M. Malabari and G. K. Gokhale:

Ranade – set up widow remarriage association

B. M. Malabari – a journalist, initiated movement against child marriage.

Gokhale – founded the Servants of the society which focused on education in women.

E.V.R. Periyar:

He advocated widow remarriage, freedom to choose one's life partner and women's education.

Women Reformers:

Some of them are Pandita Ramabai, Muthulakshmi, Moovalur Ramamirthams. Dharmambal and Tarabai Shinde.

3. **IMPACT OF REFORM MOVEMENTS:**
   a. raised the level of awareness about the condition of women in India among the general public.
   b. encouraged rational thinking and a sense of solidarity and service, particularly among women.
   c. the practices of sati and child marriage became unlawful.
   d. widow remarriage was legalized.

GEOGRAPHY

Chapter - 1 INDUSTRIES

Page No. 190 and 191

Evaluation:

I. Choose the correct answer:

1. a) Small scale industry
2. c) 4
3. c) Co-operative sector
4. b) Mineral based
5. c) 2

II. Fill in the blanks:

1. tertiary
2. Quaternary and Quinary Activities
3. Quinary
4. Agro based
5. one crore

III. Match the following:

1. Judicial sector - e. Quinary activity
2. TV telecasts - d. Raw materials
3. Geographical factor - b. Non-Geographical factor
4. Capital - c. Quaternary activity
5. Bajaj Auto - a. Private Sector

IV. Distinguish between the following:

1.

Secondary economic activity	Tertiary economic activity
The processing and conversion of primary products into usable forms. Eg., Manufacturing industries	The activities those provide services and support to the secondary activity. Eg. Banking, transport etc.

2.

Agro-based Industries	Marine based
Those industries that depend on plant and animal based products such as food processing industries, flour milling, sugar refining, vegetable oils, cotton and woolen textiles and Dairy products.	Industries based on biotic resources like fish processing and sea weeds; there are also abiotic resources like salt from sea, off-shore petroleum, minerals like manganese that are processed.

3.

Large scale industries	Small scale Industries
Those industries that involve high cost of investment of more than one crore; they also employ very high technology for large production and processing and therefore they also produce large quantities. Examples are iron and steel industry, ship building, heavy electricals.	Those industries use machines with less capital, less than one crore. Their capital investment is smaller. Examples are cotton and silk weaving industry, manufacture of small tools, household goods, etc. Cottage industries.

V. Answer the following in one or two sentences:

1. Industries comprise large scale production of commodities that convert raw materials into usable products. Eg., Iron and Steel Industry.
2. Work that involves the production, distribution and consumption of goods and services is called an economic activity.
3. The major activities are:
   - Primary activity (Agriculture)
   - Secondary activity (Manufacturing industry)
   - Tertiary activity (Transportation)
4. **Factors responsible for location of industries**: Geographical and non-geographical factors.

Geographical factors:

Raw materials, Power, Labour, Transport, Storage and ware housing, Topography, climate.

Non-geographical factors:

Capital, Availability of loans, Government policies/regulations.

VI. Answer the following in detail:

1. **Based on raw materials**

   Agro based industries include plant and animal based products such as food processing industries, flour milling, sugar refining, vegetable oils, cotton and dairy products.

   Mineral based industries are metal based like iron and steel, aluminium, copper, bronze industries, gold and silver. Mineral based industries could also be non-metallic industries like manufacture of cement, acids, detergents, pharmaceuticals.

2. **Geographical factors**
   - Topography or physical features determine much of human activities. The most populated places and majority of human activities are concentrated in fertile plains. Plains offer the land space needed for large industries.
   - Climate is a factor that affects our activities. Places with favourable climates attract people to them.
   - Water supply must be adequate and assured. It is for this reason that iron and steel, thermal power plants and major industries are located on the banks of large rivers or major canals.
   - Raw materials like minerals must be close at hand because mineral ores are heavy and cost a lot to transport. Mineral and metal based industries are located close to raw materials. Iron and steel, sugar industries are examples of industries located close to source of raw materials.
   - Power supply, like water, must be adequate and assured. Industries run on machines that function on high voltage electricity. Coal based or hydro power must be available for these machines without power disruption because many industries work throughout the night and all through the year without a break.
   - Transport of different kinds – roadways and their vehicles, railways and their different modes like goods carriers and passenger trains, airways and water ways help in transportation of people and material. Transport link is a major advantage for any region to be industrialized. Transport is the critical factor affecting industrial location in India.

3.

