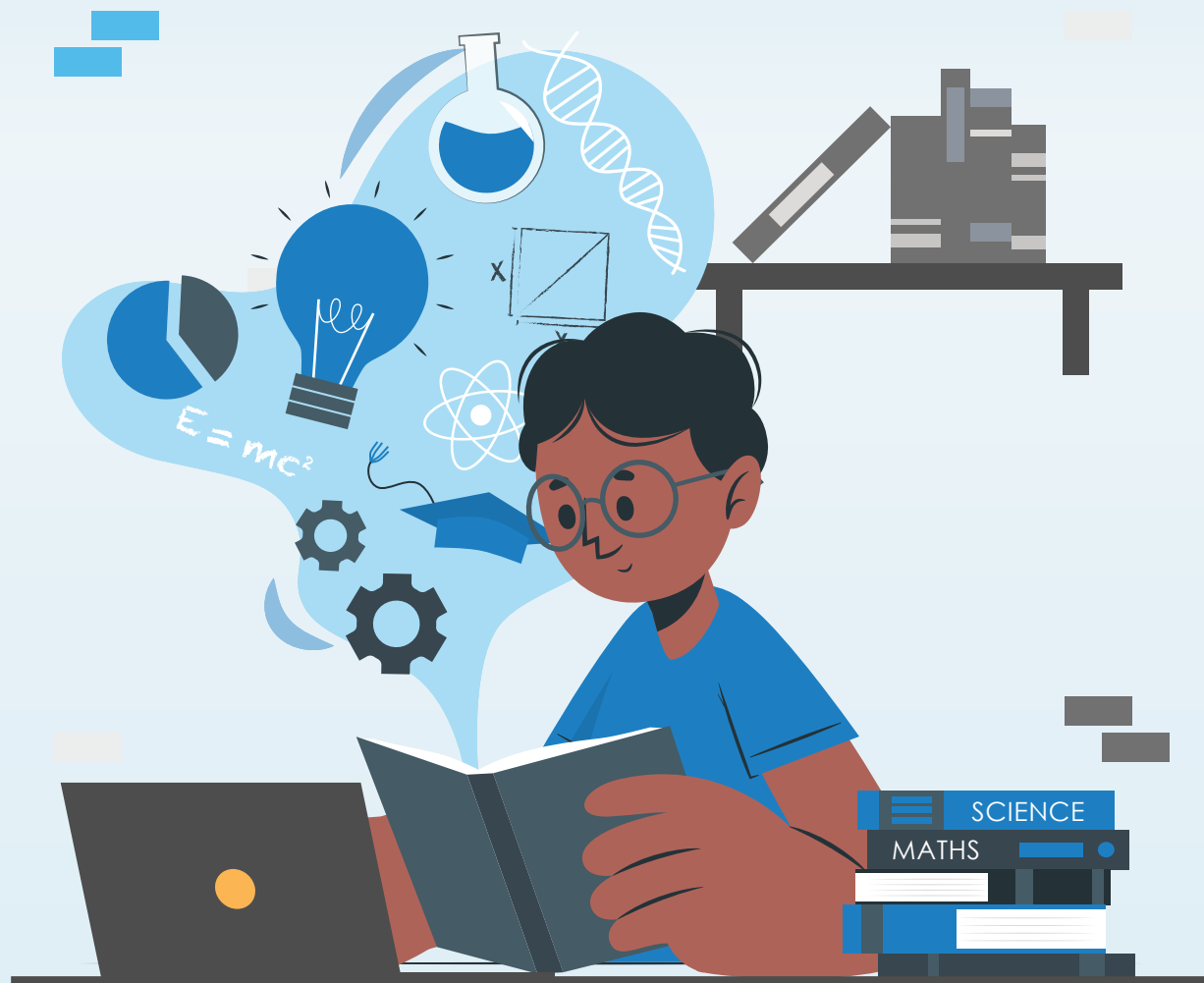




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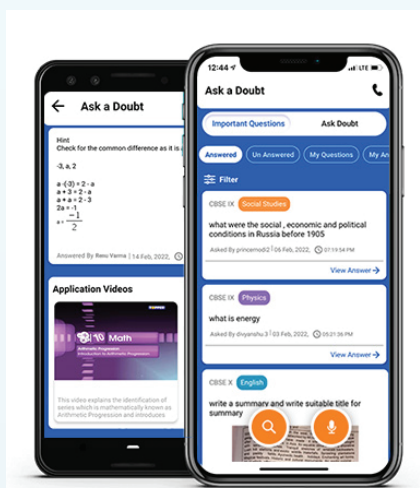
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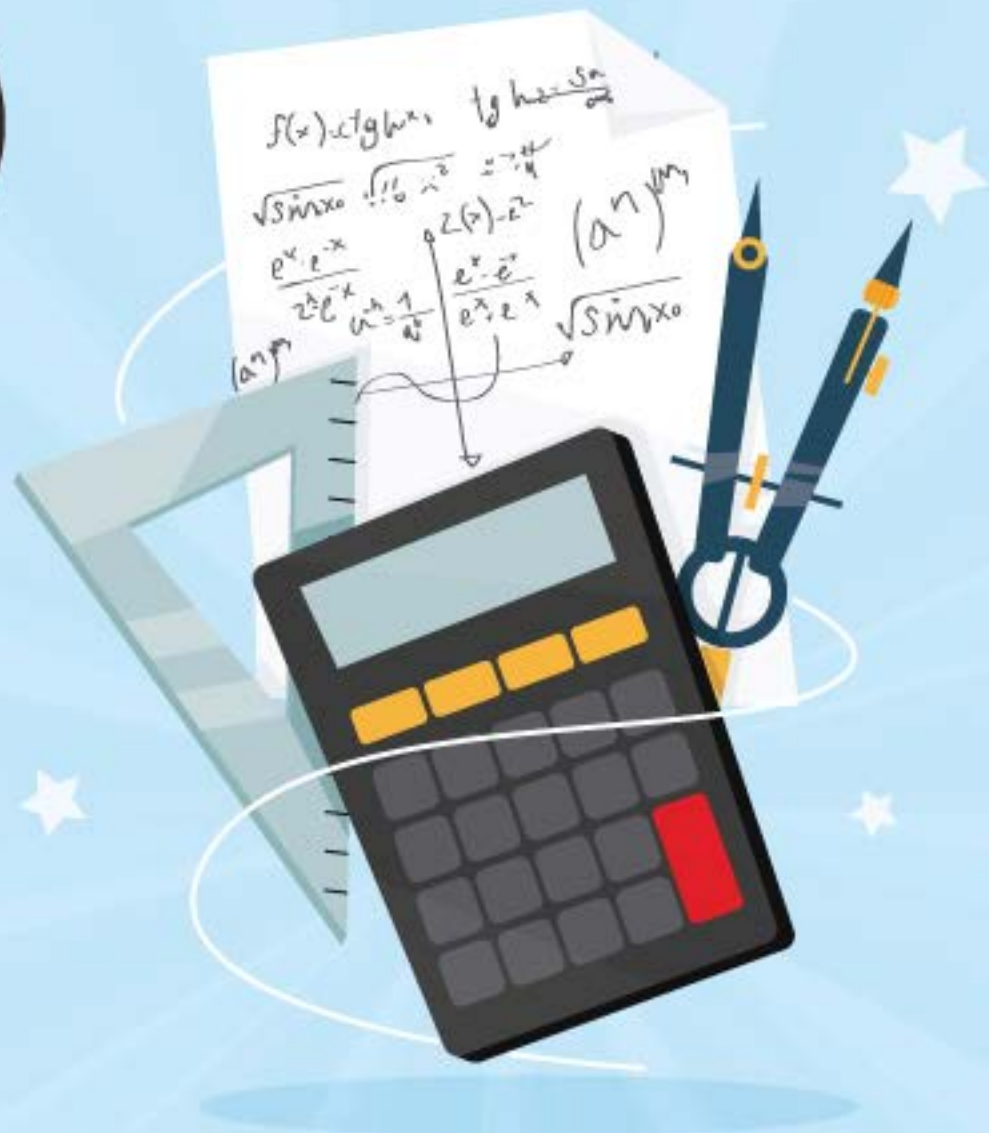


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CLASS 10



MATHEMATICS

MOCK PAPER

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Time: 3 Hours.**Total Marks: 80****General Instructions:**

1. This Question Paper has 5 Sections A - E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not *stated*.

Section A

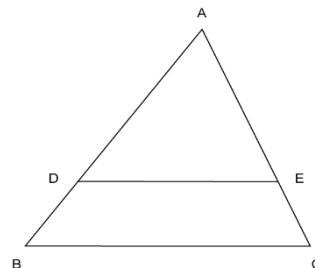
Section A consists of 20 questions of 1 mark each.

Choose the correct answers to the questions from the given options.

[20]

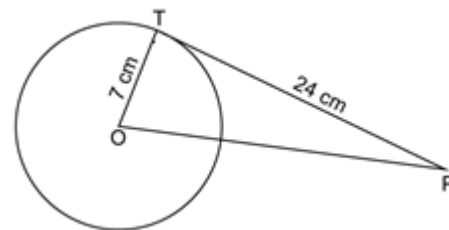
1. If LCM of 336 and 54 is 3024, then find HCF.
A. 3
B. 6
C. 9
D. 12
2. Roots of the quadratic equation $x^2 - 3x - 10 = 0$ are
A. 5, 2
B. -5, -2
C. 5, -2
D. -5, 2
3. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 + 2x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is
A. -2
B. -1
C. 0
D. 2
4. Find the value of k and r respectively for the system of linear equations $x + ky + r = 0$ and $2x + 4y + 6 = 0$ having infinite solutions.
A. 3 and 2
B. 2 and 4
C. 2 and 3
D. 2 and 2

5. If the point $P(a, -2)$ divides the line segment joining the points $(3, -4)$ and $(1, 2)$ in the ratio $1:2$, find the value of a .
- A. $\frac{1}{3}$
B. $\frac{2}{3}$
C. $\frac{4}{3}$
D. $\frac{7}{3}$
6. The ratio of any two corresponding sides in two _____ triangles is always the same.
- A. right-angled
B. scalene
C. equiangular
D. isosceles
7. If $\sin A = \frac{3}{4}$, find $\cos A$.
- A. $\frac{\sqrt{7}}{2}$
B. $\frac{-\sqrt{7}}{4}$
C. $\frac{\sqrt{7}}{4}$
D. $\frac{-\sqrt{7}}{2}$
8. Find the value of θ if $\cos 2\theta = 0$.
- A. 0°
B. 30°
C. 45°
D. 90°
9. D and E are the points on the sides AB and AC, respectively, of $\triangle ABC$ such that $DE \parallel BC$. Find the value of x where $AD = x$ cm, $DB = (x - 2)$ cm, $AE = (x + 2)$ cm and $EC = (x - 1)$ cm.
- A. 1
B. 2
C. 3
D. 4
10. If $\triangle ABC \sim \triangle DEF$ such that $2AB = DE$ and $BC = 6$ cm, find EF .
- A. 10 cm
B. 12 cm
C. 1 cm
D. 4 cm



11. In a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of the circle, then what is the length of OP?

A. 23 cm
B. 29 cm
C. 25 cm
D. 14 cm



12. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the length of an arc.

A. 22 cm
B. 30 cm
C. 20 cm
D. 32 cm

13. The greatest sphere that can be cut off from a cylindrical log of wood of base radius 1 cm and height 7 cm has maximum volume equal to

A. $\frac{5}{3}\pi \text{ cm}^3$
B. $\frac{3}{5}\pi \text{ cm}^3$
C. $\frac{4}{3}\pi \text{ cm}^3$
D. $\frac{3}{4}\pi \text{ cm}^3$

14. If mode = 80 and mean = 110, then the median is

A. 110
B. 120
C. 90
D. 100

15. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent.

A. 32 m^2
B. 32 m^3
C. 44 m^2
D. 44 m^3

16. A stopwatch was used to find the time taken by a group of students to run 110 m and the recorded data is shown below.

Time (in sec)	No. of students (f)
20 – 40	7
40 – 60	10
60 – 80	15
80 – 100	5
100 – 120	3

The sum of upper limits of median class and modal class is

- A. 60
- B. 120
- C. 80
- D. 160

17. A die is thrown once. What is the probability of getting a number less than 3?

- A. $\frac{1}{3}$
- B. $\frac{2}{3}$
- C. $\frac{4}{3}$
- D. $\frac{7}{3}$

18. The value of $\frac{\tan^2 x}{(1 + \tan^2 x)} + \frac{\cot^2 x}{(1 + \cot^2 x)}$ is

- A. 0
- B. 1
- C. -1
- D. Not defined

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option

19.

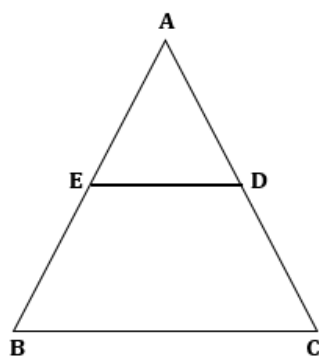
Statement A (Assertion): If $\text{HCF}(26, 169) = 13$, then $\text{LCM}(26, 169) = 338$.

Statement R (Reason): Product of HCF and LCM of two numbers is equal to the product of given two numbers.

- A. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- B. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- C. Assertion (A) is true but reason (R) is false.
- D. Assertion (A) is false but reason (R) is true.

20.

Statement A (Assertion): In the given figure, if $\angle ADE = \angle B$, $AD = 3.8$ cm, $AE = 3.6$ cm, $BE = 2.1$ cm and $BC = 4.2$ cm, then $DE = 2.8$ cm.

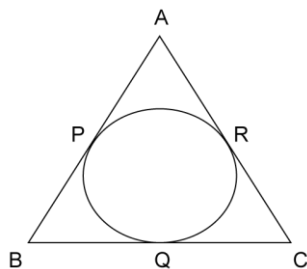


Statement R (Reason): Corresponding sides of similar triangles are congruent.

- A. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- B. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- C. Assertion (A) is true but reason (R) is false.
- D. Assertion (A) is false but reason (R) is true.

Section B

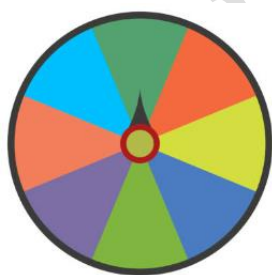
21. In $\triangle ABC$, $\angle A = x^\circ$, $\angle B = (3x)^\circ$ and $\angle C = y^\circ$. If $3y - 5x = 30$, show that $\triangle ABC$ is right-angled triangle. [2]
22. The perimeters of two similar triangles ABC and PQR are 32 cm and 24 cm, respectively. If $PQ = 12$ cm, then find AB. [2]
23. A circle is inscribed in $\triangle ABC$, touching sides AB, BC and AC at points P, Q and R respectively. If $AB = 10$ cm, $AR = 7$ cm and $CR = 5$ cm, find the length of BC. [2]



24. The radius of a circle is 42 cm. If length of an arc of a circle is 88 cm, find the area of a sector enclosed by an arc. [2]

OR

A spinner of radius 5.6 cm is divided in 8 equal sectors. Find the area of each sector.



25. If $\operatorname{cosec} \theta = 3x$ and $\cot \theta = \frac{3}{x}$, then find the value of $3\left(x^2 - \frac{1}{x^2}\right)$. [2]

OR

Prove that $\sqrt{\frac{1 - \cos A}{1 + \cos A}} + \sqrt{\frac{1 + \cos A}{1 - \cos A}} = 2 \operatorname{cosec} A$

Section C

Section C consists of 6 questions of 3 marks each.

26. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required, if in each room the same number of participants are to be seated and all of them being in the same subject. [3]
27. If p , q and r are l^{th} , m^{th} and n^{th} terms of an A.P., then prove the following:
 $(p - q)n + (q - r)l + (r - p)m = 0$ [3]
28. The monthly incomes of A and B are in the ratio 5:4 and their monthly expenditures are in the ratio 7:5. If each saves Rs. 3000 per month, then find the monthly income of each. [3]

OR

The length of a room exceeds its breadth by 3 metres. If the length is increased by 3 metres and the breadth is decreased by 2 metres, then the area remains the same. Find the length and breadth of the room.

29. If $\cos \theta = \frac{7}{25}$, find the values of all T-ratios of θ . [3]
30. The common tangents AB and CD to two circles with centres O and O' intersect at E between their centres. Prove that the points O, E and O' are collinear. [3]
- OR
- If d_1 and d_2 ($d_2 > d_1$) are the diameters of two concentric circles and c is the length of a chord of a circle which is tangent to the other circle, then prove $d_2^2 = c^2 + d_1^2$.
31. After removing red kings, queens and jacks from a deck of 52 playing cards, a deck is well shuffled and a card is drawn from the remaining cards. Find the probability of getting (i) a king, (ii) a red card, (iii) a spade card. [3]

Section D

Section D consists of 4 questions of 5 marks each.

32. One year ago, a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages. [5]

OR

A rectangular field is 16 m long and 10 m wide. There is a path of uniform width all around it with an area of 120 m^2 . Find the width of the path.

33. P and Q are the points on the sides AB and AC respectively of $\triangle ABC$. If $AP = 2 \text{ cm}$, $PB = 4 \text{ cm}$, $AQ = 3 \text{ cm}$ and $QC = 6 \text{ cm}$, show that $BC = 3PQ$. [5]

34. Rachel, an engineering student, was asked to make a model which is cylindrical in shape with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. if each cone has a height of 2 cm, find the volume of air contained in the model that Rachel made. [5]

OR

A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 7 g mass.

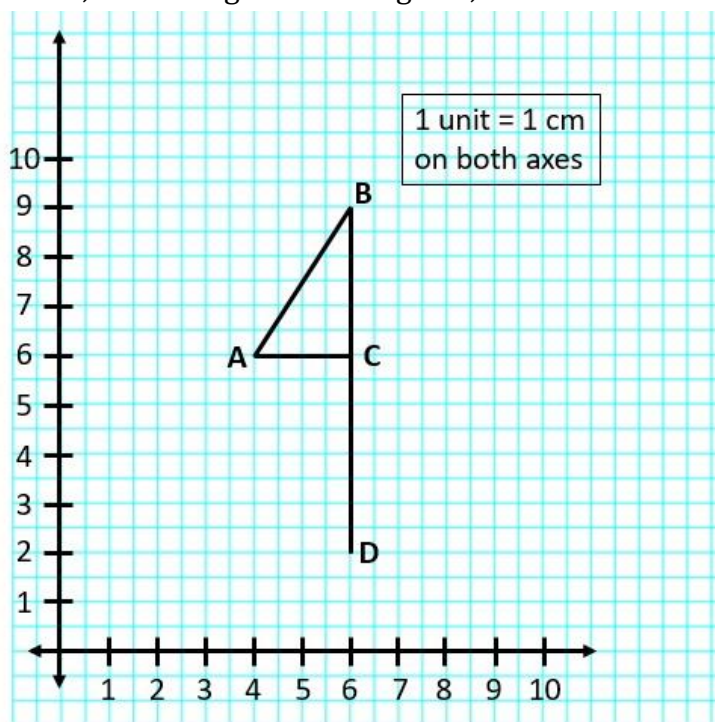
35. Find the mean, mode and median of the following data: [5]

Class	Frequency
0-10	5
10-20	10
20-30	18
30-40	30
40-50	20
50-60	12
60-70	5

Section E

Case study based questions are compulsory.

36. The students of class 10th were instructed to make a flag to represent their division in annual sports day. So they came up with a sketch of a flag on a graph paper showing the various dimensions of the flag. Now if the sketch of a flag is created on a graph paper as shown, then using the details given, answer the following questions.



- i. Find the length of BD. [1]
- ii. Find the length of AC. [1]
- iii. Find the length of AB. [2]

OR

Find the length of AD. [2]

37. Rakesh is much worried about his upcoming assessment on chapter Arithmetic Progression. He is vigorously practicing for the exam but unable to solve some questions. One of these questions is as shown below.

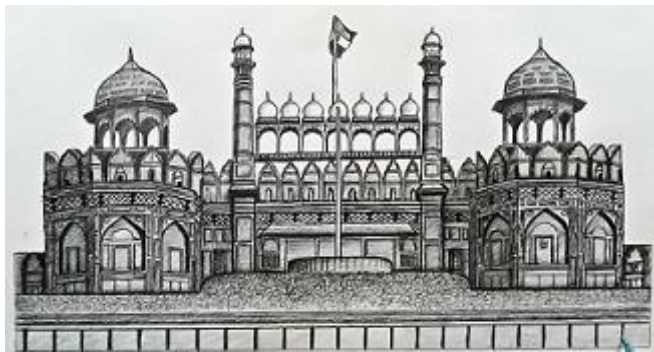
The 3rd and 9th terms of an A.P. are 4 and -8 respectively.

- i. What is the common difference? [1]
- ii. What is the first term? [1]
- iii. Which term of A.P. is -160? [2]

OR

What is the 75th term of A.P.? [2]

38. Ms. Sanjana took her students of class X to an educational trip where they saw Red Fort. She told them about the history of Red Fort where she narrated that Red Fort or Lal Qila is a historic fort located in Old Delhi, India that served as the main residence of the Mughal Emperors. Emperor Shah Jahan commissioned construction of the Red Fort on 12 May 1638, when he decided to shift his capital from Agra to Delhi. She also included that the Red Fort is about 33 m (108 ft) high.



Then answer the following questions.

- i. The angle formed by the line of sight with the horizontal when the object viewed is above the horizontal level is called as? [1]
- ii. If they want to see the tower at an angle of 60° , then find the distance. [1]
- iii. If the maximum height of Red fort is considered as 33 m and the students are standing at a distance of 33 m away from the Monument, find the angle of elevation. [2]

OR

If the rays of the Sun is inclined at 30° , then what will be the height of the vertical tower which casts a shadow of 30 m? [2]

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CLASS 10



SCIENCE

MOCK PAPER

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Class 10 Science
Mock Paper

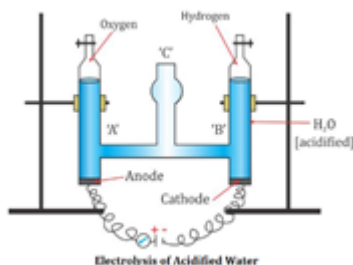
Time: 3 Hours.**Total Marks: 80****General Instructions:**

1. This Question Paper has 5 Sections A - E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not *stated*.

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1-20. There is no negative mark for incorrect response.

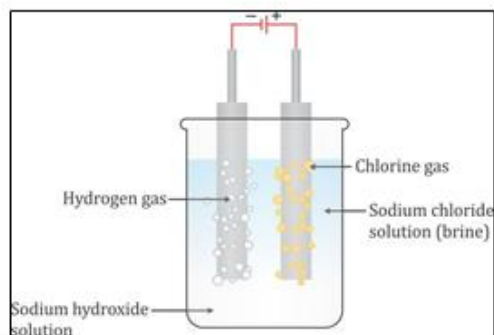
1. Which type of reaction is taking place in the following experiment? [1]



- a) Displacement
 - b) Decomposition
 - c) Combination
 - d) Double displacement
2. Calcium oxide reacts with water to produce slaked lime. It is an example of: [1]
- a) Decomposition reaction
 - b) Combination reaction
 - c) Displacement reaction
 - d) Oxidation reaction

3. As per below set up, please select the valid statements mentioned below.

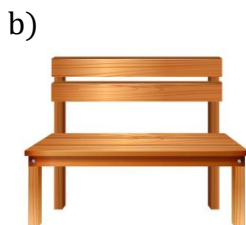
[1]



- i. Sodium hydroxide is formed near anode
 - ii. Chlorine is given off at anode
 - iii. Hydrogen gas is given off at cathode
 - iv. Hydrogen gas is given off at anode
- a) i and iii
b) ii and iii
c) i and iv
d) only iv

4. Which of the following will corrode?

[1]

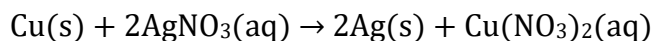


5. P foil is used for wrapping food stuff because it is Q and R in nature. Substitute P, Q, and R with the correct choice:

[1]

- a) P – Iron, Q – Malleable, R – More reactivity with water
- b) P – Aluminium, Q – Ductile, R – Less reactivity with oxygen
- c) P – Silver, Q – Ductile, R – Less reactivity with oxygen
- d) P – Aluminium, Q – Malleable, R – Less reactivity with water

6. Mrunal writes a chemical reaction as follows: [1]



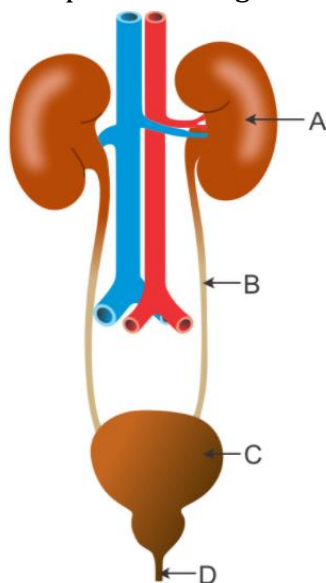
It explains:

- a) Copper is less reactive than silver
- b) Copper is more reactive than silver
- c) Copper and silver are equally reactive
- d) Nitrate is more reactive than copper and silver

7. In electrolytic refining, the impure metal is made as: [1]

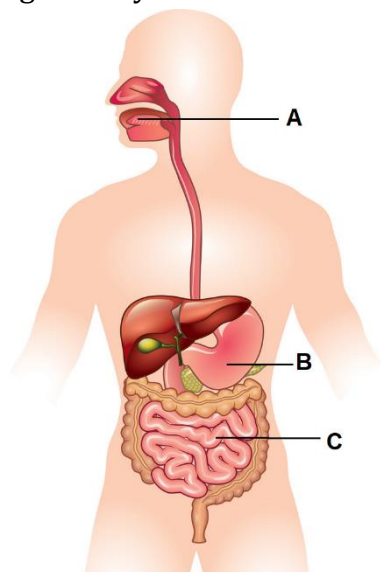
- a) Electrolyte
- b) Cathode
- c) Anode
- d) Both cathode and anode

8. Carefully study the diagram of the human excretory system with labels A, B, C and D. Select the option which gives the correct main function of the labelled organs. [1]



- a) A: Kidney - Filters the blood and concentrates the filtrate to make urine
- b) B: Urethra – Expels urine out of the body
- c) C: Urinary bladder – Dilutes the urine
- d) D: Ureter – Transports urine to the urinary bladder

9. A, B and C are structures associated with the human digestive system. Identify the option which indicates the correct pairing of the enzyme produced and the food component digested by the structure. [1]

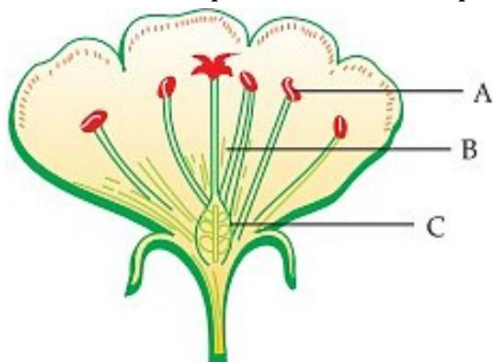


- a) A: Amylase – Fat, B: Trypsin – Protein, C: Pepsin – Protein
 b) A: Amylase – Starch, B: Pepsin – Protein, C: Lipase – Fats
 c) A: Amylase – Protein, B: Trypsin – Fats, C: Pepsin – Protein
 d) A: Amylase – Starch, B: Pepsin – Fats, C: Lipase – Protein
10. If a pea plant with violet flowers is crossed with a pea plant with white flowers, then what percentage of F_1 and F_2 generation respectively will bear violet flowers? [1]
- a) 25%, 25%
 b) 50%, 50%
 c) 75%, 100%
 d) 100%, 75%
11. The figure below shows the stages of ripening of a banana. Which hormone is responsible for this change? [1]



- a) Auxin
 b) Cytokinin
 c) Ethylene
 d) Absciscic acid

12. Which of these parts assist in the production of pollen grains? [1]

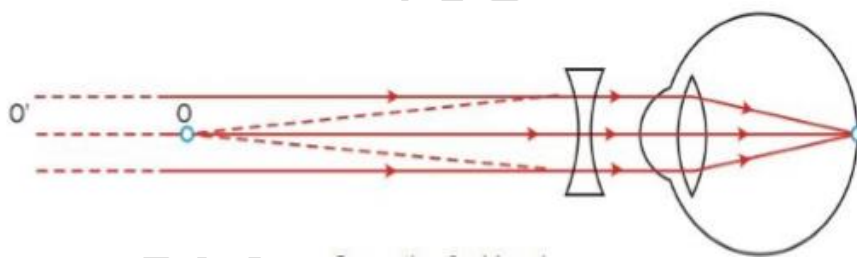


- a) A only
- b) B only
- c) A and B
- d) B and C

13. If the 'a' is object distance, 'b' is image distance and 'c' is focal length of concave mirror. Then the mirror formula is written as _____. [1]

- a) $\frac{1}{a} - \frac{1}{b} = \frac{1}{c}$
- b) $\frac{1}{b} - \frac{1}{c} = \frac{1}{a}$
- c) $\frac{1}{c} + \frac{1}{b} = \frac{1}{a}$
- d) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$

14. The below ray diagram depicts [1]



- a) Correction of myopia
- b) Correction of hypermetropic eye
- c) Correction of presbyopia
- d) None of these

15. What is the ratio of average amount of energy absorbed by the producers to the average amount of energy absorbed by the primary consumers? [1]

- a) 1 : 2
- b) 2 : 1
- c) 1 : 10
- d) 10 : 1

- 16.** Which of the following groups of organisms do not constitute an appropriate food chain operating in an ecosystem? [1]
- (i) Grass, lion, rabbit, wolf
 - (ii) Plankton, man, fish, grasshopper
 - (iii) Wolf, grass, snake, tiger
 - (iv) Frog, snake, eagle, grass, grasshopper
- a) (i) and (iii)
 - b) (iii) and (iv)
 - c) (ii) and (iii)
 - d) (i) and (iv)

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (a) Both A and R are true, and R is the correct explanation of A
- (b) Both A and R are true, and R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is False but R is true

17. Assertion: A shiny white finish on walls is obtained after two to three days of white washing the walls.

Reason: Calcium oxide reacts with carbon dioxide to produce calcium hydrogen carbonate which gives a shiny white finish. [1]

18. Assertion: Sexual reproduction leads to a greater variety in population.

Reason: It plays an important role in the origin of new species. [1]

19. Assertion: If DDT is present in water bodies, then fish-eating birds accumulate maximum amount of DDT in their bodies. [1]

Reason: Pesticides are not metabolised within the bodies of living organisms and get concentrated at each trophic level leading to bioaccumulation.

