



Series C3ABD/1

SET ~ 2

रोल नं. Roll No.							

प्रश्न-पत्र कोड

Q.P. Code

430/1/2

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।

Candidates must write the Q.P. Code on the title page of the answer-book.

नोट / NOTE :

(i) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 15 हैं।

Please check that this question paper contains 15 printed pages.

(ii) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 38 प्रश्न हैं।

Please check that this question paper contains 38 questions.

(iii) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।

Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(iv) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें।

Please write down the Serial Number of the question in the answer-book before attempting it.

(v) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित (बुनियादी)

MATHEMATICS (BASIC)



निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80



General Instructions :

Read the following instructions carefully and follow them :

1. This question paper contains **38** questions. **All** questions are compulsory.
2. Question paper is divided into **FIVE** sections – **SECTION A, B, C, D** and **E**.
3. In **section A**, question number **1** to **18** are multiple choice questions (MCQs) and question number **19** and **20** are Assertion – Reason based questions of **1** mark each.
4. In **section B**, question number **21** to **25** are very short answer (VSA) type questions of **2** marks each.
5. In **section C**, question number **26** to **31** are short answer (SA) type questions carrying **3** marks each.
6. In **section D**, question number **32** to **35** are long answer (LA) type questions carrying **5** marks each.
7. In **section E**, question number **36** to **38** are **case-based integrated units** of assessment questions carrying **4** marks each. Internal choice is provided in **2** marks question in each case study.
8. There is no overall choice. However, an internal choice has been provided in **2** questions in Section **B**, **2** questions in Section **C**, **2** questions in Section **D** and **3** questions in Section **E**.
9. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.
10. Use of calculators is **NOT** allowed.

SECTION – A

20×1 = 20

Q. No. 1 to 20 are Multiple Choice Questions of 1 mark each.

1. LCM (850, 500) is : 1
(a) 850×50 (b) 17×500 (c) $17 \times 5^2 \times 2^2$ (d) $17 \times 5^3 \times 2$
2. If the roots of quadratic equation $4x^2 - 5x + k = 0$ are real and equal, then value of k is : 1
(a) $\frac{5}{4}$ (b) $\frac{25}{16}$ (c) $-\frac{5}{4}$ (d) $-\frac{25}{16}$
3. The mean and median of a statistical data are 21 and 23 respectively. The mode of the data is : 1
(a) 27 (b) 22 (c) 17 (d) 23
4. The height and radius of a right circular cone are 24 cm and 7 cm respectively. The slant height of the cone is : 1
(a) 24 cm (b) 31 cm (c) 26 cm (d) 25 cm
5. If one of the zeroes of the quadratic polynomial $(\alpha - 1)x^2 + \alpha x + 1$ is -3 , then the value of α is : 1
(a) $-\frac{2}{3}$ (b) $\frac{2}{3}$ (c) $\frac{4}{3}$ (d) $\frac{3}{4}$



6. A card is drawn from a well shuffled deck of 52 playing cards. The probability that drawn card is a red queen, is : 1
(a) $\frac{1}{13}$ (b) $\frac{2}{13}$ (c) $\frac{1}{52}$ (d) $\frac{1}{26}$
7. If a certain variable x divides a statistical data arranged in order into two equal parts, then the value of x is called the : 1
(a) mean (b) median (c) mode (d) range of the data.
8. Three coins are tossed together. The probability of getting exactly one tail, is : 1
(a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{7}{8}$ (d) $\frac{3}{8}$
9. If $\sin \theta = \frac{1}{3}$, then $\sec \theta$ is equal to : 1
(a) $\frac{2\sqrt{2}}{3}$ (b) $\frac{3}{2\sqrt{2}}$ (c) 3 (d) $\frac{1}{\sqrt{3}}$
10. Outer surface area of a cylindrical juice glass with radius 7 cm and height 10 cm, is : 1
(a) 440 sq m (b) 594 sq m (c) 748 sq m (d) 1540 sq m
11. On a throw of a die, if getting 6 is considered success then probability of losing the game is : 1
(a) 0 (b) 1 (c) $\frac{1}{6}$ (d) $\frac{5}{6}$
12. The distance between the points $(2, -3)$ and $(-2, 3)$ is : 1
(a) $2\sqrt{13}$ units (b) 5 units (c) $13\sqrt{2}$ units (d) 10 units
13. For what value of θ , $\sin^2 \theta + \sin \theta + \cos^2 \theta$ is equal to 2 ? 1
(a) 45° (b) 0° (c) 90° (d) 30°
14. The diameter of a circle is of length 6 cm. If one end of the diameter is $(-4, 0)$, the other end on x-axis is at : 1
(a) $(0, 2)$ (b) $(6, 0)$ (c) $(2, 0)$ (d) $(4, 0)$
15. The value of k for which the pair of linear equations $5x + 2y - 7 = 0$ and $2x + ky + 1 = 0$ don't have a solution, is : 1
(a) 5 (b) $\frac{4}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{2}$