Industries		
Based on raw material	**Based on size and capital**	**Based on ownership**
1. Agro based 2. Mineral based 3. Forest based 4. Marine based	1. Large scale 2. Small scale	1. Public sector 2. Private sector 3. Joint sector 4. Cooperative sector

Chapter - 2 EXPLORING CONTINENTS AFRICA, AUSTRALIA AND ANTARCTICA

Page No. 213 and 214

Evaluation:

I. Choose the best answer:

1. c) Cape of Good Hope
2. c) Suez Canal
3. b) 2 and 4 are correct
4. a) Great Dividing Range
5. d) Gold

II. Match the following:

1. e. pointed limestone pillars
2. c. small red fish
3. d. flightless bird
4. b. salt lake
5. a. Equatorial forest

III. Assertion and Reasoning questions:

1. c) A is true but R is false.
2. a) Both A and R is individually true and R is the correct explanation for A.

IV. Fill in the blanks:

1. African
2. Mt. Kilimanjaro
3. Eucalyptus
4. downs
5. Dakshin Gangotri

V. Answer the following in one or two sentences:

1. Man first evolved in Africa and moved out to populate the rest of the world. That is why it is called the 'Mother Continent', for it gave birth to the human race.
2. River Nile, River Congo, River Niger, River Zambesi are some important rivers of Africa.
3. The physical divisions of Africa are:
   1. The Eastern Highlands (mountains)
   2. The Great Western Plateau
   3. The Central Lowlands (plains)
4. Agriculture, mining, fishing and trade and services are four economic activities of Australia.

VI. Distinguish between the following:

1.

Sahel	Sahara
This is the sandy and rocky region between the Sahara in the north and the savanna in the south. It is an area semi arid region that is not the fertile tropic nor the dry desert.	The largest desert of the world is 9.2 sq km. It is bordered on the north by the Mediterranean Sea, on the west by the Atlantic Ocean, the Sahel Region in the south and the Nile River on the east.

2.

Western Antarctica	Eastern Antarctica
West Antarctica faces the Pacific Ocean with the Antarctic Peninsula pointing towards South America. It points to the fact that it is a continuation of the Andes mountains.	The East Antarctic faces the Indian Ocean. Mountain Antarctic faces the Indian Ocean. Mountain Erebus is an active volcano on Ross Island.

3.

Great Barrier Reef	Great Artesian Basin
This is the largest stretch of coral island which extends along the coast of Australia. Coral reefs are colonies of coral polyps - tiny organisms that live as a community and so together form reefs. Large colonies of these organisms form islands.	Artesian Basin is an underground geological formation of porous rock that is basin shaped. Rainwater and underground water from surrounding highlands seep into this porous rock and collect in it. The wells of the Great Artesian Basin have supported agriculture and sheep farming.

VII. Give reasons for the following:

1. The long river runs 6650 kilometres from south to north to the Mediterranean Sea, watering the desert of Egypt and making it so fertile and earning the name 'Gift of the Nile'.
2. They are located so because the trade winds blow from the eastern sides, which receive the moisture and rain as they are onshore sides. By the time the winds reach the western sides, they become dry.
3. It is uninhabited except for the scientists from different countries and their research stations. By an international treaty, known as the Antarctic Treaty Settlement, the continent is to be maintained only for research purposes and no country can own it or exploit its resources. It is to be maintained as a zone of peace and science. So, it is called the 'Continent of science/ scientists'.

VIII. Answer the following in detail:

1. **Mineral wealth of Australia:**

   Australia is rich in minerals. In ranks first in mining of Bauxite, limonite, rutile and zircon. The country ranks second in lithium, manganese, gold, lead, zinc, and is the third largest producer of iron ore and uranium.

   Australia is the largest producer of black coal. Iron ore is found in western and southern Australia. Bauxite is mined around the Gulf of Carpentaria, Perth and Tasmania.

   Petroleum is found in the Bass Strait and west of Brisbane.

   Uranium is mined in the Northern Territory at Ram Jungle and Queensland.

   Gold is mined in Kalgoorlie and Coolgardie.

   Silver, manganese, tungsten nickel, copper and tin are also found in the continent.

   Coal is found from New castle to Sydney and iron ore in Western Australia.

2. **Flora and Fauna of Antartica:**

   It is always very cold, the conditions are not favourable for plants. Simple ones like algae, mosses, liverworts, lichens and microscopic fungi can thrive in the harsh conditions. There is almost no soil cover. Some of the planktons, algae and mosses may be seen in the fresh and salt water lakes.