20. Assertion: In an A.C generator, we can increase the magnitude of induced current will increase if we increase the number of armature coils.

Reason: In an A.C generator, by decreasing the area of armature coils we can increase the amount of induced current. [1]

SECTION - B

Question No. 21 to 26 are very short answer questions.

21. Nisha added white powder to the cake to make in order to make it soft and fluffy. What is the name of the powder? What are the main ingredients in it? What are the functions of each ingredient? [2]

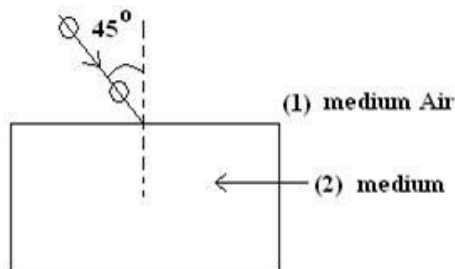
22. What could be the possible reason for the declining female–male sex ratio in our country? Suggest two measures to achieve the 1:1 ratio. [2]

23. What will happen if mucus is not secreted by the gastric glands? [2]

OR

Leaves of a healthy potted plant were coated with *Vaseline*. Will this plant remain healthy for long? Give reasons.

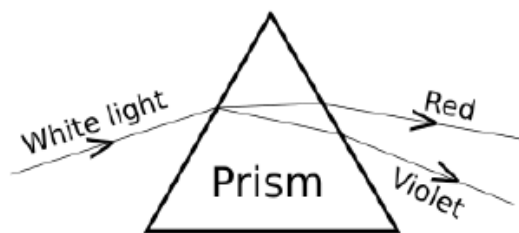
24. A ray of light is incident at an angle of 45° at the interface of medium (1) and medium (2) as shown in the above diagram. Redraw this diagram in the answer book and complete it. If the angle of refraction is 30° , find the refractive index of medium (2) with respect to medium (1).



(Given that $\sin 45^\circ = \frac{1}{\sqrt{2}}$ and $\sin 30^\circ = \frac{1}{2}$)

If the second medium is water in place of medium (2), will the angle of refraction increase or decrease? Why? (Refractive index of water = $4/3$)

25.



A student observes the above phenomenon in the lab as a white light passes through a prism. Among many other colours, he observed the position of the two colours Red and Violet. What is the phenomenon called? What is the reason for the violet light to bend more than the red light? [2]

OR

A concave lens has focal length of 25 cm. At what distance should the object from the lens be placed so that it forms an image at 20 cm distance from the lens? [2]

26. Our food grains such as wheat and rice, vegetables and fruits, and even meat are found to contain varying amounts of pesticide residues. State the reason to explain how and why it happens. [2]

SECTION - C

Question No. 27 to 33 are short answer questions.

27. Write the balanced equation for the chemical reactions involved when [3]
 (a) Chlorine is passed over dry slaked lime.
 (b) Sodium hydrogen carbonate reacts with dilute hydrochloric acid.
 (c) Sodium hydrogen carbonate is heated.

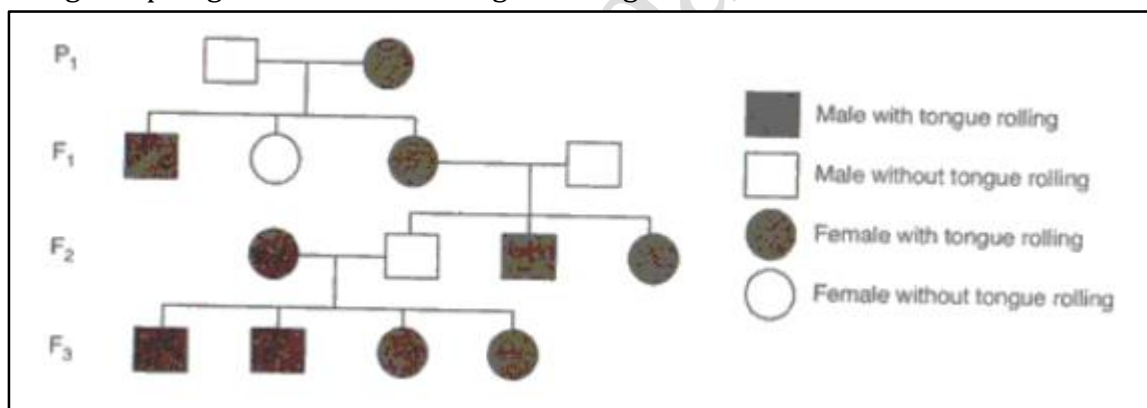
28. Radha has two beakers — one with water and the other with kerosene. She also has a raw sample of sodium metal. Which flask will she choose to store the raw sample of sodium and why?

OR

Nisha treated metal X with cold water, it gave a basic salt Y with the molecular formula XOH (Molecular mass = 56) and liberated a gas Z which easily catches fire. Identify X, Y and Z and also write the reaction involved along with its type.

29. Transmission of nerve impulses between two neurons takes place through synapse. [3]
 (a) What happens at the synapse between two neurons?
 (b) Why is the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron but not the reverse?

30. The given pedigree chart shows tongue rolling. [3]

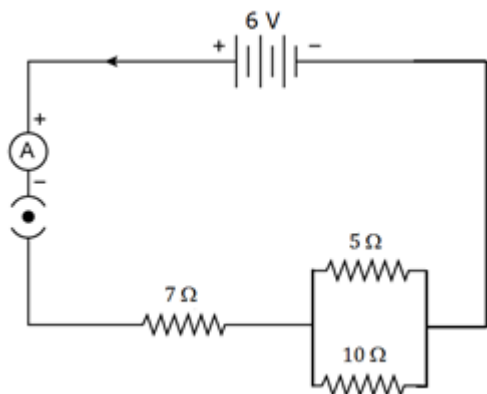


- (i) Is this trait dominant or recessive?
 (ii) Give reason for the above answer.

31.
 (a) What type of lens should we use to get a diminished, virtual and erect image?
 (b) Explain the above case with the help of ray diagram.
 (c) State the characteristics of images formed in case of convex mirror.

32. From the following electric circuit:

[3]



Calculate:

- Resultant resistance and current
- Heat energy evolved when the circuit is switched on for 30 minutes

33. An electric appliance of 1.5 kW power rating operates on a 220V main supply and has a current rating of 5 A. Is this fuse suitable for this electrical appliance? Explain.

SECTION - D

Question No. 34 to 36 are long answer questions.

34.

[5]

- A neutral organic compound X of molecular formula C_2H_6O on oxidation with acidified potassium dichromate gives an acidic compound Y. Compound X reacts with Y on warming in the presence of conc. H_2SO_4 to give a sweet smelling substance Z. Identify X, Y and Z with explanation and reactions.
- Karuna added some water to a syrupy liquid taken in a tube while working in laboratory. The tube immediately cracked and the liquid which escaped out of it, produced blisters on the skin of the student. What actually happened?

OR

An organic compound A (molecular formula $C_2H_4O_2$) reacts with Na metal to form a compound B and evolves a gas which burns with a pop sound. Compound A on treatment with an alcohol C in the presence of a little of concentrated sulphuric acid forms a sweet-smelling compound D (molecular formula $C_3H_6O_2$). Compound D on treatment with NaOH solution gives back B and C. Identify A, B, C and D and give the chemical reactions involved.

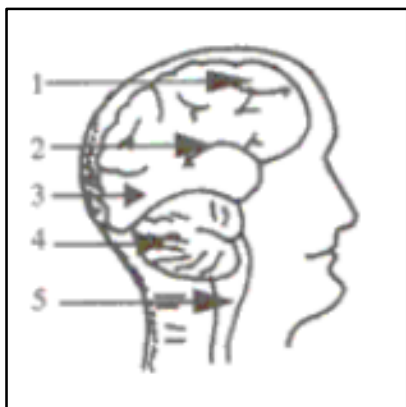
35.

[5]

- In a tobacco plant, the male gametes have 24 chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
- Kashyap noticed that an organism by mistake was cut into parts. After sometime, both parts developed into new individuals.
 - Name the mode of reproduction used by the organism.
 - State the type of cells which carry out this process.
 - Give one example of an organism which reproduces by the above method.

OR

The figure represents the human brain.



- Label the parts 1 – 5.
- State the function of part 4 and 5.
- How are neurons arranged in the brain?
- How is the brain protected?

36.

[3]

- For what position of the object does a convex lens form an erect and virtual image?
- What is regular reflection of light?
- What type of mirror is used as a shaving mirror? Support your answer with a reason.

OR

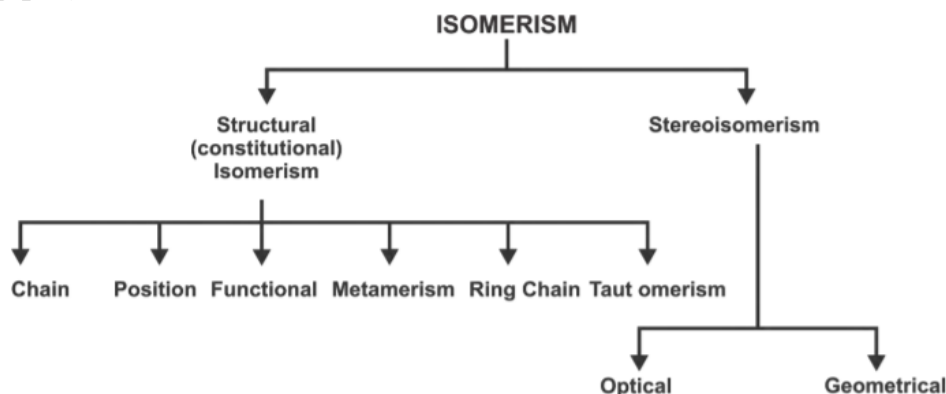
Answer the following:

- What is the advantage of having two eyes instead of one?
- Explain the function of the iris.
- What is the difference in the defect of a person wearing spectacles of +1 D to a person wearing spectacles of –1 D?

SECTION - E

Question No. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. Compounds which have the same molecular formula but different structural formulas are called isomers and the phenomenon is known as isomerism. They have different physical and chemical properties and can be classified in the following manner.



There are four types of structural isomerism. First is Chain Isomerism. If the longest chain length of carbon atoms of the isomeric forms varies having same molecular formula, then

it is called chain isomerism. The isomers chain isomerism are straight chain and branched chain isomers. [4]

- (a) How many isomers a disubstituted benzene can have? Draw structures for the same.
 (b) How many isomers can be drawn for a compound with molecular formula C_5H_{12} ?
 Write the type of isomerism and name of structures.

OR

- (b) How many isomers can be drawn for a compound with molecular formula C_4H_{10} ?
 Write the type of isomerism and name of structures.

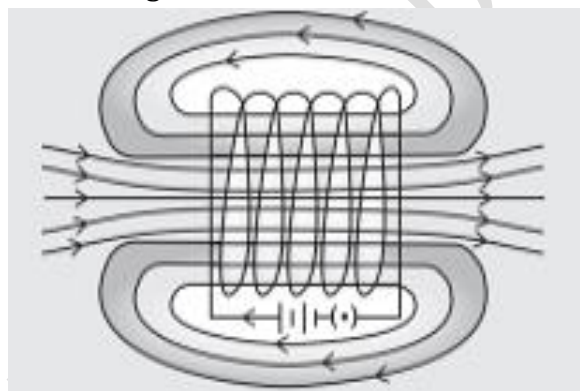
38. In a cross between plants with purple flowers and plants with white flowers, the F_1 generation had all purple flowers. When the F_1 generation was self-bred, the F_2 generation gave rise to 100 individuals, 75 of which had purple flowers. Make a cross and answer. [4]

- a) What is the ratio of purple flowered plants in F_2 generation?
 b) What are the genotypes of F_2 individuals?
 c) If F_2 generation gave rise to 400 individuals, how many flowers would be pure homozygous? Give the genotype of these plants.

OR

Instead of the above cross, if there was a cross between tall and dwarf plants resulting in 100 individuals in F_2 generation, how many plants would have been dwarf? Give reason for your answer.

39. The pattern of magnetic field lines around a current carrying solenoid is shown in the figure. This pattern of the field is similar to the magnetic field around a bar magnet. In fact, one end of the solenoid behaves as a magnetic north pole, while another end behaves as the South Pole. The field lines inside the solenoid are in the form of parallel straight lines. A strong magnetic field produced inside a solenoid can be used to magnetise piece of material like soft iron, when placed in magnet. The magnet so formed is called electromagnet. [4]



- a) Which among the following statement best describes the solenoid?
 i. Straight conductor carrying current
 ii. A freely suspend bar magnet which align in north -south direction
 iii. A closely wound cylindrical coil of insulated metallic wire
 iv. None of the above
 b) How is the field strength at all points in case of uniform magnetic field?
 c) How does the magnetic field vary inside a solenoid?

OR

- c) A) Which magnet is the strongest?
 B) Which magnet produces the field lines similar to those produces around a current – carrying solenoid?

CBSE
CLASS 10



SOCIAL SCIENCE

MOCK PAPER

CBSE
Class X Social Science
Mock Paper

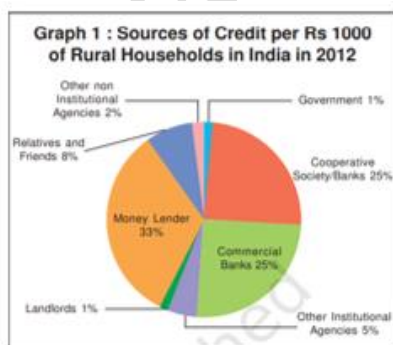
Time: 3 Hours.**Total Marks: 80****General Instructions:**

1. This Question Paper has 5 Sections A - E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not *stated*.

SECTION A

1. Which famous industrialist criticized colonial control over Indian economy and supported the Civil Disobedience Movement? [1]
(a) Badruddin Taiyyabji
(b) Kawasji Maneckshaw
(c) Purshottamdas Thakurdas
(d) Gulabchand Walchand
2. Which place in India has an artificial lake to conserve water that dates to 11th century? [1]
(a) Delhi
(b) Bhopal
(c) Mumbai
(d) Kolhapur
3. In the question given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and chose the correct option:
Assertion (A): For development, people look at a mix of goals.
Reason (R): The developmental goals that people have may not only be about better income but also about other important things in life. [1]
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

4. Which of the following statements regarding the forests is NOT true? [1]
- More than half of the total forest land has been declared as reserved forests.
 - Almost one-third of the total forest area is protected forest.
 - Protected forests are regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned.
 - Unclassed forests and wastelands belong to both government and private individuals and communities.
5. In India, power is shared among the legislature, executive and judiciary. It represents which system of power sharing? [1]
- Vertical
 - Circular
 - Horizontal
 - Both a and c
6. Which of the following statements accurately distinguishes between Majoritarianism and Power sharing? [1]
- Majoritarianism emphasizes the dominance of the majority community, while Power sharing emphasizes the sharing of power among different groups.
 - Majoritarianism emphasizes the need for consensus building, while Power sharing emphasizes the exclusion of minority groups.
 - Majoritarianism emphasizes the importance of accommodating minority interests, while Power sharing emphasizes the need for majority rule.
 - Majoritarianism emphasizes the need for peaceful resolution of conflicts, while Power sharing emphasizes the use of force to impose the majority's will.
7. What is regarded as the most positive outcome of democratic regimes? [1]
- Its ability to punish the corrupt leaders
 - Rule by majority
 - Reducing economic inequalities
 - Ability to handle social differences, divisions and conflicts.
8. Look at the figure below and answer the question that follows: [1]



Why do you think that money lenders are the largest sources of credit in rural households?

