



Series DA2AB/2

SET~3

रोल नं. Roll No.							

प्रश्न-पत्र कोड
Q.P. Code **30/2/3**

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 :

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 23 हैं।
Please check that this question paper contains 23 printed pages.
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 38 प्रश्न हैं।
Please check that this question paper contains 38 questions.
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी 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.
- 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.
- 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 परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।



15 minute 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 candidates will read the question paper only and will not write any answer on the answer-book during this period.

गणित (मानक)

MATHEMATICS (Standard)



निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80

30/2/3/DA2AB/21

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P.T.O.



General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) This question paper contains **38** questions. **All** questions are **compulsory**.
- (ii) This question paper is divided into **FIVE** Sections – **A, B, C, D** and **E**.
- (iii) In Section–**A** questions number **1** to **18** are Multiple Choice Questions (MCQs) and question number **19** and **20** are Assertion-Reason based questions of **1** mark each.
- (iv) In Section–**B** questions number **21** to **25** are Very Short Answer (VSA) type questions, carrying **2** marks each.
- (v) In Section–**C** questions number **26** to **31** are Short Answer (SA) type questions, carrying **3** marks each.
- (vi) In Section–**D** questions number **32** to **35** are Long Answer (LA) type questions, carrying **5** marks each.
- (vii) In Section–**E** question number **36** to **38** are Case Study based questions carrying **4** marks each. Internal choice is provided in **2** marks questions in each case-study.
- (viii) 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** question in Section–**E**.
- (ix) Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
- (x) Use of calculator is **NOT** allowed.



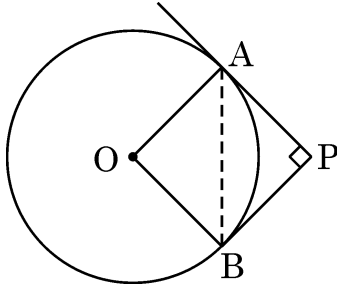
SECTION – A

$20 \times 1 = 20$

This section consists of 20 questions of 1 mark each.

1. The distance between the points $(a \cos \theta, -a \sin \theta)$ and $(a \sin \theta, a \cos \theta)$ is 1
(A) a (B) $a\sqrt{2}$
(C) 0 (D) $2a$

2. In the given figure, tangents PA and PB to the circle centred at O, from point P are perpendicular to each other. If PA = 5 cm, then length of AB is equal to 1

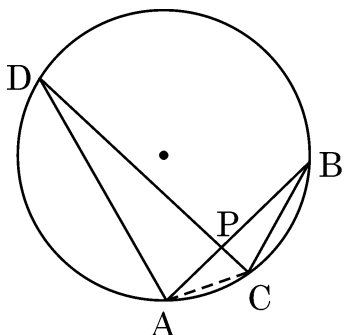


- (A) 5 cm (B) $5\sqrt{2}$ cm
(C) $2\sqrt{5}$ cm (D) 10 cm
3. Which term of the A.P. $-29, -26, -23, \dots, 61$ is 16 ? 1
(A) 11^{th} (B) 16^{th}
(C) 10^{th} (D) 31^{st}

4. A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is 1
(A) $\frac{7}{50}$ (B) $\frac{7}{55}$
(C) $\frac{1}{10}$ (D) $\frac{5}{49}$



5. AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following : 1



- (A) $\triangle ADP \sim \triangle CBA$ (B) $\triangle ADP \sim \triangle BPC$
(C) $\triangle ADP \sim \triangle BCP$ (D) $\triangle ADP \sim \triangle CBP$

6. Two dice are rolled together. The probability of getting the sum of the two numbers to be more than 10, is 1

- (A) $\frac{1}{9}$ (B) $\frac{1}{6}$
(C) $\frac{7}{12}$ (D) $\frac{1}{12}$

7. After an examination, a teacher wants to know the marks obtained by maximum number of the students in her class. She requires to calculate _____ of marks. 1