   The animals include aquatic mammals like whales, seals, walruses; krill which is a name for small fish, and crustaceans which the larger animals eat; birds such as penguins, albatross, polar skua and stout. The Arctic tern migrates every year during the Arctic winter to Antarctic for the summer and back. Its flight is the longest any bird makes on Earth. The blue whale is the largest mammal and it feeds on plankton. The animals have a thick layer of fat called blubber under their skin to keep them warm and protect them. Penguins are flightless birds and have webbed feet to walk on land and swim. Albatrosses are among the largest of flying birds.

3. Australia's is divided into
   1. The Eastern Highlands (mountains)
   2. The Great Western Plateau
   3. The Central Lowlands (plains)

The Eastern Highland:

The mountain ridge of the Eastern Highlands extends from Cape York in the north to the island of Tasmania in the south. It has many smaller mountain ranges of which The Australian in

the southern part is the highest with Mount Kosciusko as the highest peak at 2230 metres. These mountains have ice on their peaks.

The Eastern Highlands run very close to the east coast and parallel to it. They are also called the Great Dividing Range for on their heights are located the sources of rivers, some of which flow east to the Pacific Ocean and some to the south west to the Great Australian Bight and some to the west only to sink into the depressions in the centre without actually reaching the sea. As it divides the east flowing rivers from the west flowing ones, it is called the Great Dividing Range.

Chapter - 3 MAP READING

Page No. 224 and 225

Evaluation:

I. Choose the best answer:

1. b) Cartography
2. b) Relief map
3. c) Light blue
4. a) Cadastral maps
5. c) Dots

II. Fill in the blanks:

1. Earth
2. Map
3. Isoline
4. Government
5. Thematic

III. Match the following:

b) 4, 1, 2, 5, 3

IV. Match the statement with the reason and select the correct answer:

1. c) Both the statement and reasons are correct.
2. a) Both the statement and reasons are correct.

V. Answer the following in one or two sentences.

1. Scale is the representation of map distance to actual ground distance. Whatever length we measure on the map, must correspond to a proportionately longer distance on the ground.
2. **Physical maps:**

   Relief or Physical Maps show the physical features of a region. It maybe of a country, continent, the world or smaller regions like a district. The chief aim of these maps is to show major landforms like mountains, plateaus, plains, deserts, rivers and smaller features like important mountain peaks, waterfalls etc.
3. Map projections and locational information give us the latitudinal and longitudinal locations that help us in pinpoint a place.
4. Intermediate directions are north-east, south-east, south-west and north-west.

VI. Distinguish between the following:

1.

Relief map	Thematic map
Relief or Physical Maps show the physical features of a region. It maybe of a country, continent, the world or smaller regions like a district. The chief aim of these maps is to show major landforms like mountains, plateaus, plains, deserts, rivers and smaller features like important mountain peaks, waterfalls etc.	These are maps that are drawn to depict a topic or a theme. They are different from general purpose maps that may show physical features, towns and cities, political divisions, transport lines etc.

2.

Map	Globe
A map is a visual representation of the spherical surface of the earth's or a part of it drawn to scale on a flat surface like a paper. The function of a map is to show by illustration, aspecific, detailed or general information of an area of the world or whole world.	Globe is a three - dimensional model of the entire earth. It shows landmasses and water bodies.

VII. Answer the following in detail:

1. Scale is the representation of map distance to actual ground distance. Whatever length we measure on the map, must correspond to a proportionately longer distance on the ground. So, cartographers indicate this as map scale. They are shown in three ways.

a. Verbal scale is also called a statement scale. It states in words the proportion of map distance to ground distance. Example: 1 cm represents 10 kilometres.

b. Representative fraction (RF) is also called a numerical fraction or ratio scale. In this method, the system of measurement is not given as centimetres to kms or inches to miles. When we measure and calculate, we can use our own system of measurement. The numerator and denominator use the same unit of measurement. The numerator is always 1, which represents 1 unit on the map. The denominator represents the corresponding distance in the same units.

c. Graphical scale is an illustrated way of representing the scale. A linear line is drawn with equally divided segments, each representing the ground distance of the proportionate map distance.

2. **Importance of cadastral map:**

The word cadastral is derived from the French word 'cadastre' meaning 'registration of property'. These would include surveying of properties and their boundaries, mapping them, drawing sketches, plans, charts and diagrams. These official records are kept for land valuation and taxation.

The government maintains these as official documents for tax purposes, local administration and for defining property in legal documents and as a matter of public record.

