

**CCE PR**

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Code No. : **81-E**

ವಿಷಯ : ಗಣಿತ

**Subject : MATHEMATICS**

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version )

( ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus )

( ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / Private Repeater )

*General Instructions :*

- i) The Question-cum-Answer Booklet consists of objective and subjective types of questions having 50 questions.
- ii) Space has been provided against each objective type question. You have to choose the correct choice and write the complete answer along with its letter in the space provided.
- iii) For subjective type questions enough space for each question has been provided. You have to answer the questions in the space.
- iv) Follow the instructions given against both the objective and subjective types of questions.
- v) Candidates should not write the answer with pencil. Answers written in pencil will not be evaluated. ( Except Graphs, Diagrams & Maps )
- vi) In case of Multiple Choice, Fill in the blanks and Matching questions, scratching / rewriting / marking is not permitted, thereby rendering to disqualification for evaluation.
- vii) Candidates have extra 15 minutes for reading the question paper.
- viii) **Space for Rough Work** has been printed and provided at the bottom of each page.
- ix) Do not write anything in the space provided in the right side margin.

I. Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the correct alternative and write the complete answer along with its letter in the space provided against each question.  $8 \times 1 = 8$

1. If  $n^{\text{th}}$  term of a sequence is  $\frac{n}{n+1}$ , then the 2nd term of the

sequence is

(A)  $\frac{3}{2}$

(B)  $\frac{2}{3}$

(C)  $\frac{1}{3}$

(D)  $\frac{1}{2}$ .

2. Which one of the following is the Harmonic mean between 'a' and 'b'?

(A)  $\frac{a+b}{2ab}$

(B)  $\frac{2a+b}{ab}$

(C)  $\frac{2ab}{a+b}$

(D)  $\frac{2a+b}{a+b}$ .

3. Faces of a cubical die numbered from 1 to 6 is rolled once. The probability of getting an odd number on the top face is

(A)  $\frac{1}{6}$

(B)  $\frac{4}{6}$

(C)  $\frac{2}{6}$

(D)  $\frac{3}{6}$ .

4. If the mean ( $\bar{x}$ ) of some scores is 60, and the co-efficient of variation of it is 5, then the standard deviation is

(A) 0.3

(B) 0.03

(C) 3

(D) 30.

5. In the quadratic polynomial  $f(x) = x^2 - 9x + 20$ , the value of  $f(0)$  is

(A) 20

(B) 11

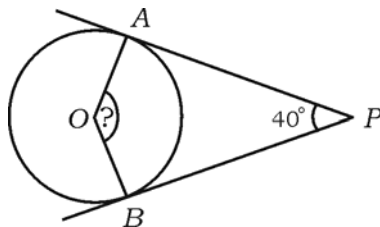
(C) -20

(D) 29.

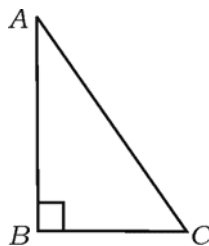
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( SPACE FOR ROUGH WORK )

6. In the figure  $O$  is the centre of the circle,  $PA$  and  $PB$  are the tangents to the circle. If  $\angle APB = 40^\circ$  then the measure of  $\angle AOB$  is



- (A)  $90^\circ$  (B)  $50^\circ$   
 (C)  $130^\circ$  (D)  $140^\circ$ .
7. In the  $\triangle ABC$ ,  $\angle ABC = 90^\circ$ . The correct statement among the following is



- (A)  $AB^2 = AC^2 + BC^2$  (B)  $AC^2 = AB^2 + BC^2$   
 (C)  $BC^2 = AB^2 + AC^2$  (D)  $BC^2 = AB^2 - AC^2$ .
8. The slope of the line joining the points  $(-4, 1)$  and  $(5, 2)$  is
- (A)  $\frac{1}{9}$  (B) 9  
 (C)  $\frac{3}{9}$  (D) 1.

