

**RR+PR**ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**Code No. : **81-E**

ವಿಷಯ : ಗಣಿತ

**Subject : MATHEMATICS**(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / **English Version** )( ಹಳೆ ಪಠ್ಯಕ್ರಮ / **Old Syllabus** )

( ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ + ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ /

**Regular Repeater + Private Repeater** )*General Instructions :*

- i) The Question-cum-Answer Booklet consists of objective and subjective types of questions having 58 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) Candidate 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.

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**RR+PR-Y4002**

[ Turn over

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.  $20 \times 1 = 20$

1. If  $U = \{a, b, c, d, e, f\}$  and  $A = \{b, c, d, e\}$ , then the complement of  $A$  is
 

(A) $\{a, f\}$	(B) $\{a, b, c\}$
(C) $\{d, e, f\}$	(D) $\{b, c, d, e\}$ .
2. The order of matrix  $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{bmatrix}$  is
 

(A) $3 \times 2$	(B) $2 \times 3$
(C) $3 \times 3$	(D) $2 \times 2$ .
3. The H.C.F. of two co-prime expressions is
 

(A) 0	(B) $\infty$
(C) 10	(D) 1.
4. The symbol used to denote an algebraic identity is
 

(A) $=$	(B) $\equiv$
(C) $\equiv$	(D) $\neq$ .
5. A quadratic equation always has
 

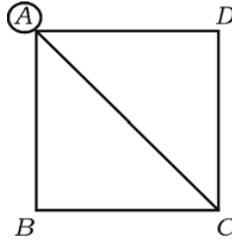
(A) one root	(B) three roots
(C) two roots	(D) four roots.
6. The number of common tangents that can be drawn to two externally touching circles is
 

(A) 2	(B) 1
(C) 4	(D) 3.

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( SPACE FOR ROUGH WORK )

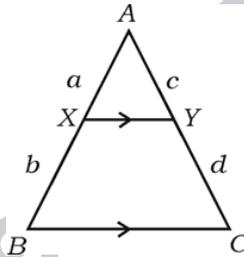
7. The angle formed in the minor segment is always  
 (A) obtuse angle (B) acute angle  
 (C) right angle (D) straight angle.
8. The volume of cone can be calculated by using formula  
 (A)  $V = \pi r^2 h$  (B)  $V = \frac{1}{3} \pi r^2 h$   
 (C)  $V = \frac{2}{3} \pi r^2 h$  (D)  $V = \frac{3}{4} \pi r^2 h$ .
9. The order of node A in the graph given is



- (A) 3 (B) 4  
 (C) 5 (D) 6.
10. If  $a = 3$ ,  $r = 2$ , then the 5th term of geometric progression is  
 (A) 81 (B) 64  
 (C) 48 (D) 32.
11. The value of  $\sum_{xyz} (x - y)$  is  
 (A)  $2x + 2y + 2z$  (B) 0  
 (C) 1 (D)  $x + y + z$ .
12. The sum of the roots of equation  $2x^2 + 4x + 7 = 0$  is  
 (A) -2 (B)  $\frac{7}{2}$   
 (C) +2 (D) 1.
13. The discriminant of quadratic equation  $x^2 + 2x + 1 = 0$  is  
 (A) 0 (B) 1  
 (C) 2 (D) 4.

( SPACE FOR ROUGH WORK )

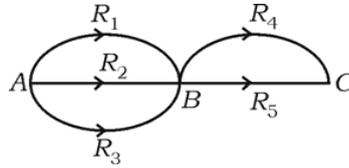
14. Two circles of radii 5 cm and 3 cm touch each other externally. The distance between their centres is  
 (A) 2 cm (B) 5 cm  
 (C) 8 cm (D) 15 cm.
15. The curved surface area of cone having radius of base 10 cm and slant height 28 cm is  
 (A)  $88 \text{ cm}^2$  (B)  $880 \text{ cm}^2$   
 (C)  $8.8 \text{ cm}^2$  (D)  $8800 \text{ cm}^2$ .
16. The product of two numbers is 300 and their H.C.F. is 10. The L.C.M. of the numbers is  
 (A) 100 (B) 300  
 (C) 3000 (D) 30.
17. For what positive value of  $m$  the roots of the equation  $x^2 + mx + 4 = 0$  are equal ?  
 (A) 4 (B) 6  
 (C) 8 (D) 10.
18. In  $\triangle ABC$ ,  $XY \parallel BC$ . Which of the following equalities is correct ?



- (A)  $\frac{a+b}{b} = \frac{c+d}{d}$  (B)  $\frac{a+b}{b} = \frac{d}{c+d}$   
 (C)  $\frac{b}{a+b} = \frac{c+d}{c}$  (D)  $\frac{a+b}{c+d} = \frac{a}{b}$ .

( SPACE FOR ROUGH WORK )

19. The index form of surd  $\sqrt[3]{x^2}$  is  
 (A)  $x^{1/3}$  (B)  $x^{2/3}$   
 (C)  $x^{3/2}$  (D)  $x^{1/2}$ .
20. There are 3 routes from A to B and 2 routes from B to C. The number of ways in which a person can travel from A to C via B is



- (A) 5 (B) 2  
 (C) 6 (D) 9.