3. They are used to denote various features. They are used to represent a lot of information in the small map space. They may be figures, numbers, alphabets or colours. Their meanings are given in a legend or key.

The actual map reading to make sense of what the map communicates is possible only with the help of key or legend.

CIVICS

Chapter - 1 DEFENCE AND FOREIGN POLICY

Page No. 237 and 238

Evaluation:

I. Choose the correct answer:

1. a) President
2. d) All the above
3. a) 15th January
4. d) Ministry of Home Affairs
5. c) 1978
6. b) Panchsheel
7. b) Andaman and Lakshadweep Island

II. Fill in the blanks:

1. Wellington, Udhagamandalam, Tamil Nadu
2. Admiral Karambir Singh
3. Arjan Singh
4. Jawaharlal Nehru
5. V.K. Krishna Menon

III. Match the following:

1. Nelson Mandela	-	Apartheid
2. National war Memorial	-	New Delhi
3. Manekshaw	-	Field Marshal
4. SAARC	-	8 members
5. BBIN	-	Energy development

IV. State True or False:

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

V. Answer the following in one or two sentences:

1. National Security is not only important for the political, social and economic development of any country, but it is also essential for its growth and to maintain peace and prosperity.

2. a) SFF - Special Frontier Force
   b) ICG - Indian Coast Guard
   c) BSF - Border Security Force
   d) NCC - National Cadet Corps

3. Initially known as the Crown Representative's Police it became the Central Reserve Police Force after independence. Its mission is as follows:

- to assist the government in maintaining the Rule of law, public order and internal security effectively and efficiently
- to preserve national integrity
- to promote social harmony and development by upholding the supremacy of the Constitution.

A specialised wing of the CRPF (Central Reserve Police Force) known as The Rapid Action Force deals with riots, crowd control, rescue and relief operations, and other unrest related situations

4. The founding fathers of the Non-Aligned Movement were Jawaharlal Nehru of India, President Joseph Tito of Yugoslavia, President Nasser of Egypt, President Sukarno of Indonesia, and Kwame Nkrumah of Ghana.

5. The basic principles of India's Foreign Policy are as follows:

- To preserve national interest
- Economic development
- Abolish colonialism, racial discrimination and imperialism
- Achieve world peace
- Call for disarmament
- Encourage friendly relations among nations

6. The member countries of the SAARC are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

VI. Answer the following in detail:

1. The largest component of the Indian Armed Forces is the Indian Army. It is the land-based branch, and according to statistics it is the largest volunteer army in the world. The Indian Army is commanded by the Chief of Army Staff (COAS), who is a four-star general. It has a regimental system and is operationally and geographically divided into seven commands.

The primary mission of the Indian Army is as follows:

- to ensure national security and national unity
- to defend the country from external aggression and internal threats
- to maintain peace and security within its borders.

The other roles include conducting humanitarian rescue operations during natural disaster and calamities.

2. Paramilitary Forces are those forces that help to maintain internal security, protect the coastline and assist the army.

Some of their other responsibilities include:

- The security of important places like railway stations, Oil fields and refineries, water reservoirs lines.
- Participating in the management of natural or man-made disasters.
- Protecting the international borders (during peace time)

Para military are today used to refer to two forces, The Assam Rifles (AR) and The Special Frontier Force (SFF).The Assam Rifles is the oldest amongst these forces and was started on 24t March 1835. Initially known as Cachar Levy' it was set up by the British in the Assam region. At present there are 46 battalions of Assam Rifles. In 1965, control over Assam Rifles was transferred to the Ministry of Home Affairs (MHA) from the Ministry of External Affairs.

Created in 1962 another paramilitary special force is The Special Frontier Force (SFF) . The SFF was first put under the direct supervision of the Intelligence Bureau. Later it was under the Research and Analysis Wing, India's external intelligence agency.

3. The five principles of Panchsheel were as follows:

- Mutual non-interference in each other's internal affairs
- Mutual respect for each other's territorial integrity and sovereignty
- Equality and mutual benefit

- Mutual non-aggression
- Peaceful co-existence

4. India focuses on improving ties with its neighbours. India has a unique position in its neighbourhood. Our country believes that through cooperation all disputes and problems between nations can be solved peacefully and hence it has always favoured international and regional cooperation. The country's foreign policy is based on the principle of maintaining friendly relations and cooperation with the neighbouring countries. Part of India's foreign policy actively focuses on improving ties with its neighbours. It provides support as required in the form of resources, equipment and training. Greater connectivity and integration is provided so as to improve the free flow of goods, people, energy, capital and information.