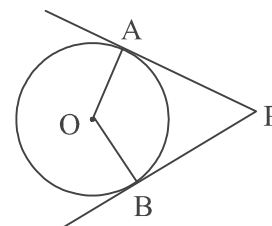
16. For what value of k , the product of zeroes of the polynomial $kx^2 - 4x - 7$ is 2 ? 1
 (a) $-\frac{1}{14}$ (b) $-\frac{7}{2}$ (c) $\frac{7}{2}$ (d) $-\frac{2}{7}$
17. In an A.P. ; if $a = 8$ and $a_{10} = -19$, then value of d is : 1
 (a) 3 (b) $-\frac{11}{9}$ (c) $-\frac{27}{10}$ (d) -3
18. The mid-point of the line segment joining the points $(-1, 3)$ and $(8, \frac{3}{2})$ is : 1
 (a) $(\frac{7}{2}, -\frac{3}{4})$ (b) $(\frac{7}{2}, \frac{9}{2})$ (c) $(\frac{9}{2}, -\frac{3}{4})$ (d) $(\frac{7}{2}, \frac{9}{4})$

Directions :

In Q. No. 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Select the correct option from the following options :

- (a) Both, Assertion (A) and Reason (R) are true. Reason (R) explains Assertion (A) completely.
 (b) Both, Assertion (A) and Reason (R) are true. Reason (R) does not explain Assertion (A).
 (c) Assertion (A) is true but Reason (R) is false.
 (d) Assertion (A) is false but Reason (R) is true.

19. **Assertion (A) :** If PA and PB are tangents drawn to a circle with centre O from an external point P, then the quadrilateral OAPB is a cyclic quadrilateral.



Reason (R) : In cyclic quadrilateral opposite angles are equal. 1

20. **Assertion (A) :** Zeroes of a polynomial $p(x) = x^2 - 2x - 3$ are -1 and 3 .

Reason (R) : The graph of polynomial $p(x) = x^2 - 2x - 3$ intersects x -axis at $(-1, 0)$ and $(3, 0)$. 1

SECTION – B

Q. No. 21 to 25 are Very Short Answer Questions of 2 marks each.

21. (A) Prove that $6 - 4\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. 2

OR

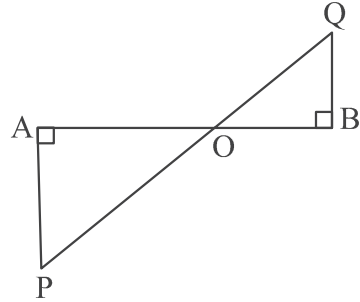
- (B) Show that $11 \times 19 \times 23 + 3 \times 11$ is not a prime number. 2



22. A bag contains 4 red, 5 white and some yellow balls. If probability of drawing a red ball at random is $\frac{1}{5}$, then find the probability of drawing a yellow ball at random. 2

23. In a $\triangle ABC$, $\angle A = 90^\circ$. If $\tan C = \sqrt{3}$, then find the value of $\sin B + \cos C - \cos^2 B$. 2

24. In the given figure, $AP \perp AB$ and $BQ \perp AB$. If $OA = 15$ cm, $BO = 12$ cm and $AP = 10$ cm, then find the length of BQ . 2



25. (A) Solve the following pair of linear equations for x and y algebraically :
 $x + 2y = 9$ and $y - 2x = 2$ 2

OR

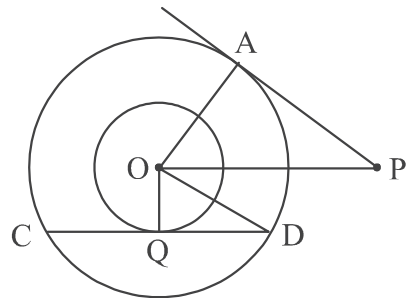
- (B) Check whether the point $(-4, 3)$ lies on both the lines represented by the linear equations $x + y + 1 = 0$ and $x - y = 1$. 2

SECTION – C

Q. No. 26 to 31 are Short Answer Questions of 3 marks each.

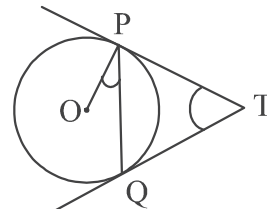
26. Prove that : $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2 \operatorname{cosec} A$ 3

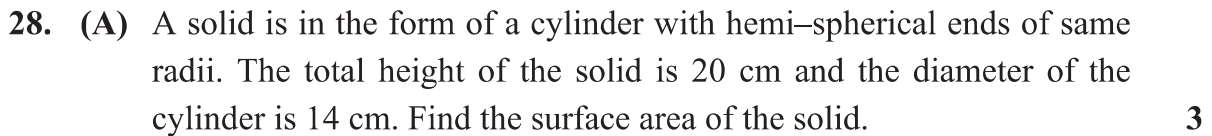
27. (A) In two concentric circles, the radii are $OA = r$ cm and $OQ = 6$ cm, as shown in the figure. Chord CD of larger circle is a tangent to smaller circle at Q . PA is tangent to larger circle. If $PA = 16$ cm and $OP = 20$ cm, find the length CD . 3



OR

- (B) In given figure, two tangents PT and QT are drawn to a circle with centre O from an external point T . Prove that $\angle PTQ = 2 \angle OPQ$. 3





(B) A juice glass is cylindrical in shape with hemi-spherical raised up portion at the bottom. The inner diameter of glass is 10 cm and its height is 14 cm. Find the capacity of the glass. (use $\pi = 3.14$) **3**

- 29.** Two alarm clocks ring their alarms at regular intervals of 20 minutes and 25 minutes respectively. If they first beep together at 12 noon, at what time will they beep again together next time ? **3**

-
- A Cartesian coordinate system with a line passing through points A(4, 0) and B(0, -3). The line is labeled with P(2, -3) and has a negative slope. The axes are labeled X, Y, X', and Y'.