- (A) median (B) mode
(C) mean (D) range

8. The roots of the quadratic equation $4x^2 - 5x + 4 = 0$ are 1

- (A) irrational (B) rational and distinct
(C) not real (D) rational and equal

9. The common difference of an A.P. in which $a_{20} - a_{15} = 20$, is 1

- (A) 4 (B) 5
(C) 4d (D) 5d



10. यदि किन्हीं आँकड़ों के प्रत्येक प्रेक्षण का मान 2 से बढ़ा दिया जाए, तो नए आँकड़ों का माध्यक 1
- (A) 2 से बढ़ जाएगा । (B) $2n$ से बढ़ जाएगा ।
- (C) वही रहेगा । (D) 2 से कम हो जाएगा ।
11. दो समरूप त्रिभुजों ABC तथा PQR के परिमाप क्रमशः 56 cm तथा 48 cm हैं । PQ/AB बराबर है : 1
- (A) $\frac{7}{8}$ (B) $\frac{6}{7}$
- (C) $\frac{7}{6}$ (D) $\frac{8}{7}$
12. यदि α तथा β , ($\alpha > \beta$), बहुपद $-x^2 + 8x + 9$ के शून्यक हैं, तो $(\alpha - \beta)$ का मान है : 1
- (A) -10 (B) 10
- (C) ± 10 (D) 8
13. k का वह मान जिसके लिए समीकरण निकाय $3x - y + 8 = 0$ तथा $6x - ky + 16 = 0$ के अपरिमित रूप से अनन्त हल हैं, है 1
- (A) -2 (B) 2
- (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$
14. यदि $\sin \theta = \cos \theta$, ($0^\circ < \theta < 90^\circ$) है, तो $(\sec \theta \cdot \sin \theta)$ का मान है : 1
- (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$
- (C) 1 (D) 0



10. If value of each observation in a data is increased by 2, then median of the new data 1
- (A) increases by 2 (B) increases by $2n$
(C) remains same (D) decreases by 2
11. The perimeters of two similar triangles ABC and PQR are 56 cm and 48 cm respectively. PQ/AB is equal to 1
- (A) $\frac{7}{8}$ (B) $\frac{6}{7}$
(C) $\frac{7}{6}$ (D) $\frac{8}{7}$
12. If α and β ($\alpha > \beta$) are the zeroes of the polynomial $-x^2 + 8x + 9$, then $(\alpha - \beta)$ is equal to 1
- (A) -10 (B) 10
(C) ± 10 (D) 8
13. The value of k for which the system of equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions, is 1
- (A) -2 (B) 2
(C) $\frac{1}{2}$ (D) $-\frac{1}{2}$
14. If $\sin \theta = \cos \theta$, ($0^\circ < \theta < 90^\circ$), then value of $(\sec \theta \cdot \sin \theta)$ is : 1
- (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$
(C) 1 (D) 0



15. बिंदु P, बिंदुओं A(4, -5) तथा B(1, 2) को मिलाने वाले रेखाखण्ड को 5:2 के अनुपात में बाँटता है।

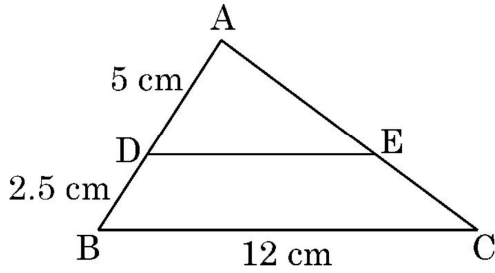
बिंदु P के निर्देशांक हैं :

1

- (A) $\left(\frac{5}{2}, \frac{-3}{2}\right)$ (B) $\left(\frac{11}{7}, 0\right)$
(C) $\left(\frac{13}{7}, 0\right)$ (D) $\left(0, \frac{13}{7}\right)$

16. दी गई आकृति में $\triangle ABC$ दिखाया गया है और $DE \parallel BC$ है, यदि $AD = 5$ cm, $DB = 2.5$ cm तथा $BC = 12$ cm है, तो DE बराबर है :

1



- (A) 10 cm (B) 6 cm
(C) 8 cm (D) 7.5 cm

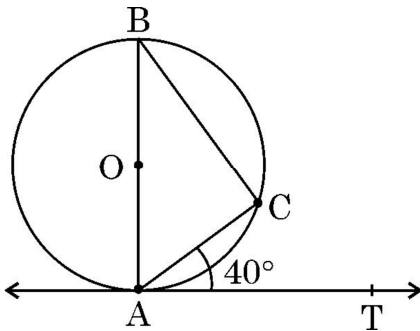
17. यदि $HCF(2520, 6600) = 40$ और $LCM(2520, 6600) = 252 \times k$ है, तो k का मान है :

1

- (A) 1650 (B) 1600
(C) 165 (D) 1625

18. दी गई आकृति में O केंद्र वाले वृत्त पर स्पर्श-रेखा AT है। यदि $\angle CAT = 40^\circ$ है, तो $\angle CBA$ की माप है :