- They give loan at low rates of interest.
- They are a reliable source from which loan can be taken.
- There are not many credit societies in rural areas from where loans could be taken.
- They give loans without any collateral.

9. Which of the following outlines the prudential reason for power sharing? [1]
- Power sharing is good for democracy.
 - It is the spirit of democracy.
 - It reduces the chances of social conflicts.
 - A democratic rule involves power sharing.

10. Study the picture and answer the question that follows: [1]



Which of the following aspects best signifies this image of 'Germania'?

- Heroism and Justice
 - Folk and Cultural Tradition
 - Austerity and Asceticism
 - Revenge and Vengeance
11. Read the given statements in context of 'globalization' and choose the correct option: [1]
- It is the only way for economic development of the country.
 - Interlinks only production-based activities in dispersed locations in the world.
 - It has always given only positive results in all the countries.
 - Leads to spread of technology, cultures and diseases from a region to another.
12. In a representative democracy, which of the following best describes the role of elected representatives? [1]
- They have absolute power and authority to make decisions without consulting the public.
 - They are accountable to the public and make decisions on behalf of their constituents.
 - They act as mere figureheads with no real power or influence in the government.
 - They serve lifetime appointments and cannot be removed from office.
13. Arrange the following statements in sequential order based on the events related to the Civil Disobedience Movement in India: [1]
- Gandhi sent a letter to Viceroy Irwin stating eleven demands.
 - Under the presidency of Jawaharlal Nehru, the Lahore Congress formalised the demand of 'Purna Swaraj' or full independence for India.
 - (Mahatma Gandhi started his famous salt march accompanied by 78 of his trusted volunteers.
 - (The Tory government in Britain constituted a Statutory Commission under Sir John Simon to visit India.
- iv, i, ii, iii
 - ii, i, iii, iv
 - iv, ii, i, iii
 - i, ii, iii, iv

14. In one acre of agricultural land, 4 people are required to work. But all 10 members of the family work on the land. This condition is known as: [1]
 (a) Over employment
 (b) Under employment
 (c) Disguised employment
 (d) Seasonal employment
15. There are two statements given below about the Print Revolution, marked as Assertion (A) and Reason (R). Read the statements and choose the correct option. [1]
Assertion (A): The distribution, application, and preservation of knowledge were fundamentally altered with the invention of printing.
Reason (R): Printing enabled intellectuals to produce, comment on, and evaluate texts which spread as ideas across Europe.
 (a) A is true but R is false.
 (b) A is false but R is true.
 (c) Both A and R are true and R explains A.
 (d) Both A and R are true but R does not explain A.
16. Identify the crop with the help of the following information. [1]
 ❖ It grows well on laterite soil.
 ❖ It is an example of plantation agriculture.
 ❖ Assam is the major producer of this crop.
 (a) Tea
 (b) Rice
 (c) Wheat
 (d) Rubber
17. Which one among the following pairs is NOT matched correctly? [1]
- | Political parties | Leaders |
|---------------------------------|---------------------|
| a. All India Trinamool Congress | Mamata Banerjee |
| b. Bhartiya Janta Party | Deendayal Upadhyaya |
| c. Indian National Congress | Jawahar Lal Nehru |
| d. Bahujan Samaj Party | Sharad Pawar |
18. Liberalisation involves [1]
 (a) Removal of trade barriers
 (b) Increased subsidy on fertilizers
 (c) Increase in import duties on goods
 (d) Increased export duties on goods
19. Which of the following is NOT a good choice for a democratic nations? [1]
 (a) Two party system
 (b) One party system
 (c) Multi-party system
 (d) All of the above

20. Read the given statements in context of 'globalization' and choose the correct option:
 Read the information given below and select the correct option: [1]
 Soham is an agricultural labourer. There are several months in a year when he has no work and needs credit to meet his daily expenses. He depends upon his employer, the landowner for credit who charges an interest rate of 5 per cent per month. Mohan repays the money by working physically for the landowner on his farmland.
 Over the years his debt will:
 a. **Increase** - because of increasing interest and non-payment of monthly amount.
 b. **Remain constant** - as he is working for the employer but is repaying less.
 c. **Reduce** - as amount equivalent to his salary is being counted as monthly repayment.
 d. **Be totally repaid** - as he is repaying the debt in the form of physical labour.

SECTION B

21. How is the community government elected in Belgium? What power has been bestowed on it? [2]
 22. What do you think was the most powerful weapon of the Spanish conquerors in America? Why do you think so? Give two reasons. [2]

OR

The conquest of America made the world familiar with new and unknown crops. Explain.

23. Which is the second most important food crop in India? What climatic conditions are required for the growth of this crop? [2]
 24. Why do we need a local government? [2]

SECTION C

25. Printers and publishers continuously developed new strategies to sell their product. Explain. [3]
 26. Distinguish the service conditions of organized sector from that of unorganized sector.
 OR
 How is the tertiary sector different from other sectors? [3]
 27. Discuss three main features of plantation agriculture. [3]
 28. Mention three different provisions of Indian constitution which makes India a federal country. [3]
 29. Why only final goods and services counted in calculating the GDP? Explain with the help of an example. [3]

SECTION D

30. Discuss five forms in which minerals occur.

OR

Why there is a pressing need to use renewable energy sources in India?

31. Explain how culture influenced the development of nationalism in Europe in the 19th century. [5]

OR

Describe the explosive conditions that prevailed in Balkans after 1871 in Europe.

32. What is meant by a political party? Describe the three components of a political party [5]

OR

No party system is ideal for all countries and in all situations. Justify the statement with arguments. [5]

33. Do you agree that cheap and affordable credit must be available to all. Elaborate. [5]

OR

How do self-help groups bridge the gap between formal and informal sources of credit for the poor?

SECTION E

CASE BASED QUESTIONS

34. Read the source given below and answer the question that follows:

Not all social groups were moved by the abstract concept of swaraj. One such group was the nation's 'untouchables', who from around the 1930s had begun to call themselves dalit or oppressed. For long the Congress had ignored the dalits, for fear of offending the *sanatanis*, the conservative high-caste Hindus. But Mahatma Gandhi declared that swaraj would not come for a hundred years if untouchability was not eliminated. He called the 'untouchables' harijan. or the children of God, organised satyagraha to secure them entry into temples, and access to public wells, tanks, roads and schools. He himself cleaned toilets to dignify the work of the sweepers and persuaded upper castes to change their heart and give up 'the sin of untouchability'. But many dalit leaders were keen on a different political solution to the problems of the community.

- 34.1 Who organised the dalits into the Depressed Classes Association in 1930? [1]

- 34.2 Why did the person you mentioned above clashed with Gandhi at the second Round Table Conference? [1]

- 34.3 Which Pact was signed between him and Gandhi in 1932? Mention one term of this Pact. [2]

35. Read the source given below and answer the question that follows:

Narmada Bachao Andolan or Save Narmada Movement is a Non-Governmental Organisation (NGO) that mobilised tribal people, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam being built across the Narmada River in Gujarat. It originally focused on the environmental issues related to trees that would be submerged under the dam water. Recently it has re-focused the aim to enable poor citizens, especially the outsees (displaced people) to get full rehabilitation facilities from the government.

35.1 Who do you think gain the most from the building of large dams? [1]

35.2 Why do you think the local communities protest against the building of the large dams? [1]

35.3 Mention two disadvantages of building large dams. [2]

36. Read the source given below and answer the question that follows:

For development, people look at a mix of goals. It is true that if women are engaged in paid work, their dignity in the household and society increases. However, it is also the case that if there is respect for women there would be more sharing of housework and a greater acceptance of women working outside. A safe and secure environment may allow more women to take up a variety of jobs or run a business. Hence, the developmental goals that people have are not only about better income but also about other important things in life.

36.1 'Money in your pocket cannot buy all the goods and services which you may need to live well'. Justify the statement. [2]

36.2 Different people can have different development goals. In light of this statement mention two development goals each for a landless labourer and a prosperous farmer from Punjab. [2]

SECTION F MAP BASED QUESTIONS

37. 37a. Two places A and B have been marked on the given outline map of India. [2]

A. Indian National Congress session at this place in 1920.

B. Mahatma Gandhi organised a peasant satyagraha.

37b. On the same outline map of India locate and label any THREE of the following with suitable Symbols. [3]

a. Rana Pratap Sagar Dam

b. Namrup Thermal Plant

c. Bengaluru Software Technology Park

d. Vishakhapatnam Port



CBSE
CLASS 10



MATHEMATICS

MOCK PAPER

SOLUTIONS

CBSE
Class 10 Mathematics
Mock Paper

Section A

1. Correct Option: B

Explanation:

$\text{HCF} \times \text{LCM} = \text{product of two numbers}$

$$\Rightarrow \text{HCF} \times 3024 = 336 \times 54$$

$$\Rightarrow \text{HCF} = 18144 \div 3024 = 6$$

2. Correct Option: C

Explanation:

$$x^2 - 3x - 10 = 0$$

$$\Rightarrow x^2 - 5x + 2x - 10 = 0$$

$$\Rightarrow x(x - 5) + 2(x - 5) = 0$$

$$\Rightarrow (x - 5)(x + 2) = 0$$

$$\Rightarrow x - 5 = 0 \text{ or } x + 2 = 0$$

$$\Rightarrow x = 5 \text{ or } x = -2$$

3. Correct Option: A

Explanation:

$$f(x) = x^2 + 2x + 1 = (x + 1)^2$$

$\Rightarrow -1, -1$ are the roots of the given polynomial $f(x)$.

$$\therefore \alpha = \beta = -1$$

$$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta + \alpha}{\alpha\beta} = \frac{-1 - 1}{(-1)(-1)} = -2$$

4. Correct Option: C

Explanation:

The system of linear equations has infinite solutions if the lines are overlapping. So, the condition for coincident lines is

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\Rightarrow \frac{1}{2} = \frac{k}{4} = \frac{r}{6}$$

$$\therefore \frac{1}{2} = \frac{k}{4} \Rightarrow k = 2$$

$$\therefore \frac{2}{4} = \frac{r}{6} \Rightarrow r = 3$$

5. Correct Option: D

Explanation:

Since point $P(a, -2)$ divides $(3, -4)$ and $(1, 2)$ in the ratio 1:2,

$$a = \frac{1 \times 1 + 2 \times 3}{1 + 2} = \frac{7}{3}$$

6. Correct Option: C

Explanation:

Two triangles having equal corresponding angles have same ratio for any two corresponding sides.

Hence, the ratio of any two corresponding sides in two equiangular triangles is always the same.

7. Correct Option: C

Explanation:

Let $\triangle ABC$ be a right-angled triangle.

Given that,

$$\sin A = \frac{3}{4} \Rightarrow \frac{BC}{AC} = \frac{3}{4}$$

Let $BC = 3k$ (where k is a positive integer)

Then, $AC = 4k$

In right-angled $\triangle ABC$, by Pythagoras theorem,

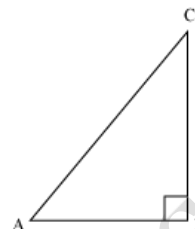
$$AC^2 = AB^2 + BC^2$$

$$(4k)^2 = AB^2 + (3k)^2$$

$$AB^2 = 16k^2 - 9k^2 = 7k^2$$

$$\Rightarrow AB = \sqrt{7}k$$

$$\cos A = \frac{\text{Side adjacent to } \angle A}{\text{hypotenuse}} = \frac{AB}{AC} = \frac{\sqrt{7}K}{4K} = \frac{\sqrt{7}}{4}$$



8. Correct Option: C

Explanation:

$$\cos 2\theta = 0$$

$$\Rightarrow \cos 2\theta = \cos 90^\circ$$

$$\Rightarrow 2\theta = 90^\circ$$

$$\Rightarrow \theta = 45^\circ$$

9. Correct Option: D

Explanation:

Given that in $\triangle ABC$, $DE \parallel BC$ and D and E are the points on the sides AB and AC respectively.

$$\therefore \frac{AD}{DB} = \frac{AE}{EC} \quad (\text{by Thales theorem})$$

$$\Rightarrow \frac{x}{x-2} = \frac{x+2}{x-1}$$

$$\Rightarrow x(x-1) = x^2 - 4$$

$$\Rightarrow x^2 - x = x^2 - 4$$

$$\Rightarrow x = 4$$

10. Correct Option: B

Explanation:

$$\triangle ABC \sim \triangle DEF$$

$$\Rightarrow \frac{AB}{DE} = \frac{BC}{EF}$$

$$\Rightarrow \frac{1}{2} = \frac{6}{EF}$$

$$\Rightarrow EF = 12 \text{ cm}$$

11. Correct Option: C

Explanation:

PT is a tangent to a circle at point T.

And, tangent to any point on a circle is perpendicular to the radius through the point of contact.

$$\therefore \angle PTO = 90^\circ$$

Then, in $\triangle PTO$, by Pythagoras theorem

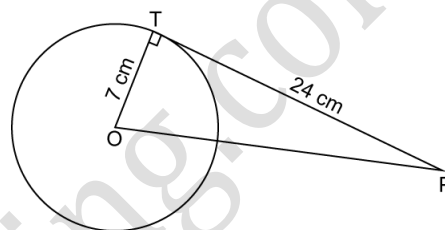
$$OP^2 = PT^2 + OT^2$$

$$= 24^2 + 7^2$$

$$= 576 + 49$$

$$= 625$$

$$\Rightarrow OP = 25 \text{ cm}$$



12. Correct Option: A

Explanation:

Radius of a circle, $r = 21 \text{ cm}$ Angle subtended by an arc $= 60^\circ$

$$\text{Length of an arc of a sector of angle } \theta = \frac{\theta}{360^\circ} \times 2\pi r$$

$$= \frac{60^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 21$$

$$= \frac{1}{6} \times 2 \times 22 \times 3$$

$$= 22 \text{ cm}$$

13. Correct Option: C

Explanation:

For greatest sphere,

Radius of sphere = radius of wooden log = 1 cm

$$\text{Maximum volume of sphere} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(1)^3 = \frac{4}{3}\pi \text{ cm}^3$$

14. Correct Option: D

Explanation:

$$3\text{Median} = \text{Mode} + 2\text{Mean}$$

$$\text{Median} = \frac{80 + 2(110)}{3} = \frac{80 + 220}{3} = \frac{300}{3} = 100$$

15. Correct Option: C

Explanation:

Given that

Height (h) of the cylindrical part = 2.1 m

Diameter of the cylindrical part = 4 m

So, radius of the cylindrical part = 2 m

Slant height (l) of conical part = 2.8 m

Area of canvas used = CSA of conical part + CSA of cylindrical part

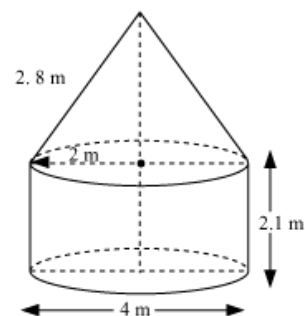
$$= \pi r l + 2\pi r h$$

$$= \pi \times 2 \times 2.8 + 2\pi \times 2 \times 2.1$$

$$= 2\pi [2.8 + 2 \times 2.1]$$

$$= 2 \times \frac{22}{7} \times 7$$

$$= 44 \text{ m}^2$$



16. Correct Option: D

Explanation:

Time (in sec)	No. of students (f)	cf
20 – 40	7	7
40 – 60	10	17
60 – 80	15	32
80 – 100	5	37
100 – 120	3	40
	$N = \sum f = 40$	

Here $N/2 = 40/2 = 20$

Hence, median Class = 60-80

The highest frequency is 15 that belongs to class 60-80.