   SAARC was set up to encourage regional co-operation and foster the bonds of brotherhood, co-operation and peaceful co-existence among its members. The BCIM or Bangladesh – China – India – Myanmar Economic corridor is an initiative to contribute to socioeconomic development in the region . The objectives of BIMSTEC or Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation are to strengthen and improve technological economic cooperation among the member states, and promote international trade and foreign direct investment cooperation.

   BBIN (Bangladesh – Bhutan - India – Nepal) is a Motor Vehicle agreement to permit unhindered movement of passenger and cargo vehicles in the region and for energy development.

Chapter - 2 THE JUDICIARY

Page No. 246 and 247

Evaluation:

I. Choose the correct answer:

1. c) Supreme Court
2. d) All the above
3. a) Original jurisdiction
4. c) Punjab, Haryana and Chandigarh
5. a) Supreme Court
6. a) One
7. d) New Delhi
8. a) First Information Report
9. b) Sessions court

II. Fill in the blanks:

1. Calcutta
2. independent impartial
3. Montesquieu
4. Civil law
5. Dharmas

III. Match the following:

1. Supreme Court	c. Highest court of appeal
2. High Court	d. Highest court in the States
3. Lok Adalat	b. Speedy justice
4. Sir Elijah Impey	e. Chief Justice
5. Smritis	a. Social duties

IV. Answer the following in one or two sentences:

1. We need a judicial system to administer justice, to settle disputes, to interpret the laws, to protect the fundamental rights of the citizens and to act as the guardian of the Constitution.

2. There are three different levels of courts in India. The Supreme Court is at the apex of the entire judicial system. Under it are the High Courts of each state and below each High Court are the other subordinate courts.

3. Lok Adalat means 'Peoples Court'. These courts were set up to provide cheap legal aid and speedy justice to citizens not in a position to hire lawyers or pay legal fees. These courts hear and settle disputes in the language of the people and in the presence of the public. Lok Adalats are presided over by a retired judge along with a lawyer and a social worker. Cases are brought forward without advocates and are solved through mutual consent.

4. Mobile courts provide relief to the rural people. They not only create awareness about the

judicial system among the rural people, but provide cheap justice at their doorsteps.

V. Answer the following in detail:

1. The role of the judiciary can be categorised as follows:

   Dispute Resolution - The Judiciary provides a mechanism to resolve disputes between citizens, citizens and the government, two State government and between the Centre and State governments.

   Judicial Review - If the Judiciary believes that a law, executive order or ordinance passed by the Parliament violates the basic structure of the Constitution it has the power to declare it unconstitutional.

   Upholding Laws and Enforcing Fundamental Rights - If a citizen of the country believes that his/her fundamental rights have been violated, they can approach the Supreme Court or High Court to enforce their rights.

2.

Civil law	Criminal law
Deals with disputes over money, property (rent) and social matters (marriage disputes).	Deals with conduct or acts that the law defines as offences, like women harassment, theft, murder, etc.
Petitions have to be filed by the affected parties before the relevant court.	An FIR (First Information Report) is usually lodged with police investigation, after which a case is filed in the court.
Sentences are awarded in the form of money remuneration and as per the petitioner's claim.	If proven guilty, punishment is awarded, and the accused is sent to jail.

3. The Supreme Court has different jurisdictions.

   Original Jurisdiction is the power of the Supreme Court to hear disputes for the first time in that court only. It has original jurisdiction in disputes between the Union and one or more states and between two or more states. Appellate jurisdiction refers to the power to hear appeals against the decisions made by the High Court on the granting of a certificate by the High Court. The Supreme Court can give its opinion to the President about a question of public importance referred to it by the President. Writs or orders can be issued by the Supreme Court under Article 32 and by the High Courts under Article 226 of the Constitution. The Supreme Court maintains records of court proceedings and judgements as evidence. Its decisions are binding upon subordinate courts. The special powers of the Supreme Court include supervising the functioning of the lower courts.