1



- (A) 70° (B) 50°
(C) 65° (D) 40°



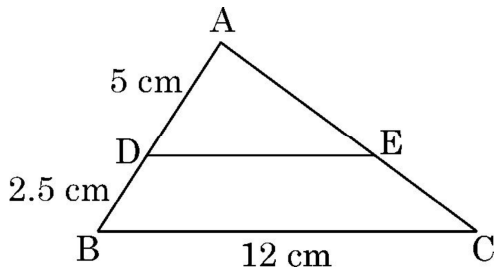
15. Point P divides the line segment joining the points A(4, -5) and B(1, 2) in the ratio 5:2. Co-ordinates of point P are

1

- (A) $\left(\frac{5}{2}, \frac{-3}{2}\right)$ (B) $\left(\frac{11}{7}, 0\right)$
(C) $\left(\frac{13}{7}, 0\right)$ (D) $\left(0, \frac{13}{7}\right)$

16. In the given figure $\triangle ABC$ is shown. DE is parallel to BC. If AD = 5 cm, DB = 2.5 cm and BC = 12 cm, then DE is equal to

1



- (A) 10 cm (B) 6 cm
(C) 8 cm (D) 7.5 cm

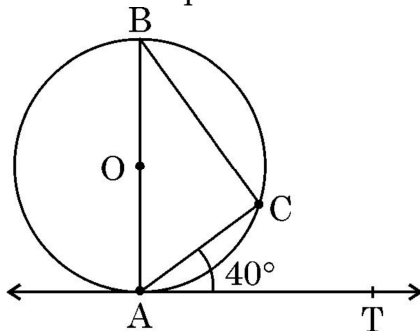
17. If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = $252 \times k$, then the value of k is

1

- (A) 1650 (B) 1600
(C) 165 (D) 1625

18. In the given figure, AT is tangent to a circle centred at O. If $\angle CAT = 40^\circ$, then $\angle CBA$ is equal to

1



- (A) 70° (B) 50°
(C) 65° (D) 40°



Directions : In Question 19 and 20, **Assertion (A)** and **Reason (R)** are given. Select the correct option from the following :

- (A) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
- (C) Assertion (A) is true but Reason (R) is not true.
- (D) Assertion (A) is not true but Reason (R) is true.

19. **Assertion (A) :** If $\sin A = \frac{1}{3}$ ($0^\circ < A < 90^\circ$), then the value of $\cos A$ is $\frac{2\sqrt{2}}{3}$

Reason (R) : For every angle θ , $\sin^2 \theta + \cos^2 \theta = 1$.

1

20. **Assertion (A) :** Two cubes each of edge length 10 cm are joined together.
The total surface area of newly formed cuboid is 1200 cm^2 .

Reason (R) : Area of each surface of a cube of side 10 cm is 100 cm^2 .

1

SECTION – B

In this section, there are 5 questions of 2 marks each.

21. (a) In what ratio is the line segment joining the points (3, -5) and (-1, 6) divided by the line $y = x$?

2

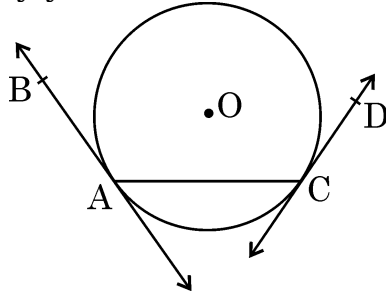
OR

(b) A(3, 0), B(6, 4) and C(-1, 3) are vertices of a triangle ABC. Find length of its median BE.

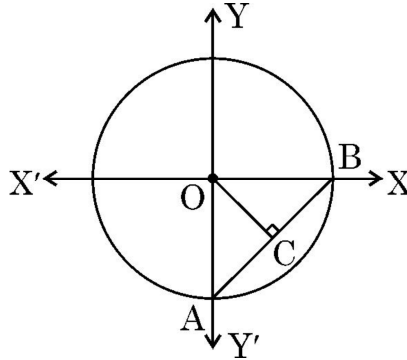
2



22. In the given figure, AB and CD are tangents to a circle centred at O. Is $\angle BAC = \angle DCA$? Justify your answer. 2



23. In the given figure, a circle centred at origin O has radius 7 cm, OC is median of $\triangle OAB$. Find the length of median OC. 2



24. (a) Evaluate : $2 \sin^2 30^\circ \sec 60^\circ + \tan^2 60^\circ$. 2

OR

- (b) If $2 \sin (A + B) = \sqrt{3}$ and $\cos (A - B) = 1$, then find the measures of angles A and B. $0 \leq A, B, (A + B) \leq 90^\circ$. 2

25. Can the number 8^n , n being a natural number, end with the digit 0 ? Give reasons. 2

SECTION – C

This section consists of 6 questions of 3 marks each.