Hence, modal Class = 60-80

Sum of upper limits of median class and modal class = $80 + 80 = 160$

17. Correct Option: A

Explanation:

When a die is rolled, the sample space is given by

$$S = \{1, 2, 3, 4, 5, 6\} \Rightarrow n(S) = 6$$

Let A be the event of getting a number less than 3.

$$\text{Then, } A = \{1, 2\} \Rightarrow n(A) = 2$$

$$\text{Hence, } P(A) = \frac{2}{6} = \frac{1}{3}$$

18. Correct Option: B

Explanation:

$$\begin{aligned} & \frac{\tan^2 x}{(1 + \tan^2 x)} + \frac{\cot^2 x}{(1 + \cot^2 x)} \\ &= \frac{\frac{\sin^2 x}{\cos^2 x}}{\frac{\cos^2 x}{\sin^2 x} + 1} + \frac{\frac{\cos^2 x}{\sin^2 x}}{1 + \frac{\sin^2 x}{\cos^2 x}} \\ &= \frac{\sin^2 x}{\cos^2 x + \sin^2 x} + \frac{\cos^2 x}{\sin^2 x + \cos^2 x} \\ &= \frac{\sin^2 x}{1} + \frac{\cos^2 x}{1} \\ &= \sin^2 x + \cos^2 x \\ &= 1 \end{aligned}$$

19. Correct Option: A

Explanation:

The statement given in reason is correct and hence reason is true and is the correct explanation for assertion.

Now, HCF (26, 169) = 13

HCF $\times$ LCM = Product of numbers

$$\Rightarrow \text{LCM} = \frac{169 \times 26}{13} \Rightarrow \text{LCM} = 338$$

Hence, assertion is true.

20. Correct Option: C

Explanation:

In $\triangle ADE$ and $\triangle ABC$,

$\angle A = \angle A$... (Common angle)

$\angle ADE = \angle ABC$... (Given)

$\Rightarrow \triangle ADE \sim \triangle ABC$... (by AA similarity criteria)

Using the property i.e. 'corresponding sides of similar triangle are proportional', we have

$$\begin{aligned} & \frac{AD}{AB} = \frac{DE}{BC} \\ & \Rightarrow \frac{3.8}{(3.6 + 2.1)} = \frac{DE}{4.2} \quad \dots (AB = AE + EB) \\ & \Rightarrow DE = 2.8 \text{ cm} \end{aligned}$$

Hence, assertion is true.

And, corresponding sides of similar triangles are **proportional** not congruent.

Hence, reason is false.

Section B

21. In $\triangle ABC$, by angle sum property,

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\Rightarrow x + 3x + y = 180$$

$$\Rightarrow 4x + y = 180 \quad \dots(1)$$

$$\text{Also, } 3y - 5x = 30 \quad (\text{given})$$

$$\Rightarrow -5x + 3y = 30 \quad \dots(2)$$

Multiplying equation (1) by 3, we get

$$12x + 3y = 540 \quad \dots(3)$$

Subtracting equation (2) from (3), we get

$$17x = 510 \Rightarrow x = 30$$

Putting $x = 30$ in (1), we get

$$4 \times 30 + y = 180 \Rightarrow y = 60$$

$$\text{Hence, } \angle A = 30^\circ, \angle B = 3 \times 30^\circ = 90^\circ, \angle C = 60^\circ$$

Hence, $\triangle ABC$ is a right-angled triangle.

22. Given, $\triangle ABC \sim \triangle PQR$.

If two triangles are similar, then their corresponding sides are proportional and they are proportional to the corresponding perimeters.

$$\therefore \frac{\text{Perimeter of } \triangle ABC}{\text{Perimeter of } \triangle PQR} = \frac{AB}{PQ}$$

$$\Rightarrow \frac{32}{24} = \frac{AB}{12}$$

$$\Rightarrow AB = \frac{32 \times 12}{24} = 16 \text{ cm}$$

23. Given $AB = 10 \text{ cm}$, $AR = 7 \text{ cm}$, $CR = 5 \text{ cm}$

Tangents drawn from an exterior point to a circle are equal in length.

Since, AR and AP are tangents from an exterior point A to the circle,

$$AP = AR = 7 \text{ cm}$$

$$AB = 10 \text{ cm}$$

$$\therefore BP = AB - AP = (10 - 7) = 3 \text{ cm}$$

Also, BP and BQ are tangents from an exterior point B to the circle.

$$\therefore BP = BQ = 3 \text{ cm}$$

Further, CQ and CR are tangents from an exterior point C to the circle.

$$\therefore CQ = CR = 5 \text{ cm}$$

$$\text{Now, } BC = BQ + CQ = (3 + 5) \text{ cm} = 8 \text{ cm}$$

24. Given,

$$\text{Radius of an arc, } r = 42 \text{ cm}$$

$$\text{Length of an arc} = 88 \text{ cm}$$

$$\text{Now, area of a sector} = \frac{\theta^\circ}{360^\circ} \times \pi r^2$$

$$= \frac{\theta^\circ}{360^\circ} \times 2\pi r \times \frac{r}{2}$$

$$= \text{length of an arc} \times \frac{r}{2}$$

$$= 88 \times \frac{42}{2}$$

$$= 1848 \text{ cm}^2$$

OR

Radius of a circle, $r = 5.6 \text{ cm}$ Number of equal sectors, $n = 8$

$$\text{Then, area of each sector} = \frac{1}{n} \times \pi r^2 = \frac{1}{8} \times \frac{22}{7} \times 5.6 \times 5.6$$

$$= 12.32 \text{ cm}^2$$

25.

We know that

$$\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

$$\Rightarrow (3x)^2 - \left(\frac{3}{x}\right)^2 = 1$$

$$\Rightarrow 9x^2 - \frac{9}{x^2} = 1$$

$$\Rightarrow 9\left(x^2 - \frac{1}{x^2}\right) = 1$$

$$\Rightarrow 3 \times 3\left(x^2 - \frac{1}{x^2}\right) = 1$$

$$\Rightarrow 3\left(x^2 - \frac{1}{x^2}\right) = \frac{1}{3}$$

OR

$$\begin{aligned} \text{L.H.S} &= \sqrt{\frac{1 - \cos A}{1 + \cos A}} + \sqrt{\frac{1 + \cos A}{1 - \cos A}} \\ &= \sqrt{\frac{(1 - \cos A)(1 - \cos A)}{(1 + \cos A)(1 - \cos A)}} + \sqrt{\frac{(1 + \cos A)(1 + \cos A)}{(1 - \cos A)(1 + \cos A)}} \\ &= \sqrt{\frac{(1 - \cos A)^2}{(1 - \cos^2 A)}} + \sqrt{\frac{(1 + \cos A)^2}{(1 - \cos^2 A)}} \\ &= \sqrt{\frac{(1 - \cos A)^2}{\sin^2 A}} + \sqrt{\frac{(1 + \cos A)^2}{\sin^2 A}} \\ &= \frac{1 - \cos A}{\sin A} + \frac{1 + \cos A}{\sin A} \\ &= \frac{1 - \cos A + 1 + \cos A}{\sin A} \\ &= \frac{2}{\sin A} \\ &= 2 \times \operatorname{cosec} A \\ &= \text{RHS} \end{aligned}$$

Section C

26. To find the minimum number of rooms required, we first find the maximum number of participants which can be accommodated in each room such that the number of participants in each room is the same.

This can be determined by finding the HCF of 60, 84 and 108.

$$60 = 22 \times 3 \times 5$$

$$84 = 22 \times 3 \times 7$$

$$108 = 22 \times 33$$

$$\text{Then, HCF} = 22 \times 3 = 12$$

$$\text{So, the minimum number of rooms required} = \frac{\text{Total number of participants}}{12}$$

$$= \frac{60 + 84 + 108}{12}$$

$$= 21$$

27. $p = a + (l - 1)d$ (1)

$$q = a + (m - 1)d$$
(2)

$$r = a + (n - 1)d$$
(3)

Subtracting equation (2) from (1),

$$p - q = (l - m)d$$

Subtracting equation (3) from (2),

$$q - r = (m - n)d$$

Subtracting equation (1) from (3),

$$r - p = (n - l)d$$

$$\text{Now, LHS} = (p - q)n + (q - r)l + (r - p)m$$

$$= [(l - m)n + (m - n)l + (n - l)m]d$$

$$= [ln - mn + ml - nl + nm - lm]d$$

$$= 0 \times d$$

$$= 0$$

$$= \text{RHS}$$

28. Let the monthly incomes of A and B be Rs. $5x$ and Rs. $4x$ respectively, and let their expenditure be Rs. $7y$ and Rs. $5y$ respectively.

Then

$$5x - 7y = 3000$$
(1)

$$4x - 5y = 3000$$
(2)

Multiplying equation (1) by 5 and equation (2) by 7, we get

$$25x - 35y = 15000$$
(3)

$$28x - 35y = 21000$$
(4)

Subtracting equation (3) from equation (4), we get

$$3x = 6000 \Rightarrow x = 2000$$

Putting $x = 2000$ in equation (1), we get

$$5 \times 2000 - 7y = 3000$$

$$\Rightarrow -7y = 3000 - 10000$$

$$\therefore x = 2000 \text{ and } y = 1000$$

Therefore, income of A = $5x = 5 \times 2000 = \text{Rs. } 10000$

And, income of B = $4x = 4 \times 2000 = \text{Rs. } 8000$

OR

Let the length and breadth of a room be x metres and y metres respectively.

Then,

$$x - y = 3 \quad \dots(1)$$

$$(x + 3)(y - 2) = xy$$

$$\Rightarrow 3y - 2x = 6$$

$$\Rightarrow -2x + 3y = 6 \quad \dots(2)$$

Multiplying equation (1) by 2, we get

$$2x - 2y = 6 \quad \dots(3)$$

Adding equation (2) and (3),

$$y = 12$$

Putting $y = 12$ in equation (1),

$$x - 12 = 3$$

$$\Rightarrow x = 15$$

$$\therefore x = 15 \text{ and } y = 12$$

Hence, the length and breadth of a room are 15 metres and 12 metres respectively.

29. Given, $\cos \theta = \frac{7}{25}$

Let $AB = 7k$ and $AC = 25k$, where k is a positive integer.

Let us draw a $\triangle ABC$ in which $\angle B = 90^\circ$ and $\angle BAC = \theta$.

In $\triangle ABC$, by Pythagoras theorem,

$$AC^2 = AB^2 + BC^2$$

$$\Rightarrow BC^2 = AC^2 - AB^2$$

$$\Rightarrow BC^2 = (25k)^2 - (7k)^2$$

$$\Rightarrow BC^2 = 625k^2 - 49k^2 = 576k^2$$

$$\Rightarrow BC = 24k$$

Then,

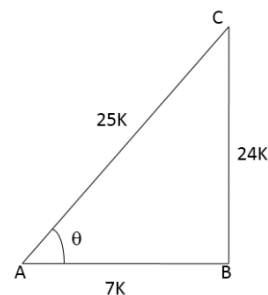
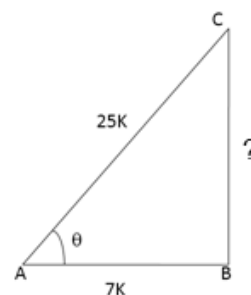
$$\sin \theta = \frac{BC}{AC} = \frac{24k}{25k} = \frac{24}{25}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{24}{25} \times \frac{25}{7} = \frac{24}{7}$$

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta} = \frac{25}{24}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{25}{7}$$

$$\cot \theta = \frac{1}{\tan \theta} = \frac{7}{24}$$



30. Construction: Join OA, OC, O'D and O'B.

In $\triangle OAE$ and $\triangle OCE$,

$OA = OC$ (radii of the same circle)

$OE = OE$ (common side)

$\angle OAE = \angle OCE$ (each is a right angle)

$\Rightarrow \triangle OAE \cong \triangle OCE$ (RHS congruence criterion)

$\Rightarrow \angle AEO = \angle CEO$ (cpct)

Similarly, for the circle with center O'

$\angle DEO' = \angle BEO'$

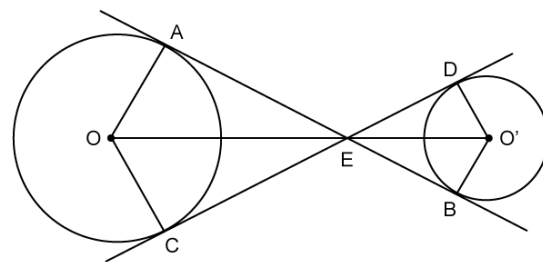
Now, $\angle AEC = \angle DEB$ (vertically opposite angles)

$$\Rightarrow \frac{1}{2} \angle AEC = \frac{1}{2} \angle DEB$$

$$\Rightarrow \angle AEO = \angle CEO = \angle DEO' = \angle BEO'$$

Hence, all the four angles are equal and bisected by OE and O'E.

So, O, E and O' are collinear.



OR

Let OQ be the radius of the circle with diameter d_2 .

$$\text{Then, } OQ = \frac{d_2}{2}$$

Let OR be the radius of the circle with diameter d_1 .

$$\text{Then, } OR = \frac{d_1}{2}$$

PQ is a chord of outer circle which is a tangent to the inner circle.

$$\therefore \angle ORQ = 90^\circ$$

Now, perpendicular from the centre of a circle to a chord bisects the chord.

$$\therefore QR = PR = \frac{c}{2}$$

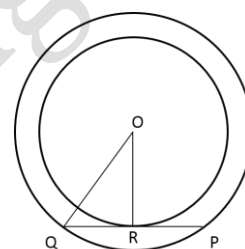
In right-angled $\triangle ORQ$,

$$OQ^2 = OR^2 + QR^2$$

$$\Rightarrow \left(\frac{d_2}{2}\right)^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{c}{2}\right)^2$$

$$\Rightarrow \frac{1}{4}(d_2)^2 = \frac{1}{4}[(d_1)^2 + (c)^2]$$

$$\Rightarrow d_2^2 = d_1^2 + c^2 \quad (\text{proved})$$



31. 2 red kings, 2 red queens, 2 red jacks are removed from a deck of 52 cards.

Then, remaining number of cards = $52 - 6 = 46$

i. As 2 red kings are removed, only 2 black kings are left.

$$\therefore \text{Probability of getting a king card} = \frac{2}{46} = \frac{1}{23}$$

ii. When 6 red cards are removed, number of red cards left = $26 - 6 = 20$

$$\therefore \text{Probability of getting a red card} = \frac{20}{46} = \frac{10}{23}$$

iii. There are 13 spade cards in a deck.

$$\therefore \text{Probability of getting a spade card} = \frac{13}{46}$$

Section D

32. Let the present age of son be x years and that of man be y years.

$$\text{Then, } y = x^2 \quad \dots(1)$$

The ages of son and man one year ago will be $(x - 1)$ years and $(y - 1)$ years respectively.

$$\text{Then, } (y - 1) = 8(x - 1)$$

$$\Rightarrow y - 1 = 8x - 8$$

$$\Rightarrow y = 8x - 7$$

$$\Rightarrow x^2 = 8x - 7 \quad \dots[\text{From (1)}]$$

$$\Rightarrow x^2 - 8x + 7 = 0$$

$$\Rightarrow x^2 - 7x - x + 7 = 0$$

$$\Rightarrow x(x - 7) - 1(x - 7) = 0$$

$$\Rightarrow (x - 7) = 0 \text{ or } (x - 1) = 0$$

$$\Rightarrow x = 7 \text{ or } x = 1$$

Here, $x = 1$ does not satisfy the condition given for one year ago.