II. Fill in the blanks with suitable answers :  $10 \times 1 = 10$

21. The general term of geometric progression whose first term is  $a$  and common ratio is  $r$  is given by  $T_n = \dots\dots\dots$
22. The 10th term of Arithmetic progression is  $\frac{1}{10}$ . The 10th term of the corresponding harmonic progression is  $\dots\dots\dots$
23. If the order of matrix  $A$  is  $m \times n$  and order of  $B$  is  $n \times p$ , then the order of matrix  $AB$  is  $\dots\dots\dots$
24. The L.C.M. of  $(x^2 - 9)$  and  $(x^2 + 6x + 9)$  is  $\dots\dots\dots$
25. The sigma ( $\Sigma$ ) notation form of an expression  
 $a^2 + b^2 + c^2 = \dots\dots\dots$
26. The volume of sphere can be calculated by using the formula  $\dots\dots\dots$

( SPACE FOR ROUGH WORK )

27. The square root of variance is called .....
28. In  $\Delta ABC$ ,  $D$  and  $E$  are mid-points of  $AB$  and  $AC$ . If the area of  $\Delta ABC = 60 \text{ cm}^2$  then the area of  $\Delta ADE$  is .....
29. If the square on one side of a triangle is equal to the sum of the squares on the other two sides, then those two sides contain a ..... angle.
30. The length of longest chord of circle of radius 5 cm is .....
- III. 31. In a school, 130 students offered Mathematics, 100 students offered Science and 50 students offered both. Find the number of students in the school. 2
32. If  $A$  and  $B$  are non-empty sets having some common elements, show by using Venn diagram, 2
- i)  $A \cup B$  :
- ii)  $A \cap B$  :
33. In a geometric progression given that  $S_{2n} : S_n = (r^n + 1) : 1$ . Find the value of  $r$  if  $S_{10} : S_5 = 33 : 1$ . 2
34. Find the harmonic mean between 5 and 7. 2
35. If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , then find  $A - A'$ . 2
36. If  ${}^n P_3 = 720$ , then find the value of  $n$ . 2
37. Classify the following surds into a group of like surds : 2
- $\sqrt{8}, \sqrt{27}, \sqrt{12}, \sqrt{50}$ .

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**( SPACE FOR ROUGH WORK )**

38. Rationalise the denominator and simplify :

2

$$\frac{3\sqrt{5}}{\sqrt{6-\sqrt{3}}}$$

39. If  $a^2 + b^2 = c^2$  solve for  $b$ . Find the value of  $b$  if  $c = 17$  and  $a = 8$ .

2

40. Construct two tangents to a circle of radius 4 cm from an external point 8 cm away from the centre.

2

41. The circumference of base of a cylinder is 44 cm and its height is 10 cm. Find its curved surface area.

2

42. Draw a plan of a level ground using the given information :

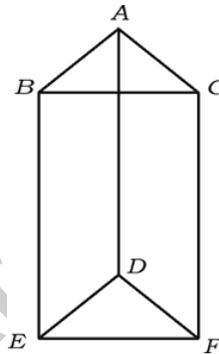
2

[ Scale : 25 m = 1 cm ]

	Metres to D	
	250	
	200	75 to C
75 to E	150	
	100	50 to B
	From A	

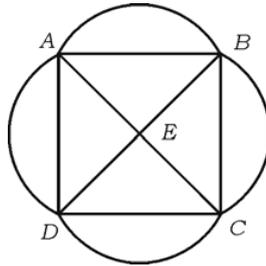
43. Verify Euler's formula for the solid given below :

2



( SPACE FOR ROUGH WORK )

44. For the given network write the order of each node and verify whether the network is traversable : 2



45. The sum of a number and its reciprocal is  $\frac{5}{2}$ . Find the number. 2
46. The sum of square of a number and 7 times of it is “- 12.” Form the equation for the statement given. 2
47. Find the value of  $k$  so that the equation  $x^2 + 4x + (k + 2) = 0$  has one root equal to zero. 2
48. Construct Cayley’s table on  $Z_4$  under  $\oplus_4$ . 2
- IV. 49. There are 8 gentlemen and 5 ladies in a group. A committee of 5 is to be formed. In how many ways can this be done so that the committee contains atleast 4 ladies ? 3
50. Find the variance and standard deviation of first eight even natural numbers. 3
51. Find the H.C.F. of  $(4x^3 - 3x^2 - 24x - 9)$  and  $(8x^3 - 2x^2 - 53x - 39)$  by using division method. 3
52. If  $a + b + c = 2s$  prove that  $a^2 - b^2 - c^2 + 2bc = 4(s - b)(s - c)$ . 3

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( SPACE FOR ROUGH WORK )

53. In  $\triangle ABC$ ,  $AB = AC$  and  $BD \perp AC$ , prove that  
 $BD^2 + CD^2 = 2AC \cdot CD.$  3
54. Prove that the tangents drawn to a circle from an external point are equal. 3
- V. 55. In an arithmetic progression, if  $T_n = 4n + 3$  then find  $T_{15}$  and  $S_{15}.$  4
56. Prove that "If two triangles are equiangular, then their corresponding sides are proportional". 4
57. Construct two direct common tangents to two circles of radii 4 cm and 2 cm having their centres 10 cm apart. 4
58. Draw the graph of  $y = x^2$  and find the value of  $\sqrt{7}.$  4

graph

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( SPACE FOR ROUGH WORK )