26. Prove that $\frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \sec^2 \theta} = \frac{3}{4}$, if $\tan \theta = \frac{1}{\sqrt{7}}$ 3



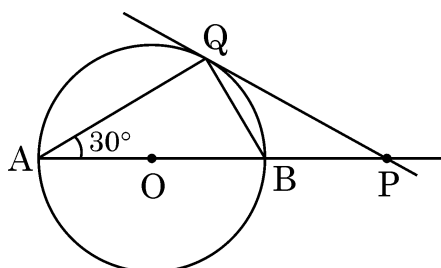
27. (a) If the sum of first m terms of an A.P. is same as sum of its first n terms ($m \neq n$), then show that the sum of its first $(m + n)$ terms is zero. 3

OR

- (b) In an A.P., the sum of three consecutive terms is 24 and the sum of their squares is 194. Find the numbers. 3

28. Prove that $\sqrt{5}$ is an irrational number. 3

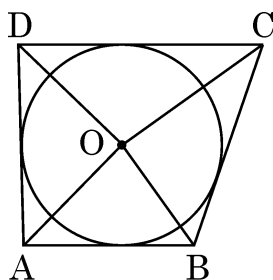
29. (a) In the given figure, PQ is tangent to a circle centred at O and $\angle BAQ = 30^\circ$; show that $BP = BQ$. 3



OR

- (b) In the given figure, AB, BC, CD and DA are tangents to the circle with centre O forming a quadrilateral ABCD. 3

Show that $\angle AOB + \angle COD = 180^\circ$



30. A dealer sells an article for ₹ 75 and gains as much percent as the cost price of the article. Find the cost price of the article. 3



31. In a test, the marks obtained by 100 students (out of 50) are given below : 3

Marks obtained :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Number of students :	12	23	34	25	6

Find the mean marks of the students.

SECTION – D

This section consists of 4 questions of 5 marks each.

32. A person standing on the bank of a river observes that the angle of elevation of the top of a tower on the opposite bank is 60° . When he moves 30 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tower and width of the river. (Take $\sqrt{3} = 1.732$) 5

33. The perimeter of a certain sector of a circle of radius 5.6 m is 20.0 m. Find the area of the sector. 5

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 the other two sides are divided in the same ratio. 5

OR

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

35. (a) Using graphical method, solve the following system of equations : 5
 $3x - 2y = 10$ and $5x + 3y = 4$

OR

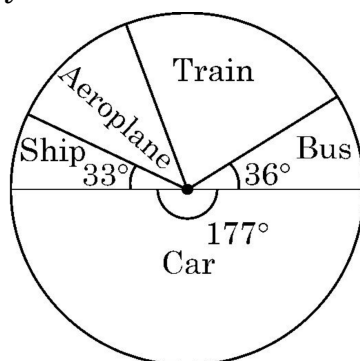
- (b) If three times the greater of two numbers is divided by the smaller one, we get 4 as the quotient and 3 as the remainder. Also, if seven times the smaller number is divided by greater one, we get 5 as the quotient and 1 as the remainder. Find the numbers. 5



SECTION – E

This section consists of 3 case based questions of 4 marks each.

36. In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.



Observe the pie chart and answer the following questions :

- (i) If one person is selected at random, find the probability that he/she travelled by bus or ship. 1
- (ii) Which is most favourite mode of transport and how many people used it ? 1
- (iii) (a) A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train. 2

OR

- (iii) (b) The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by air company at the rate of ₹ 5,000 per person. 2

37. The word 'circus' has the same root as 'circle'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd.

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.





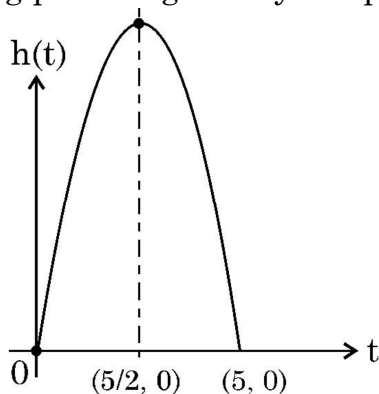
Based on the above, answer the following questions :

- (i) Find slant height of the conical part. 1
- (ii) Determine the floor area of the tent. 1
- (iii) (a) Find area of the cloth used for making tent. 2

OR

- (iii) (b) Find total volume of air inside an empty tent. 2

38. A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$.



Observe the graph of the polynomial and answer the following questions :

- (i) Write zeroes of the given polynomial. 1
- (ii) Find the maximum height achieved by ball. 1
- (iii) (a) After throwing upward, how much time did the ball take to reach to the height of 30 m ? 2

OR

- (iii) (b) Find the two different values of t when the height of the ball was 20 m. 2