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( SPACE FOR ROUGH WORK )

II. Answer the following :

6 × 1 = 6

9. If  $A = \{1, 2, 3, 4, 5\}$  and  $B = \{5, 6, 7\}$  then find  $(A \cap B)$ .

10. Find the H.C.F. of 12 and 18.

11. Find the degree of the polynomial  $x^3 + 2x^2 - 5x - 6$ .

12. If  $\sin x = \frac{3}{5}$ , find the value of  $3 \operatorname{cosec} x$ .

13. Write the formula to find the curved surface area of a cone.

14. Find the  $y$ -intercept of the line  $6x - y + 3 = 0$ .

III. 15. In a group of persons, 30 like tea, 25 like coffee and 16 like both tea and coffee. How many like either tea or coffee? 2

16. Find the 10th term of the Harmonic progression,

$$\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \dots \dots \dots \quad 2$$

17. Find the values of

(i)  ${}^n P_0 + {}^n C_0$

(ii)  ${}^n P_1 + {}^n C_1$ . 2

18. When 53 is divided by 'b' the quotient and the remainder are 4 and 1 respectively. Find the value of 'b'. 2

19. A number is selected at random from 10 to 18. Find the probability that the number is a prime number. 2

20. Find the product of  $\sqrt[3]{2}$  and  $\sqrt[4]{3}$ . 2

21. Simplify by rationalising the denominator :

$$\frac{\sqrt{6} + \sqrt{3}}{\sqrt{6} - \sqrt{3}}. \quad 2$$

( SPACE FOR ROUGH WORK )

22. Find the quotient and the remainder by using synthetic division method : 2

$$(3x^3 - 2x^2 + 7x - 5) \div (x + 3).$$

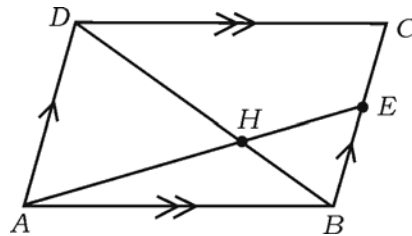
OR

What must be added to the polynomial

$$P(x) = x^4 + 2x^3 - 2x^2 + x - 1$$

so that the resulting polynomial is exactly divisible by  $x^2 + 2x - 3$  ?

23. Solve  $x^2 - 7x + 12 = 0$  by formula method. 2
24. In a circle of radius 3 cm, draw a diameter of length 6 cm. Construct a tangent at one end of the diameter. 2
25. In the parallelogram  $ABCD$ ,  $E$  is any point on  $BC$ . The diagonal  $DB$  and segment  $AE$  intersect at  $H$ . Prove that  $AH \cdot HB = HD \cdot EH$ . 2



26. Show that  $(1 - \sin^2 A)(1 + \tan^2 A) = 1$ , where  $A$  is an acute angle. 2
27. Find the distance between the points  $(2, 3)$  and  $(6, 6)$ . 2
28. The curved surface area of a right circular cylinder of height 7 cm is 88 sq.cm. Find the radius of the base of the cylinder. 2
29. The radius and height of a cone are 14 cm and 27 cm respectively. Find its volume. 2

OR

Find the volume of the sphere, whose radius is 21 cm.

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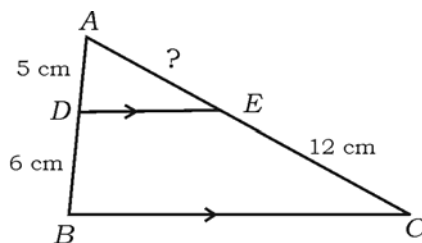
( SPACE FOR ROUGH WORK )

30. Draw the plan of a level ground using the information given below : 2

[ Scale : 20 m = 1 cm ]

|         | To D ( metre ) |         |
|---------|----------------|---------|
|         | 140            |         |
|         | 100            | C to 40 |
| E to 40 | 60             |         |
|         | 20             | B to 30 |
|         | From A         |         |

