

SAMPLE QUESTION PAPER - 1

Subject – Mathematics (Basic)

Class X

Time Allowed: 3 hours

Maximum Marks: 80

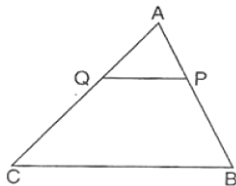
General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and 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 question carrying 05 marks each.
6. Section E has 3 case-based integrated units of assessment carrying 04 marks each.
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 2 marks questions of Section E.
8. Draw neat figure wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

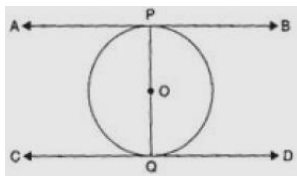
SECTION A

1. The HCF of 95 and 152, is [1]
(A) 57 (B) 19
(C) 38 (D) 1
2. Given that H.C.F. (306, 954, 1314) = 18, find L.C.M. (306, 954, 1314). [1]
(A) 1183234 (B) 1123328
(C) 1183914 (D) 1123238
3. If $x = 3$ is a solution of the equation $3x^2 + (k - 1)x + 9 = 0$ then $k = ?$ [1]
(A) 13 (B) -11
(C) 11 (D) -13
4. The angles of a triangle are x° , y° and 40° . The difference between the two angles x and y is 30° , then [1]
(A) $x^\circ = 75^\circ$ and $y^\circ = 45^\circ$ (B) $x^\circ = 85^\circ$ and $y^\circ = 55^\circ$
(C) $x^\circ = 95^\circ$ and $y^\circ = 35^\circ$ (D) $x^\circ = 65^\circ$ and $y^\circ = 95^\circ$
5. $x^2 - 6x + 6 = 0$ have [1]
(A) Real and Equal roots (B) Real roots
(C) No Real roots (D) Real and Distinct roots
6. Two vertices of $\triangle ABC$ are A (-1, 4) and B(5, 2) and its centroid is G(0, -3). Then, the coordinates of C are [1]
(A) (4, 3) (B) (4, 15)
(C) (-4, -15) (D) (-15, -4)
7. In triangles ABC and DEF, $\angle A = \angle E = 40^\circ$, $AB : ED = AC : EF$ and $\angle F = 65^\circ$, then $\angle B =$ [1]
(A) 75° (B) 85°
(C) 35° (D) 65°

8. In the adjoining figure P and Q are points on the sides AB and AC respectively of $\triangle ABC$ such that $AP = 3.5\text{cm}$, $PB = 7\text{cm}$, $AQ = 3\text{cm}$, $QC = 6\text{cm}$ and $PQ = 4.5\text{cm}$. The measure of BC is equal to [1]



- (A) 13.5cm (B) 12.5cm
(C) 9cm (D) 15cm
9. The distance between two parallel tangents of a circle of radius 3 cm is [1]



- (A) 6cm (B) 3cm
(C) 4.5cm (D) 12cm
10. $(\operatorname{cosec}\theta - \cot\theta)^2 = ?$ [1]

- (A) $\frac{1+\sin\theta}{1-\sin\theta}$ (B) $\frac{1-\cos\theta}{1+\cos\theta}$
(C) $\frac{1-\sin\theta}{1+\sin\theta}$ (D) $\frac{1+\cos\theta}{1-\cos\theta}$

11. An electric pole is $10\sqrt{3}\text{m}$ high and its shadow is 10 m in length, then the angle of elevation of the sun is [1]
(A) 45° (B) 15°
(C) 30° (D) 60°

12. $\frac{\sin\theta}{1+\cos\theta}$ is equal to [1]

- (A) $\frac{1-\sin\theta}{\cos\theta}$ (B) $\frac{1-\cos\theta}{\cos\theta}$
(C) $\frac{1-\cos\theta}{\sin\theta}$ (D) $\frac{1+\cos\theta}{\sin\theta}$

13. If θ is the angle (in degrees) of a sector of a circle of radius r, then area of the sector is [1]

- (A) $\frac{\pi r^2 \theta}{360}$ (B) $\frac{2\pi r \theta}{360}$
(C) $\frac{\pi r^2 \theta}{180}$ (D) $\frac{2\pi r \theta}{180}$

14. A chord of a circle subtends an angle of 60° at the centre. If the length of the chord is 100 cm, find the area of the major segment. [1]