So, we reject $x = 1$.

$$\text{Hence, } x = 7 \text{ and } y = x^2 = 7^2 = 49$$

Therefore, the age of son and man are 7 years and 49 years respectively.

OR

Let the width of the path be x metres.

Given, area of the path = 120 m^2

So, we have

$$(16 + 2x)(10 + 2x) - 16 \times 10 = 120$$

$$\Rightarrow (160 + 32x + 20x + 4x^2) - 160 = 120$$

$$\Rightarrow 52x + 4x^2 = 120$$

$$\Rightarrow 13x + x^2 = 30$$

$$\Rightarrow x^2 + 13x - 30 = 0$$

$$\Rightarrow x^2 + 15x - 2x - 30 = 0$$

$$\Rightarrow x(x + 15) - 2(x + 15) = 0$$

$$\Rightarrow (x + 15) = 0 \text{ or } (x - 2) = 0$$

$$\Rightarrow x = -15 \text{ or } x = 2$$

But, width cannot be negative.

$$\Rightarrow x \neq -15$$

$$\therefore x = 2$$

Hence, the width of the path is 2 m.

33. P is a point on AB.

$$\text{Then, } AB = AP + PB = (2 + 4) \text{ cm} = 6 \text{ cm}$$

Also, Q is a point on AC.

$$\text{Then, } AC = AQ + QC = (3 + 6) \text{ cm} = 9 \text{ cm}$$

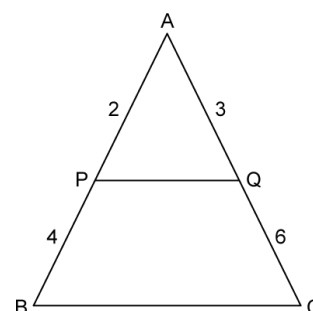
Now,

$$\frac{AP}{AB} = \frac{2}{6} = \frac{1}{3}$$

$$\frac{AQ}{AC} = \frac{3}{9} = \frac{1}{3}$$

$$\Rightarrow \frac{AP}{AB} = \frac{AQ}{AC}$$

Thus, in $\triangle APQ$ and $\triangle ABC$



$$\angle A = \angle A \text{ (common)}$$

$$\frac{AP}{AB} = \frac{AQ}{AC}$$

$\therefore \triangle APQ \sim \triangle ABC$ (by SAS similarity)

$$\Rightarrow \frac{AP}{AB} = \frac{PQ}{BC} = \frac{AQ}{AC}$$

$$\therefore \frac{PQ}{BC} = \frac{AQ}{AC}$$

$$\Rightarrow \frac{PQ}{BC} = \frac{1}{3}$$

$$\Rightarrow BC = 3PQ \quad (\text{proved})$$

34. Let the model made by Rachel be as follows:

From the figure,

Height of each conical part = $h_1 = 2$ cm

Height of cylindrical part = $h_2 = 12 - 2 \times \text{height of conical part}$
 $= 12 - 2 \times 2 = 8$ cm

Radius of cylindrical part = radius of conical part = $r = \frac{3}{2}$ cm

Now,

Volume of air present in the model

= volume of cylinder + $2 \times$ volume of cones

$$= \pi r^2 h_2 + 2 \times \frac{1}{3} \pi r^2 h_1$$

$$= \pi \left(\frac{3}{2} \right)^2 (8) + 2 \times \frac{1}{3} \pi \left(\frac{3}{2} \right)^2 (2)$$

$$= \pi \times \frac{9}{4} \times 8 + \frac{2}{3} \pi \times \frac{9}{4} \times 2$$

$$= 18\pi + 3\pi$$

$$= 21\pi$$

$$= 21 \times \frac{22}{7}$$

$$= 66 \text{ cm}^3$$

OR

Let the figure representing the question be as follows:

Height (h_1) of larger cylinder = 220 cm

Radius (r_1) of larger cylinder = $\frac{24}{2} = 12$ cm

Height (h_2) of smaller cylinder = 60 cm

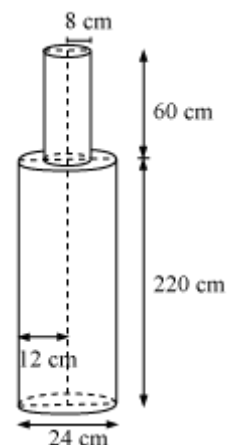
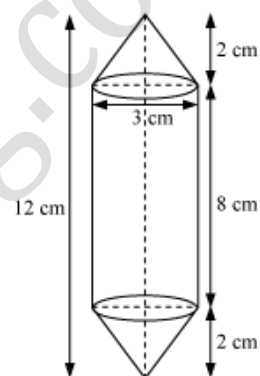
Radius (r_2) of smaller cylinder = 8 cm

Volume of pole = Volume of larger cylinder + Volume of smaller cylinder

$$= \pi r_1^2 h_1 + \pi r_2^2 h_2$$

$$= \pi (12)^2 \times 220 + \pi (8)^2 \times 60$$

$$= \pi (31680 + 3840)$$



$$= \left(35520 \times \frac{22}{7} \right) \text{ cm}^3$$

Mass of 1 cm^3 iron = 7 g

$$\text{So, mass of } \left(35520 \times \frac{22}{7} \right) \text{ cm}^3 = 35520 \times \frac{22}{7} \times 7 = 7,81,440 \text{ g} = 781.440 \text{ kg}$$

35. Let the assumed mean be 35, $h = 10$. Now, we have

Class	Frequency f_i	Mid-value x_i	$u_i = \left(\frac{x_i - A}{h} \right)$	C.F	$f_i u_i$
0-10	5	5	-3	5	-15
10-20	10	15	-2	15	-20
20-30	18	25	-1	33	18
30-40	30	35=A	0	63	0
40-50	20	45	1	83	20
50-60	12	55	2	95	24
60-70	5	65	3	100	15
$N = 100$					$\sum f_i u_i = 6$

i. Mean $\bar{x} = A + h \left(\frac{\sum f_i u_i}{N} \right)$

$$= 35 + 10 \times \left(\frac{6}{100} \right) = 35 + 0.6 = 35.6$$

ii. $N = 100$, $\frac{N}{2} = 50$

Cumulative frequency just after 50 is 63.

Then, median class is 30-40.

$$l = 30, h = 10, N = 100, F = 33, f = 30$$

$$\begin{aligned} \therefore \text{Median } M_e &= l + h \left(\frac{\frac{N}{2} - F}{f} \right) = 30 + 10 \left(\frac{50 - 33}{30} \right) \\ &= 30 + 10 \left(\frac{17}{30} \right) = 30 + 5.67 = 35.67 \end{aligned}$$

iii. Mode = $3\text{Median} - 2\text{Mean}$

$$= 3 \times 35.67 - 2 \times 35.6$$

$$= 107.01 - 71.2$$

$$= 35.81$$

Thus, mean = 35.6, median = 35.67 and mode = 35.81.

Section E

36.

- i. From the graph, the coordinates of point B and D are (6, 9) and (6, 2) respectively.

$$\therefore BD = \sqrt{(6-6)^2 + (2-9)^2} = 7 \text{ cm}$$

- ii. From the graph, the coordinates of point A and C are (4, 6) and (6, 6) respectively.

$$\therefore AC = \sqrt{(6-4)^2 + (6-6)^2} = 2 \text{ cm}$$

- iii. From the graph, the coordinates of point A and B are (4, 6) and (6, 9) respectively.

$$\therefore AB = \sqrt{(6-4)^2 + (9-6)^2} = \sqrt{13} \text{ cm}$$

OR

From the graph, the coordinates of point A and D are (4, 6) and (6, 2) respectively.

$$\therefore AD = \sqrt{(6-4)^2 + (2-6)^2} = 2\sqrt{5} \text{ cm}$$

37.

- i. 3
- rd
- term =
- $a_3 = a + 2d = 4$
-(1)

$$9^{\text{th}} \text{ term} = a_9 = a + 8d = -8 \text{(2)}$$

Subtracting equation (1) from (2), we get

$$6d = -12 \Rightarrow d = -2$$

So, the common difference is -2.

- ii.
- $d = -2$
- and
- $a_3 = a + 2d = 4$

$$\Rightarrow a = 4 - 2(-2) = 4 + 4 = 8$$

- iii. Let
- n^{th}
- term of A.P. be -160.

$$\text{Then, } a = 8, d = -2 \text{ and } a_n = -160$$

$$\text{Now, } a_n = a + (n-1)d$$

$$\Rightarrow -160 = 8 + (n-1)(-2)$$

$$\Rightarrow -160 - 8 = -2n + 2$$

$$\Rightarrow 2n = 170$$

$$\Rightarrow n = 85$$

Hence, 85th term of A.P. is -160.

OR

$$\text{Here, } a = 8 \text{ and } d = -2$$

Then, 75th term, a_{75} , is given by

$$a_{75} = a + 74d = 8 + 74(-2) = 8 - 148 = -140$$

Hence, the 75th term of A.P. is -140.

38.

- i. The angle formed by the line of sight with the horizontal when the object viewed is above the horizontal level is the angle of elevation.
- ii. Let AB represents Red Fort and x be the distance between the Red Fort and students.

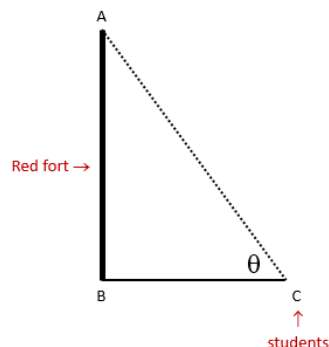
$$\theta = 60^\circ$$

Using trigonometry, we have

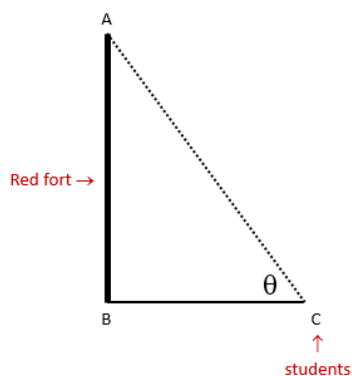
$$\tan 60^\circ = \frac{33}{x} \text{ m}$$

$$\Rightarrow \sqrt{3} = \frac{33}{x}$$

$$\Rightarrow x = \frac{3 \times 11}{\sqrt{3}} = 11\sqrt{3} \text{ m}$$



iii.



Let AB represents Red Fort with max height 33 m and BC be the distance.

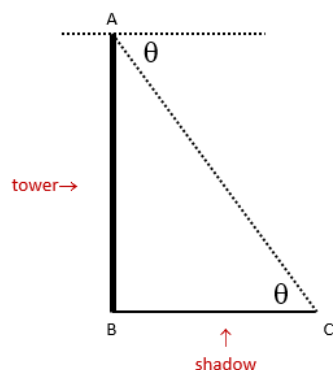
Let θ be the angle of elevation.

Using trigonometry, we have

$$\tan \theta = \frac{AB}{BC} = \frac{33}{33} = 1$$

$$\Rightarrow \theta = 45^\circ$$

OR



Let AB be the height and BC be the shadow casted by AB.

$$\theta = 30^\circ$$

$$\tan 30^\circ = \frac{AB}{BC}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{AB}{30}$$

$$\Rightarrow AB = 10\sqrt{3} \text{ m}$$

CBSE
CLASS 10



SCIENCE

MOCK PAPER

SOLUTIONS

CBSE
Class 10 Science
Mock Paper

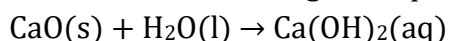
SECTION - A

1. Correct option – b: Decomposition

Electrical decomposition of water takes place in electrolysis to form hydrogen and oxygen.

2. Correct option – b: Combination reaction

A combination reaction is a reaction in which two or more elements or compounds combine to form a single compound.



3. Correct option – b: ii and iii

Chlorine is given off at anode and hydrogen is given off at cathode.

4. Correct option – d:



Frying is made of iron which is constantly get exposed to atmospheric oxygen, moisture and heat which results into rusting. Option a - is thermos flask and mug made up of steel which is rustproof alloy. Option b – is wooden sitting bench which cannot rust.

5. Correct option – d: P – Aluminium, Q – Malleable, R - Less reactivity with water

Aluminium foils are usually used to wrap food stuff due to its malleable nature, it can be converted into thin sheets or foils. Also, aluminium is less reactive with water than malleable iron.

6. Correct option – b: Copper is more reactive than silver

Copper is placed above silver in the reactivity series because it is more reactive than silver since it displaces silver from its compound easily.

7. Correct option – c: Anode

In electrolytic refining, the impure metal is made as anode and the pure metal is made as cathode.

8. Correct option – a: A: Kidney - Filters the blood and concentrates the filtrate to make urine.

A – Kidney, B – Ureter, C – Urinary bladder, D - Urethra

The kidneys filter the blood and concentrate the filtrate to make urine. They also help regulate blood pressure.

9. Correct option – b: A: Amylase – Starch, B: Pepsin – Protein, C: Lipase – Fats

A – Salivary glands, B – Stomach, C – Small intestine

Salivary amylase secreted by the salivary glands digests starch, pepsin secreted by the stomach digests proteins and lipase secreted in the small intestine digests fats.

10. Correct option – d : 100%, 75%

In a monohybrid cross between plants with violet and white flowers, in F_1 generation all plants bear violet flowers only. In F_2 generation, 75% of the plants bear violet flowers while 25% bear white flowers.

11. Correct option – c : Ethylene

Ethylene is a gaseous plant hormone that plays an important role in inducing the ripening process for many fruits.

12. Correct option – a : A only

A is anther, B is style and C is ovary. Anther is the male reproductive part of a flower which assists in the production of pollen grains.

13. Correct option – d) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$

If the 'a' is object distance, 'b' is image distance and 'c' is focal length of concave mirror. Then the mirror formula is written as

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$$

14. Correct option – a) Correction of myopia

The given ray diagram depicts the correction of myopia. Concave lens is used to correct myopic eye.

15. Correct option – d) 10 : 1

In an ecosystem, Sun is the ultimate source of energy. Solar energy is utilised by the plants to produce food by the process of photosynthesis. The consumers obtain energy from the producers. The energy is transferred from one trophic level to another. According to the 10% law of energy transfer in a food chain, 90% of captured energy is lost as heat and only 10% is available for use for the next trophic level. Thus, if 10 J of energy is available in one trophic level, then the organism in the next trophic level will have only 1 J of energy.

16. Correct option – c) (ii) and (iii)

In group (ii) plankton and fish belong to the aquatic food chain, whereas man and grasshopper are found in the terrestrial ecosystem. Hence, group (ii) does not constitute an appropriate food chain.

In group (iii) wolf, grass, snake, tiger, there is no herbivore animal to consume grass. Wolf, tiger, and snake are carnivores, they never feed on grass. Hence, this group also does not constitute a proper food chain.

17. A is true but R is false.

Calcium hydroxide is present in whitewash. So, the assertion is true. It reacts slowly with the carbon dioxide present in air to produce a thin layer of shiny calcium carbonate. So, the reason is false.

18. Both A and R are true, but R is not the correct explanation of A.

Sexual reproduction provides genetic diversity because the gametes, sperm and the egg produced contain different combinations of genes than the parent organisms. Sexual reproduction increases genetic diversities and plays a role in the origin of new species.