VI. Assertion and Reasoning questions:

c) A is correct and R explains A

ECONOMICS

Chapter - 1 PUBLIC AND PRIVATE SECTORS

Page No. 256 - 258

Evaluation:

I. Fill in the blanks:

1. Public sector and private sector
2. Profit
3. Socio economic development
4. Innovation and modernisation
5. Understanding

II. Choose the correct answer:

1. d) 1956
2. c) A & B are correct
3. b) Joint sector
4. b) Maharatna
5. b) Service oriented

III. Match the following:

1. c. NITI Aayog
2. a. Primary sector
3. e. Secondary sector

4. b. Gross Domestic Product
5. d. Navaratna Industry

IV. Which is the odd one:

1. a) Black Money

V. Which of the following is the correct answer:

1. c) i and ii are correct

VI. Answer the following in one or two sentences:

1. The sector, which is engaged in the activities of providing government goods and services to the general public is known as public sector.

   The enterprises, agencies and bodies are fully owned, controlled and run by the government whether it is central government or a local government.

2. The society wants rapid industrialisation of the economy as the main key economic development improving living standards and economic sovereignty.

3. **The objectives of public sector:**

- To promote rapid economic development through creation and expansion of infrastructure.
- To generate financial resources for development.
- To promote redistribution of income and wealth.
- To create employment opportunities.

4. **The 3 organs of public sector are**:

   a. Administration by a government department

   b. The joint sector companies.

   c. Public corporation

5. Socio economic development is measured with indicators, such as GDP, life expectancy, literacy and levels of employment.

6. The segment of a national economy that is owned, controlled and managed by private individuals or enterprises is known as private sector.

   The private sector companies are divided on the basis of sizes which are privately or publically traded organisations.

   They can be created in two ways (i. e) either by the formation of a new enterprise or by the privatisation of any public sector enterprise.

7. National Thermal Power Corporation (NTPC)

   Oil and Natural Gas Commission (ONGC)

   Steel Authority of India Ltd. (SAIL)

8. Infernos

   Adithya Birla Company

   Tata Group of Companies

VII. Answer the following in detail:

1. **History of the Public Sector**

Definition of public sector: The sector that helps provide government goods and services to the general public is called the public sector. Enterprises, agencies in this sector are fully owned and run by the government (local, state, or central).

Now, let's try to understand the need to have public sector.

1. In 1947, India was an economy that relied mainly on agriculture and did not have a strong industrial base. Therefore, there was wide support for rapid industrialisation of the economy to improve living standards and achieve economic sovereignty.
2. First Industrial Policy Resolution 1948 – built on the Bombay Plan of 1940, promoted government intervention and regulation, and laid out strategies for industrialisation.
3. Planning Commission 1950/Industrial Act 1951 – empowered the government to regulate industrial development.
4. PM Jawaharlal Nehru supported the mixed economic system. He also believed that basic and heavy industries had to be established to modernise the Indian economy.
5. Second Five Year Plan 1956-60/Industry Policy Resolution 1956 – followed Nehru's vision for national industrialisation and stressed on

the development of public sector enterprises (PSEs). Dr V Krishnamurthy (Father of PSUs in India) and Prof P.C. Mahalanobis (Indian statistician, Friedman-Mahalanobis model) together carried Nehru's vision forward in the Plan and Resolution.

6. Industrial Policy 1991 – government wanted to reduce its role in public sector and allow private sector more freedom to operate, attract foreign direct investment in India, and allowed entry of multinational corporations (MNCs) into India.

2. Indicators of socio-economic development

Gross Domestic Product (GDP)

GDP supports in developing Socio-Economic Development. The proportion of GDP by the industrial sector (both private and public) has increased. It results in increasing government funds and increasing public spending.

Life Expectancy

According to 2011 Census of India, Life expectancy in India is 65.80 years for men and 68.33 years for women. Government provides high degree of health measures through various programmes. The Government announced in the Union Budget 2018-19 the 'National Health Production Scheme' (NHPS) to serve poor and vulnerable families.

Literacy

Educational skill plays a vital role in the Socio-Economic Development. Sarva Siksha Abhiyan (SSA) is the Government of India's flagship programme. It has been implemented for providing free and compulsory education to the children of 6-14 years, along with life skills. The Government also introduced RMSA, Smart class, e-learning, free computer skill classes increase the quality of education.

Employment

There is a clear shift in employment to secondary and tertiary sector from the primary sector. A growing number of people have moved to urban areas in search of employment. It has increased urban population; hence government started the 'Smart city' scheme, which provides the city with many facilities like hospitals, schools, housing facilities and shopping centres. To promote rural and backward areas in terms of employment the government encourages private sectors to start an industry in backward areas by providing tax benefit electricity at a lower tariff, etc. It removes regional inequality.

3. Refer: Page No.: 255 – Section - 1.3
Difference between Public sector and Private sector

4. Refer: Page No.: 255 – Section - 1.2.1
Functions of private sector