- (A) 30391.7 cm^2 (B) 30720.5 cm^2
(C) 30520.61 cm^2 (D) 31021.42 cm^2

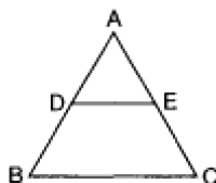
15. Raju bought a fish from a shop for his aquarium. The shop keeper takes out one fish from a tank containing 15 male fish and 18 female fish. The probability that the fish taken out is a male fish is [1]

- (A) $\frac{5}{11}$ (B) $\frac{6}{11}$
(C) $\frac{5}{12}$ (D) $\frac{7}{11}$

16. If 35 is removed from the data: 30, 34, 35, 36, 37, 38, 39, 40, then the median increases by: [1]
 (A) 0.5 (B) 1.5
 (C) 2 (D) 1
17. A cylindrical tub of radius 5 cm and height 9.8 cm is full of water. A solid in the form of a right circular cone mounted on a hemisphere is immersed into the tub. If the radius of the hemisphere is 3.5 cm and the height of the cone outside the hemisphere is 5 cm, then find the volume of water left in the tub. (Take $\pi = \frac{22}{7}$) [1]
 (A) 716 cm^3 (B) 616 cm^3
 (C) 600 cm^3 (D) 535 cm^3
18. If the mean of a frequency distribution is 8.1 and $\sum f_i x_i = 132 + 5k$, $\sum f_i = 20$ then $k =$ [1]
 (A) 3 (B) 4
 (C) 5 (D) 6
19. **Assertion (A) :** Distance between (5, 12) and origin is 13 units. [1]
Reason (R) : $D = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$
 (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.
20. **Assertion (A) :** No two positive numbers can have 18 as their H.C.F and 380 as their L.C.M. [1]
Reason (R) : L.C.M. is always completely divisible by H.C.F.
 (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.

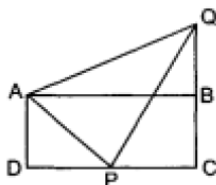
SECTION B

21. Is the pair of linear equation consistent/inconsistent? If consistent, obtain the solution graphically : [2]
 $2x - 2y - 2 = 0$; $4x - 4y - 5 = 0$
22. In figure, D and E are points on AB and AC respectively, such that $DE \parallel BC$. If $AD = \frac{1}{3} BD$, $AE = 4.5 \text{ cm}$, find AC. [2]



OR

In the given figure, ABCD is a rectangle. P is mid-point of DC. If $QB = 7 \text{ cm}$, $AD = 9 \text{ cm}$ and $DC = 24 \text{ cm}$, then prove that $\angle APQ = 90^\circ$.



23. Prove that the tangents drawn at the ends of a diameter of a circle are parallel. [2]
24. If $\operatorname{cosec}^2\theta(1 + \cos\theta)(1 - \cos\theta) = \lambda$, then find the value of λ .
25. A To warm ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (use $\pi = 3.14$) [2]

OR

What is the angle subtended at the centre of a circle of radius 6 cm by an arc of length 3π cm?

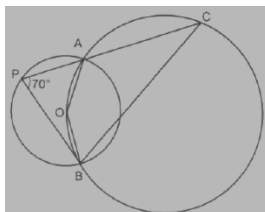
SECTION C

26. Prove that $\sqrt{5}$ is irrational. [3]
27. If α, β are zeroes of the quadratic polynomial $x^2 + 9x + 20$, form a quadratic polynomial whose zeroes are $(\alpha + 1)$ and $(\beta + 1)$. [3]
28. Solve the pair of linear equations $\sqrt{2}x - \sqrt{3}y = 0$ and $\sqrt{3}x - \sqrt{8}y = 0$ by substitution method. [3]

OR

Aditya is walking along the line joining points (1,4) and (0,6). Aditi is walking along the line joining points (3,4) and (1,0). Represent the graph and find the point where both cross each other.

29. In a given figure, two circles intersect at A and B. The centre of the smaller circle is O and it lies on the circumference of the larger circle. If $\angle APB = 70^\circ$, find $\angle ACB$. [3]



30. In ΔPQR , right angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Determine the values of $\sin P$, $\cos P$ and $\tan P$. [3]

OR

Prove that : $\frac{\cos^3\theta + \sin^3\theta}{\cos\theta + \sin\theta} + \frac{\cos^3\theta - \sin^3\theta}{\cos\theta - \sin\theta} = 2$.

31. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting [3]
- a king of red colour
 - a face card
 - a red face card
 - the jack of hearts
 - a spade
 - the queen of diamonds

SECTION D

32. Solve for x : $\left(\frac{2x}{x-5}\right)^2 + 5\left(\frac{2x}{x-5}\right) - 24 = 0$, $x \neq 5$ [5]

OR

The sum of squares of two consecutive multiples of 7 is 637. Find the multiples.

33. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$. [5]
34. A solid is in the shape of a hemisphere surmounted by a cone. If the radius of hemisphere and base radius of cone is 7 cm and height of cone is 3.5 cm, find the volume of the solid. (Take $\pi = \frac{22}{7}$) [5]

OR

A solid toy is in the form of a hemisphere surmounted by a right circular cone. Height of the cone is 2 cm and the diameter of the base is 4 cm. If a right circular cylinder circumscribes the solid. Find how much more space it will cover.

35. The following data gives the distribution of total monthly household expenditure of 200 families of a village. Find the modal monthly expenditure of the families. Also, find the mean monthly expenditure : [5]

Expenditure (in Rs)	Frequency
1000 - 1500	24
1500 - 2000	40
2000 - 2500	33
2500 - 3000	28
3000 - 3500	30
3500 - 4000	22
4000 - 4500	16
4500 - 5000	7

SECTION E

36. Read the following text carefully and answer the questions that follow : [4]

Kamla and her husband were working in a factory in Seelampur, New Delhi. During the pandemic, they were asked to leave the job. As they have very limited resources to survive in a metro city, they decided to go back to their hometown in Himachal Pradesh. After a few months of struggle, they thought to grow roses in their fields and sell them to local vendors as roses have been always in demand. Their business started growing up and they hired many workers to manage their garden and do packaging of the flowers.



In their garden bed, there are 23 rose plants in the first row, 21 are in the 2nd, 19 in 3rd row and so on. There are 5 plants in the last row.

- How many rows are there of rose plants? (1)
- Also, find the total number of rose plants in the garden. (1)
- How many plants are there in 6th row. (2)

OR

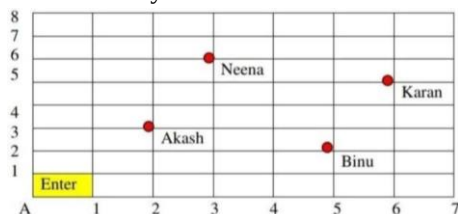
If total number of plants are 80 in the garden, then find number of rows? (2)

37. Read the following text carefully and answer the questions that follow : [4]

Karan went to the Lab near to his home for COVID 19 test along with his family members.

The seats in the waiting area were as per the norms of distancing during this pandemic (as shown in the figure).

His family member took their seats surrounded by red circular area.

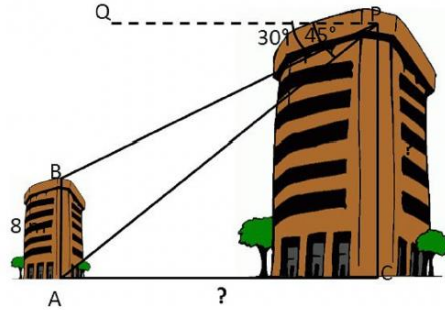


- What is the distance between Neena and Karan? (1)
- What are the coordinates of seat of Akash? (1)
- What will be the coordinates of a point exactly between Akash and Binu where a person can be? (2)

OR

Find distance between Binu and Karan. (2)

38. Basant and Vinod lives in a housing society in Dwarka, New Delhi. There are two building in their housing society. The first building is 8 meter tall. One day, both of them were just trying to guess the height of the other multi-storeyed building. Vinod said that it might be a 45 degree angle from the bottom of our building to the top of multi-storeyed building so the height of the building and distance from our building to this multi-storeyed building will be same. Then, both of them decided to estimate it using some trigonometric tools. Let's assume that the first angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45° , respectively. [4]



- i. Now help Vinod and Basant to find the height of the multi-storeyed building.
- ii. Also, find the distance between two buildings.

***** End *****

For Solution
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