19. Both A and R are true, and R is the correct explanation of A.

Pesticides such as DDT are not metabolised within the bodies of living organisms and are concentrated at each trophic level leading to bioaccumulation. At every trophic level, the concentration of DDT increases and is maximum at the highest trophic level. Since fish-eating birds occupy the topmost trophic level, they are likely to have maximum amount of DDT in their bodies.

20. A is true but R is false

In an AC generator we can increase the magnitude of induced current will increase if we increase the number of armature coils similarly by increasing the area of armature coils, we can increase the amount of current also induced current will increase if we increase the velocity of rotation.

SECTION - B

21. Baking powder is added to breads and cakes to make them fluffy and soft.

The main ingredients are baking soda and an edible acid like tartaric acid.

Baking soda (sodium hydrogen carbonate) releases CO_2 gas when heated and this makes the cake fluffy and soft.

Tartaric acid avoids the bitter taste by reacting with Na_2CO_3 formed by the heating of NaHCO_3 .

22. The reason for declining females in India is sex-selective abortions of the female foetus through surgeries (female foeticides). This can be avoided by banning pre-natal sex determination. Everyone in society needs to be educated about the equality of gender and the health of women.

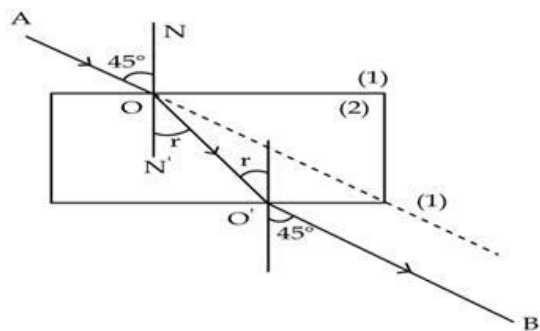
23. Gastric glands in the stomach release hydrochloric acid, enzyme pepsin and mucus. Mucus protects the inner lining of stomach from the action of hydrochloric acid and enzyme pepsin. If mucus is not released, it will lead to erosion of the inner lining of stomach, leading to acidity and ulcers.

OR

The plant will not remain healthy for a long time because:

- No photosynthesis will occur so no glucose will be made. Also, no respiration will take place as no oxygen will be taken in.
- No transpiration will occur, so there would be no upward movement of water or minerals from the soil as there will be no transpiration pull.
- Temperature regulation of leaf surface will be affected.

24.



Using Snell's law, the refractive index of medium (2) with respect to medium (1) is given as

$$n_{21} = \frac{\sin i}{\sin r} = \frac{\sin 45^\circ}{\sin 30^\circ} = \frac{1/\sqrt{2}}{1/2} = \sqrt{2} = 1.414$$

If the second medium is water in place of medium (2), the angle of refraction will decrease because water is rarer than medium (2).

25. The phenomenon is called dispersion.

Speed of violet light inside the prism is slowest and that of red is highest. Hence, deviation of violet light is maximum and that of red is minimum.

OR

A concave lens always forms a virtual, erect image on the same side of the object.

$v = -20$ cm, $f = -25$ cm, $u = ?$

$$1/v - 1/u = 1/f \quad 1/u = 1/(-20) - 1/(-25) \quad 1/u = -1/100$$

Thus, $u = -100$ cm

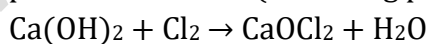
Thus, object distance is 100 cm.

26. Harmful pesticides like DDT enter the plant body on being absorbed from the soil. When the plants are eaten by the animals, the pesticides get accumulated in the animal's body as they are neither metabolised nor excreted out of their bodies. The concentration of the harmful chemicals increases at successive levels leading to bio magnification. In this way, wheat and rice, vegetables, and fruits, and even meat which occupy different trophic levels are found to contain varying amounts of pesticide residues.

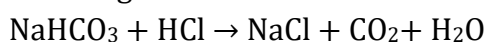
SECTION - C

27.

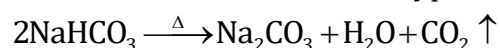
a) When chlorine is passed over dry slaked lime at room temperature, the main reaction product is CaOCl_2 (bleaching powder).



b) When dilute hydrochloric acid reacts with sodium hydrogen carbonate, carbon dioxide gas is liberated.



c) Sodium hydrogen carbonate on heating decomposes into sodium carbonate, water, and carbon dioxide. This is a type of thermal decomposition reaction.



28. Kerosene flask.

Metals such as potassium and sodium react violently with water.

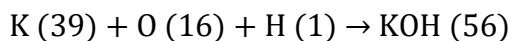
With sodium and potassium, the reaction is so violent and exothermic that the evolved hydrogen immediately catches fire.

Metals such as potassium and sodium react so vigorously that they catch fire if kept in the open.

Hence, they are kept immersed in kerosene oil to protect them and to prevent accidental fires.

OR

X is Na because the molecular mass of NaOH is 40.

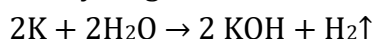


Hence,

X is Potassium.

Y is Potassium hydroxide.

Z is hydrogen, which catches fire when it reacts with water.



Here oxygen is losing hydrogens, so it is reduced. Potassium gains oxygen, so it is oxidised. Therefore, it is a redox reaction and hydrogen displacement reaction. Redox reactions are reactions in which one species is reduced and another is oxidised. Consequently, the oxidation state of the species involved must change.

29.

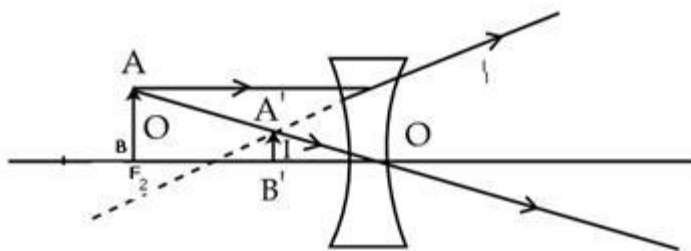
- a) At the synapse, the electrical signals are converted into chemicals that can easily cross the gap and pass on to the next neuron where they again get converted into electrical signals.
- b) Electrical impulse travels through a neuron. But to be transmitted to another neuron, it needs to pass in the form of neurotransmitters. Neurotransmitters are specialised chemicals which can enter a neuron only through specialised channels. Such channels are present in dendrites but not in axons. Neurotransmitters are only produced at the axonal end and can enter a dendrite. Due to this, the flow of signals in a synapse is from the axonal end of one neuron to the dendritic end of another neuron but not the reverse.

30.

- (i) The trait for tongue rolling is dominant.
- (ii) Out of the two parents, the female shows tongue rolling and the male is a non-tongue roller. In the F_1 progeny, a son and a daughter are tongue-rollers and another daughter is a non-tongue roller. This indicates that the female carries heterozygous genes i.e., one gene for tongue rolling and another for non-rolling. If the female was a homozygous parent then all the three offspring would have got at least one gene for the tongue rolling making them all tongue rollers.

31.

- (a) We must use concave lens since the image is virtual, erect, diminished.
 (b)



- (c) The nature of image formed by the convex mirror is virtual, erect and diminished irrespective of the position of the object.

32. For the given circuit,

- (i) Resultant resistance is

$$R_{eq} = 7 + 5 || 10$$

$$\therefore R_{eq} = 7 + \frac{10 \times 5}{10 + 5} = 7 + \frac{50}{15}$$

$$\therefore R_{eq} = \frac{105 + 50}{15} = \frac{155}{15} = 10.33 \Omega$$

Total current is

$$I = \frac{V}{R_{eq}}$$

$$\therefore I = \frac{6}{10.33} = 0.58 \text{ A}$$

- (ii) Heat energy evolved in this circuit if it is switched on for 30 min.

By Joule's law of heating,

$$H = I^2 R t$$

$$H = 0.58^2 \times 10.33 \times (30 \times 60)$$

$$H = 0.3364 \times 10.33 \times 1800$$

$$H = 6255 \text{ J/s}$$

33. Power, $P = 1.5 \text{ kW} = 1500 \text{ W}$

$$V = 220 \text{ V}$$

$$\text{Current drawn, } P = V \times I$$

$$I = \frac{P}{V}$$

$$I = \frac{1500}{220}$$

$$I = 6.81 \text{ A}$$

Current drawn, $I \approx 7 \text{ A}$

The current drawn by the electrical appliance is 7 A which is beyond the fuse rating capacity in the circuit. Hence, when a very high current of 7 A flows through the 5 A fuse, it will melt and break the circuit. Hence, the fuse wire of 5 A rating would not be suitable for this electrical appliance.

SECTION - D

34.

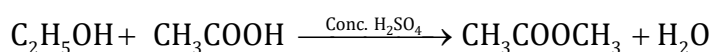
- a) The molecular formula of ethanol is C_2H_6O . Ethanol on heating with alkaline potassium permanganate or acidified potassium dichromate gets oxidised to ethanoic acid.



Ethanol

Ethanoic acid

Ethanoic acid reacts with alcohols in the presence of a little concentrated sulphuric acid to form ethyl methanoate which is a sweet smelling ester. This is called as esterification reaction as shown below:



Ethanol Ethanoic acid

Ethyl methanoate

Hence, X = Ethanol, Y = Ethanoic acid, Z = Ethyl methanoate

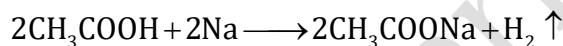
- b) The syrupy liquid in the tube was concentrated sulphuric acid. Since sulphuric acid has great affinity for water, the energy released was in the form of heat. Hence, the tube cracked and the vapours of the escaping acid produced blisters on the skin.

OR

An organic compound A (molecular formula $C_2H_4O_2$) reacts with Na metal to form a compound B and evolves a gas which burns with a pop sound.

A is ethanoic acid, CH_3COOH

B is sodium ethanoate, CH_3COONa

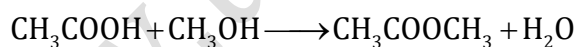
A($C_2H_4O_2$)

B

Compound A (ethanoic acid) on treatment with an alcohol C in the presence of a little concentrated sulphuric acid forms a sweet-smelling compound D (molecular formula $C_3H_6O_2$).

C is methanol, CH_3OH

D is methyl ethanoate, CH_3COOCH_3

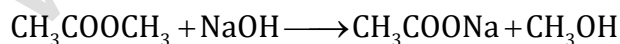


A

C

D($C_3H_6O_2$)

Compound D (methyl ethanoate) on treatment with NaOH solution gives back B (sodium ethanoate) and C (methanol).



D

B

C

35.

- (a) Number of chromosomes in female gamete is 24.
Number of chromosomes in zygote is 48.
- (b) i) The mode of reproduction used by the organism is regeneration.
ii) Regeneration is carried out by specialised cells called regenerative cells which can proliferate and make a large number of cells by cell division.
iii) *Planaria* reproduces by the method of regeneration.

OR

- (a) 1 - Frontal lobe
2 - Temporal lobe
3 - Occipital lobe
4 - Cerebellum
5 - Medulla oblongata
- (b) Function of Part 4 (Cerebellum) - Coordination of muscular activity and balance of the body.
Function of Part 5 (Medulla oblongata) - Controls the activity of the internal organs such as the heartbeat, and respiration.
- (c) The outer part of the brain contains grey matter i.e., the cell bodies of the neurons and the inner part contains white matter i.e., the axons of the neurons.
- (d) The cranium protects the brain from external injuries. Inner to the cranium lie the three layers of the meninges viz. duramater, arachnoid and piamater. The space between the meninges and the cavities of the brain contains the cerebrospinal fluid which protects the brain from mechanical injury.

36.

- (a) When the object lies between the optical centre and the focus of the lens, a convex lens forms an erect and virtual image.
- (b) When a parallel beam of light falls on a smooth and highly polished surface, the reflected beam is also parallel and directed in a fixed direction. Such reflection of light is called regular reflection.
- (c) Concave mirrors are used as shaving mirrors to see a large image of the face. This is because when the face is held within the focus of a concave mirror, an enlarged image of the face is seen in the concave mirror. This helps in getting a smooth shave.

OR

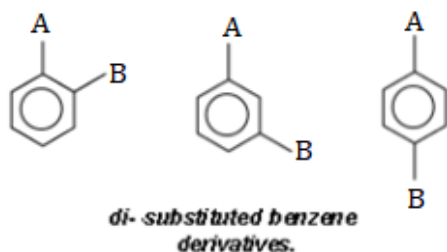
- (a) Having two eyes has the following advantages over having just one eye:
 - (i) Reduces the degree of parallax from our field of view
 - (ii) Allows us to see farther into the distance with higher resolution
 - (iii) Provides us with proper eyesight even if one of our eyes is damaged
 - (iv) Gives organisms a wider field of view and the perception of depth
- (b) The iris controls the size of the pupil. Thus, when our eye encounters bright light, the iris contracts the pupil and protects the retina from damage.
- (c) If a person is wearing spectacles of power +1 D, the lens has a positive focal length which indicates that he is wearing a convex lens. Hence, it can be concluded that he is suffering from hypermetropia or long-sightedness.

For a person wearing spectacles of power -1 D, the lens has a negative focal length which indicates that he is wearing a concave lens. Hence, it can be concluded that he is suffering from myopia or short-sightedness.

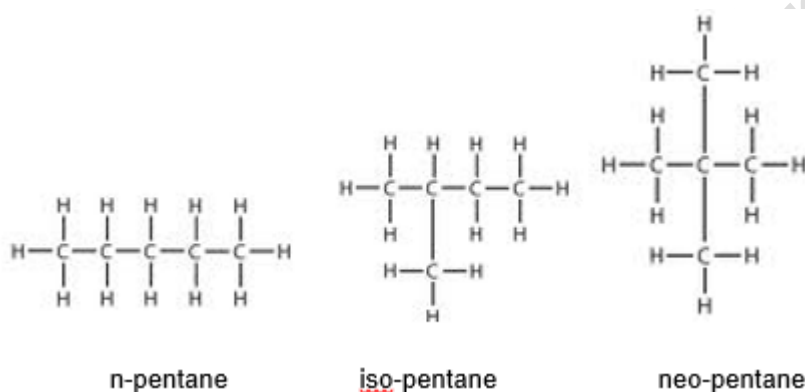
SECTION - E

37.

- (a) Number of isomers possible for disubstituted benzene are three. There will be three position isomers possible. Suppose the substituents are A and B, the possible isomers will be 1, 2- disubstituted benzene; 1, 3-disubstituted benzene; and 1, 4- disubstituted benzene as follows.

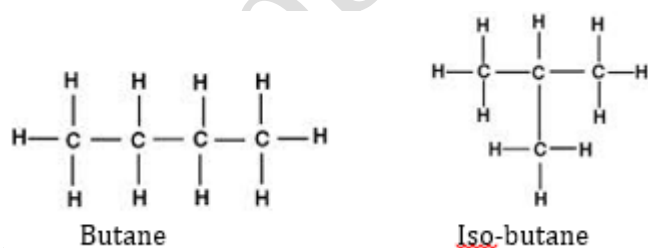


- (b) The compound with molecular formula C_5H_{12} would show following three isomers. This type of structural isomerism is called as chain isomerism.



OR

- (b) The compound with molecular formula C_4H_{10} would show two isomers-straight chain and branched isomer. This type of isomerism is called as chain isomerism.