- 31.** The greater of two supplementary angles exceeds the smaller by 18° . Find measures of these two angles. **3**

Q. No. 32 to 35 are Long Answer Questions of 5 marks each.

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33. (A) The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it was 60° . Find the height of the tower and the length of original shadow. (use $\sqrt{3} = 1.73$) 5

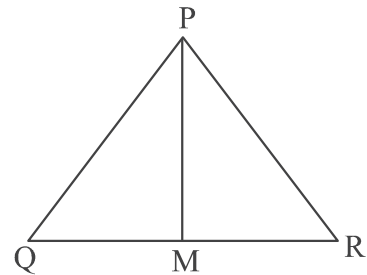
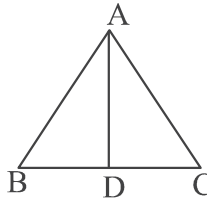
(B) The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings. (use $\sqrt{3} = 1.73$)



34. (A) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that other two sides are divided in the same ratio. 5

OR

- (B) Sides AB and BC and median AD of a $\triangle ABC$ are respectively proportional to sides PQ and PR and median PM of $\triangle PQR$. Show that $\triangle ABC \sim \triangle PQR$. 5



35. In an A.P. if $S_n = 4n^2 - n$, then
- find the first term and common difference.
 - write the A.P.
 - which term of the A.P. is 107 ?

5

SECTION – E

Q. No. 36 to 38 are Case-Based Questions of 4 marks each.

36. Gurpreet is very fond of doing research on plants. She collected some leaves from different plants and measured their lengths in mm.



The data obtained is represented in the following table :

Length (in mm) :	70-80	80-90	90-100	100-110	110-120	120-130	130-140
Number of leaves :	3	5	9	12	5	4	2

Based on the above information, answer the following questions :

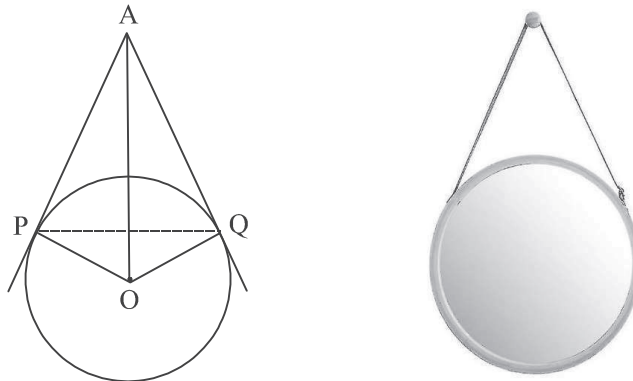
- Write the median class of the data. 1
- How many leaves are of length equal to or more than 10 cm ? 1
- (a) Find median of the data. 2

OR

- Write the modal class and find the mode of the data. 2



37. The picture given below shows a circular mirror hanging on the wall with a cord. The diagram represents the mirror as a circle with centre O. AP and AQ are tangents to the circle at P and Q respectively such that $AP = 30$ cm and $\angle PAQ = 60^\circ$.



Based on the above information, answer the following questions :

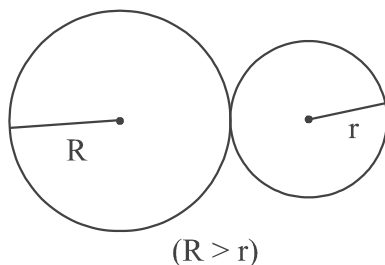
- | | |
|-------------------------------|---|
| (i) Find the length PQ. | 1 |
| (ii) Find $m\angle POQ$. | 1 |
| (iii) (a) Find the length OA. | 2 |

OR

- | | |
|------------------------------------|---|
| (b) Find the radius of the mirror. | 2 |
|------------------------------------|---|

38. To keep the lawn green and cool, Sadhna uses water sprinklers which rotate in circular shape and cover a particular area.

The diagram below shows the circular areas covered by two sprinklers :



Two circles touch externally. The sum of their areas is 130π sq m and the distance between their centres is 14 m.

Based on above information, answer the following questions :

- | | |
|---|---|
| (i) Obtain a quadratic equation involving R and r from above. | 1 |
| (ii) Write a quadratic equation involving only r. | 1 |
| (iii) (a) Find the radius r and the corresponding area irrigated. | 2 |

OR

- | | |
|---|---|
| (b) Find the radius R and the corresponding area irrigated. | 2 |
|---|---|