31. Given  $A = \{1, 2, 3\}$  and  $B = \{2, 3, 4, 5\}$  are subsets of  $U = \{1, 2, 3, 4, 5, 6, 7\}$ ; then verify  $(A \cup B)' = A' \cap B'$ . 2
32. Find the sum of  $3 + 6 + 9 + \dots$  to 15 terms. 2
33. Find the maximum number of diagonals that can be drawn in a pentagon by using the formula. 2
34. Write the sample space for the following random experiments : 2
- (i) Tossing a fair coin once.
- (ii) Tossing two fair coins simultaneously once.
35. What is meant by 'Rationalisation' of surds ? Write the rationalising factor of  $2\sqrt{x+y}$ . 2
36. If  $k = \frac{1}{2}mv^2$ , solve for  $v$  and then find the value of  $v$ , if  $k = 100$  and  $m = 2$ . 2
37. For what positive value of  $m$ , the roots of the equation  $x^2 + mx + 4 = 0$  are equal ? 2
38. In the  $\Delta ABC$ ,  $DE \parallel BC$ ,  $BD = 6$  cm,  $AD = 5$  cm and  $CE = 12$  cm then find the measure of  $AE$ . 2



( SPACE FOR ROUGH WORK )

39. There are 36 students in a class. The following table shows how they come to school from their house. Represent this data by a pie-chart :

2

| <i>Students come to school by</i> | <i>Walk</i> | <i>Bicycle</i> | <i>Bus</i> |
|-----------------------------------|-------------|----------------|------------|
| <i>Number of students</i>         | 12          | 18             | 6          |

40. A hemispherical bowl has inner radius 14 cm. Find the maximum quantity of the milk it can hold, in cubic centimetre. 2
- IV. 41. A committee of 5 is to be formed out of 6 men and 4 ladies. Calculate in how many ways the committee can be formed when at least 3 ladies are included. 3

OR

Find out how many (i) lines and (ii) triangles can be drawn through 8 points which are on a circle.

42. Calculate the standard deviation for the following distribution : 3

| <i>Class-intervals (C-I)</i> | <i>frequency (f)</i> |
|------------------------------|----------------------|
| 0 — 4                        | 1                    |
| 5 — 9                        | 2                    |
| 10 — 14                      | 3                    |
| 15 — 19                      | 4                    |
|                              | N = 10               |

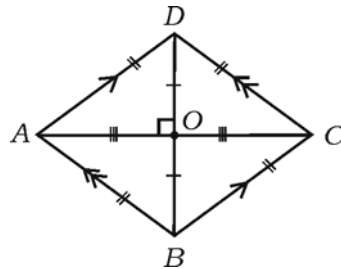
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( SPACE FOR ROUGH WORK )

43. The perimeter of a rectangle is 40 cm and its area is 96 sq.cm.  
Calculate its length and breadth. 3

OR

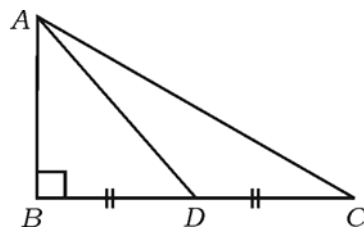
- If one root of the equation  $x^2 + bx + c = 0$  is 4 times the other, then prove that  $4b^2 = 25c$ .
44. Prove that the tangents drawn to a circle from an external point are equal. 3
45. In the rhombus  $ABCD$ , prove that  $AC^2 + BD^2 = 4AB^2$ . 3



OR

In the  $\triangle ABC$ ,  $\angle ABC = 90^\circ$ ,  $D$  is the mid-point of  $BC$ , then prove that

$$AC^2 = 4AD^2 - 3AB^2.$$




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( SPACE FOR ROUGH WORK )



46. If  $A = 60^\circ$  and  $B = 30^\circ$ , then verify that

$$\cos ( A + B ) = \cos A . \cos B - \sin A . \sin B \quad 3$$

OR

Prove that

$$\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta.$$

- V. 47. The sum of first three terms in an arithmetic progression is 24 and the sum of their squares is 224. Find the first three terms of this arithmetic progression. 4

OR

The sum of first three terms in a geometric progression is 14 and the sum of the next three terms of it is 112. Find the geometric sequence.

48. Prove that “The areas of similar triangles are proportional to the squares of the corresponding sides”. 4
49. Construct two direct common tangents to two circles of radii 4 cm and 2 cm, whose centres are 9 cm apart. Measure and write the length of direct common tangents. 4
50. Solve the quadratic equation  $x^2 - x - 6 = 0$  graphically. 4

graph

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( SPACE FOR ROUGH WORK )