38. The cross is depicted as under:

WW = Purple, ww = White

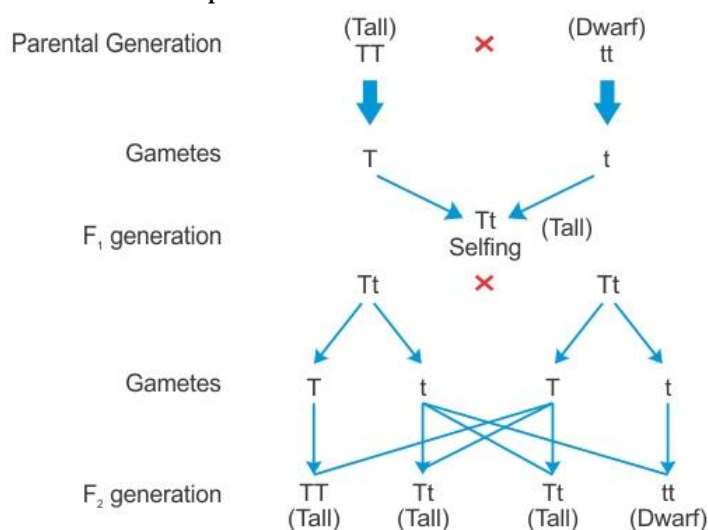
Parents :	WW Purple	×	ww White
		↓	
F1		Ww (Purple)	
	Ww (Purple)	×	Ww (Purple)
		↓	
F2	WW (Purple)	:	Ww (Purple)
		:	ww (White)
	1	:	2
		:	1

- a) Ratio of purple flowered plants in F_2 generation is:
Purple : White = 3 : 1
- b) The genotype of F_2 individuals is:
WW (Purple) : Ww (Purple) : ww (White) = 1 : 2 : 1
- c) Homozygous is a genetic condition where an individual inherits the same alleles for a particular gene from both parents.

In the above cross, the pure homozygous individuals have the genotype WW (Purple) and ww (White). So, if there are 400 individuals obtained in the F_2 generation, then there would be 100 individuals each with genotype WW and ww. Thus, there would be a total of 200 flowers which are pure homozygous.

OR

The cross is depicted as under:



With respect to height of the plant, the trait for tallness is dominant over trait for dwarfness. Thus, the phenotypic ratio of tall and dwarf plants in F_2 generation would be 3 : 1. Hence, out of 100 individuals, 25 individuals would have been dwarf and 75 would have been tall.

39.

- a) iii. A closely wound cylindrical coil of insulated metallic wire.
- b) The magnetic field strength in case of uniform magnetic field is same at all points.
- c) Inside the solenoid the magnetic field remains uniform.

OR

- c)
- A) Electromagnet is strongest one
- B) The field lines around a current – carrying solenoid is similar to that produced by a bar magnet.

CBSE
CLASS 10



SOCIAL SCIENCE

MOCK PAPER

SOLUTIONS

CBSE
Class 10 Social Science
Mock Paper

1.
(c) Purshottamdas Thakurdas
2.
(b) Bhopal
3.
(a) Both A and R are true and R is the correct explanation of A.
4.
(c) Protected forests are regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned.
5.
(c) Horizontal
6.
(a) Majoritarianism emphasizes the dominance of the majority community, while Power sharing emphasizes the sharing of power among different groups.
7.
(d) Ability to handle social differences, divisions and conflicts
8.
(d) They give loans without any collateral.
9.
(c) It reduces the chances of social conflicts.
10.
(a) Heroism and Justice
11.
(d) Leads to spread of technology, cultures and diseases from a region to another.
12.
(b) They are accountable to the public and make decisions on behalf of their constituents.
13.
(c) iv, ii, i, iii
14.
(b) Disguised employment
15.
(c) Both A and R are true and R explains A.

16.

(a) Tea

17.

(d) Bahujan Samaj Party- Sharad Pawar

18.

(a) Removal of trade barriers

19.

(b) One-party system

20.

(a) Increase - because of increasing interest and non-payment of monthly amount.

21.

The community government is elected by people of Belgium belonging to one language community – Dutch, French and German-speaking people. This government has the power regarding cultural, educational and language-related issues.

22.

The most powerful weapon of the Spanish conquerors in America was the germs of smallpox.

- The Spanish conquerors used germs like smallpox which spread deep into the continent before any European could reach there.
- America's original inhabitants had no immunity against these diseases that came from Europe. This disease erased the whole community, leading to conquest. This biological warfare in the mid sixteenth century made it easy for Spanish to overpower the Americans.

OR

The conquest of America made the world familiar with new and unknown crops.

- Many of the common foods today such as potatoes, soya, groundnuts, maize, tomatoes, chilies, sweet potatoes, and so on were not known to our ancestors until the discovery of America.
- These foods were only introduced in Europe and Asia after Christopher Columbus discovered the vast continent of America. In fact, many of our common foods came from America's original inhabitants – the American Indians.

23.

Wheat is the second most important food crop in India. It requires the following climatic conditions:

- Wheat crops require a cool growing season and bright sunshine at the time of ripening.
- It requires 50 to 75 cm of annual rainfall evenly distributed over the growing season.

24.

India being a vast country has states which are as large as independent countries of Europe. Hence, rises the need for a government at the basic level that can solve large number of problems and issues by the people who have better knowledge of problems in their localities. Besides, solving of problems it also encourages people to directly participate in decision making. Therefore, it is said that Local government is the best way to realise the principle of democracy.

25.

Printers and publishers continuously developed new strategies to sell their product.

- Nineteenth-century periodicals serialised important novels, which gave birth to a particular way of writing novels.
- In the 1920s in England, popular works were sold in cheap series, called the Shilling Series.
- During the great Depression in the 1930s, publishers brought out cheap paperback editions to keep the sale of the book stable.

26.

Differences between the service conditions of organized sector with that of unorganized sector

Organised Sector	Unorganised Sector
Employees have fixed working hours and they are paid for overtime work.	They are paid low wages and are not paid for extra work.
Employees get social security benefits like pension, PF, paid leaves, sick leaves etc.	Employees do not get benefit like paid leaves and do not get any social security benefits.
The employees have a regular term of employment and cannot be forced to leave under normal circumstances.	The employees can anytime be asked to leave.

OR

The primary and the secondary sectors deal with the economic activities related to natural resources and manufacturing of goods respectively. The service sector includes activities which provide several services as transport, banking, communication, education etc. Hence, the service sector is different from the other sectors. For example, the primary sector includes the cultivation of cotton, the secondary sector includes workers in a match factory and the service sector included teachers' services in educational institutions.

27.

Three main features of plantation are:

- Plantation is also a type of commercial farming in which a single crop is grown on a large area.
- Plantation agriculture is practiced on a large scale in big farms commonly known as estates which are spread over hundreds of hectares.
- Plantation requires large labour force and huge capital investments and latest scientific techniques. Plantation crops are generally exported.

28.

Provisions of Indian constitution which makes India a federal country are:

- In India, the powers to run the country have been vested into the Central government and the State government. State governments are not subordinate to the Central governments and both derive their authority from the Constitution.
- The Supreme Court and the High Courts have the power to interpret the Constitution. Disputes arising between various levels of the government are resolved by the Supreme Court.
- There are three different lists in which laws can be made by the central and the state governments. The Central government can form laws on the subjects mentioned in the Union List, the State government can make laws in the subjects included in the State List and both governments can form laws mentioned in the Concurrent List.

29.

It is to avoid the problem of double counting, the value of intermediate goods is not included in the estimation of gross domestic product. The value of intermediate goods is reflected in the value of final goods.

- For example, a farmer sells wheat to a flour mill at Rs 15 per kg. The mill grinds the flour and sells it to the biscuit company for Rs 20 per kg. The biscuit company uses flour, sugar and butter to make 5 biscuit packets. The biscuits are sold to the consumer at Rs 25 a packet (Rs 125).
- Here, the biscuits are the final goods which are purchased by the consumer. Wheat and wheat flour are the intermediate goods used in the production of final goods. The value of the biscuit packet (Rs 25) includes the value of flour (Rs 20).
- Hence, only the value of the final goods and services is considered.

30.

Five forms in which minerals occur are:

- Minerals may occur in the crack, crevices, faults and joints in the igneous and metamorphic rocks. While the smaller occurrences are known as veins, the larger are called lodes. Minerals in liquid forms are forced upwards through cracks in the earth. They cool and solidify as they rise.
- Minerals occur in beds and layers in sedimentary rocks. They have been formed as a result of deposition, accumulation and concentration in horizontal strata. Some examples are coal and gypsum.
- Another mode of formation involves the decomposition of surface rocks, and the removal of soluble constituents, leaving a residual mass of weathered material containing ores. Bauxite is formed this way.
- Some minerals also occur as alluvial deposits in the sands of valley floors and the base of hills. Gold, silver, tin and platinum are some examples of such minerals.
- The ocean waters contain vast quantities of minerals. The ocean beds are rich in manganese nodules. Common salt, magnesium and bromine are some of these minerals.

OR

Following are the five important reasons why there is a pressing need to use renewable energy sources in India:

- The rapid rate at which the consumption of energy is increasing has compelled India to be dependent on fossil fuels like coal, gas and oil which are finite. Hence the use of sustainable energy resources like solar, wind and water needs to be enhanced.
- The phenomenal rise in oil and gas prices and their imminent shortages have put a question mark on future energy security. This in turn leads to uncertainty regarding the future of the national economy.
- Use of fossil fuels also leads to environmental pollution and degradation of soil, water and air.
- Renewable energy sources, on the other hand, are pollution free and eco-friendly.
- Renewable energy sources are infinitely cheaper than the conventional ones and tend to be available in nature in abundance.

31.

Culture played an important role in creating the idea of the nation through art and poetry, stories and music. It shaped nationalistic feelings in Europe.

- Romanticism was a cultural movement which helped in developing forms of nationalist sentiment. Romantic artists and poets generally criticised the glorification of reason and science and instead focused on emotions, intuition and mystical feelings.
- Their effort was to create a sense of a shared collective heritage, a common cultural past, as the basis of a nation.
- Other Romantics such as the German philosopher Johann Gottfried Herder claimed that true German culture was to be discovered among the common people – das volk. It was through folk songs, folk poetry and folk dances that the true spirit of the nation (volksgeist) was popularised.
- The emphasis was laid on vernacular language and the collection of local folklore not to just recover an ancient national spirit, but also to carry the modern nationalist message to people who were mostly illiterate.
- Though Poland at this time was not an independent country, national feelings were kept alive through music and language. Karol Kurpinski, for example, celebrated the national struggle through his operas and music, turning folk dances into nationalist symbols.

OR

The feeling of nationalism became intense in the Balkan region after 1871.

- The Balkan region formerly comprised the present-day territories of Romania, Bulgaria, Macedonia, Croatia, Greece, Bosnia-Herzegovina, Slovenia, Serbia and Montenegro. The people in these countries were called Slavs.
- The disintegration of the Ottoman Empire in the region made the situation in the region very explosive as each state was jealous of the other and hoped to gain independence at the cost of the other.
- One by one, the European nationalities in the Balkan broke away from the control of the Ottoman Empire and declared independence.
- As the different Slavic nationalities struggled to define their identity and independence, the Balkan area became an area of intense conflict.
- During this time, many powerful European nations such as England, France, Russia and Germany competed to gain control in the Balkan region. This competition for gaining prominence in the region finally led to the First World War in 1914.

32.

A party is a group of people who come together to contest elections and hold power in the government. Members of such a group agree on certain fundamental values, policies and programmes for society and strive to follow them in order to achieve public good.

The three components of a political party are leaders, active members and followers.

- **The Leaders:** The leaders constitute the higher ranks of a political party. They are the ones who effectively run the government if the party wins the elections.
- **The Active Members:** They are the rank and file of the party, mobilising public opinion on the ground and serving as a link between the party followers and the party leaders.
- **The Followers:** Simply put, they are the followers of the party leadership who work under the guidance of the active members of the party.

OR

Political parties are essential for a democracy to sustain itself. No party system is ideal for all countries and in all situations because of the following reasons:

- The party system is not something any country can choose.
- It actually develops out of the nature and the culture of society on which it is built.
- The social and regional divisions, its history of politics and the system of elections also play a role.
- Each country develops a party system which is conditioned by its special circumstances. For example, India has evolved a multiparty system because of its social and geographical diversity which cannot be easily absorbed by two or three political parties.
- Political parties formulate policies to attain collective good and there can be different views on what is good for all.

33.

Compared to formal lenders, most informal lenders charge very high interest rates on loans, thus the cost to the borrower of informal loans is very high.

- Higher cost of borrowing means that most of the earnings are spent on repaying the loan, and hence, borrowers have less income for themselves.
- Higher interest rate can also imply that the amount to be repaid is greater than the income of the borrower and this could result in debt.
- Higher interest rates might discourage people who want to start an enterprise or carry out some business.

Therefore, in order to overcome the problems associated with the high cost of borrowing, cheap and affordable credit must be available.

Lower borrowing costs will encourage many people to start their business, set up small-scale industries, farmers could borrow to buy his inputs, set up new industries and this in turn would lead to the development of the country.

Banks and cooperative societies need to lend more, especially in rural areas. This would reduce the dependence on informal sources of credit.

It is also important that formal credit is distributed equally so that the poor can benefit from cheaper loans.

OR

A group of people who come together to provide the poor a medium to avail loans is a self-help group.

- They are a group of 15–20 members, particularly women, who pool in their savings which vary from Rs 25 to Rs 100 depending on the ability of members.
- Interest rates charged on these loans are lesser than what is charged by moneylenders.
- Small loans are provided to members for buying fertilisers, seeds, cloth, cattle, sewing machines etc. This helps to create self-employment opportunities for members.
- The group makes all the decisions associated with the loan such as the interest rate, repayment schedule and purpose for borrowing, and the group is responsible for the repayment of the loan in case the borrower fails to repay it.
- SHGs help poor borrowers to overcome the problem of lack of collateral which is a requirement in availing loans from the formal sector. Borrowers also get timely loans where the cost of borrowing or the interest rate is much lower than informal moneylenders. In this way, SHGs play an important role in bridging the gap between formal and informal sources of credit.

34.

34.1 Dr B.R. Ambedkar organised the dalits into the Depressed Classes Association in 1930.

34.2 Dr B.R. Ambedkar clashed with Gandhi at the second Round Table Conference as he was demanding separate electorates for Dalits.

34.3 The Poona Pact was signed between Dr B.R. Ambedkar and Gandhi in 1932. One feature of the Pact was that it gave the Depressed Classes (later to be known as the Schedule Castes) reserved seats in provincial and central legislative councils, but they were to be voted in by the general electorate.

35.

35.1 Large and rich farmers, landowners, industrialists and the people in surrounding urban areas gain the most from the building of the dam.

35.2 The local communities protest against the building of the large dams because of their large-scale displacement. Local people often have to give up their land, livelihood and their meagre access and control over resources for the greater good of the nation.

35.3 Two disadvantages of building large dams are:

- The dams that were constructed to control floods have triggered floods due to sedimentation in the reservoir. The big dams have mostly been unsuccessful in controlling floods at the time of excessive rainfall.
- Sedimentation caused due to the building of large dams also deprive the flood plains were silt, a natural fertiliser, further adding on to the problem of land degradation.

36.

36.1 Money provides us the means to buy most of the goods and services which are essential for our living; however, there are certain aspects of life which money cannot obtain such as

- Pollution-free environment
- Unadulterated medicines
- Protection from infectious diseases

36.2 Two development goals of a landless labourer:

- More days of work and better wages
- Local school is able to provide quality education for their children.

Two development goals of a prosperous farmer from Punjab:

- Assured a high family income through higher support prices for their crops.
- They should be able to settle their children abroad.

37.

37(a)



37 (b)



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