Roll No.												Serial No. of Q. C. A. B.

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 58] [ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 32

Total No. of Questions : 58] [Total No. of Printed Pages : 32

ಸಂಕೇತ ಸಂಖ್ಯೆ : 81-E ವಿಷಯ : **ಗಣಿತ**

Code No. : 81-E **Subject : MATHEMATICS**

(ಇಂಗ್ಲೀಷ್ ಭಾಷಾಂತರ / English Version)

ದಿನಾಂಕ : 20. 06. 2011] [Date : 20. 06. 2011

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-45 ರವರೆಗೆ] [Time : 10-30 A.M. to 1-45 P.M.

ಪರಮಾವಧಿ ಅಂಕಗಳು : 100] [Max. Marks : 100

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Q. No.	Marks		Q. No.	Marks		Q. No.	Marks		Q. No.	Marks		Q. No.	Marks
1.			14.			27.			40.			53.	
2.			15.			28.			41.			54.	
3.			16.			29.			42.			55.	
4.			17.			30.			43.			56.	
5.			18.			31.			44.			57.	
6.			19.			32.			45.			58.	
7.			20.			33.			46.			×	
8.			21.			34.			47.			×	
9.			22.			35.			48.			×	
10.			23.			36.			49.			×	
11.			24.			37.			50.			×	
12.			25.			38.			51.			×	
13.			26.			39.			52.			×	
												Total Marks	

Total Marks in words		**Grand Total**	

1. ✓			
2. ✓		✓	✓
Signature of Evaluators	*Registration No.*	*Signature of the Deputy Chief*	*Signature of the Room Invigilator*

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 alphabet 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.

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 alphabet in the space provided against each question. $20 \times 1 = 20$

1. The law which is symbolically stated as $(A \cup B) \cup C = C \cup (A \cup B)$ is

(A) Commutative law (B) Associative law

(C) Distributive law (D) De Morgan's law.

Ans. : _____

(SPACE FOR ROUGH WORK)

2. In a Geometric Progression, if $T_5 : T_2 = 8 : 1$, then the common ratio is

(A) 12 (B) 8

(C) 3 (D) 2.

Ans. : _____

3. The Geometric Mean of two numbers is $4\sqrt{3}$ and Harmonic Mean is 6. Its Arithmetic Mean is

(A) 6 (B) 8

(C) 10 (D) 12.

Ans. : _____

4. If $A - B = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$ then matrix A is

(A) $\begin{bmatrix} 3 & 6 \\ 7 & 6 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & 2 \\ 3 & 6 \end{bmatrix}$.

Ans. : _____

5. The product of H.C.F. and L.C.M. of two expressions is $6a^3 b^4 c^2$. If one expression is $2a^3 b^3 c^2$, then the other is

(A) $3abc$ (B) $6bc$

(C) $3bc$ (D) $3b$.

Ans. : _____

(SPACE FOR ROUGH WORK)

6. L.C.M. of $(\sqrt{x} - \sqrt{y})$ and $(x - y)$ is

(A) $\sqrt{x} + \sqrt{y}$ (B) $\sqrt{x} - \sqrt{y}$

(C) $x - y$ (D) $x + y$.

Ans. : _____

7. The expression $(x^2 + y^2 + z^2 - x - y - z)$ written using $\sum$ notation is

(A) $\sum_{xyz} (x^2 + x)$ (B) $\sum_{xyz} x - x^2$

(C) $\sum_{xyz} x^2 + \sum_{xyz} x$ (D) $\sum_{xyz} (x^2 - x)$.

Ans. : _____

8. If $a + b + c = 0$ then the value of $a^2 + b^2 - c^2$ is

(A) ab (B) $-2ab$

(C) $2ab$ (D) bc.

Ans. : _____

9. The rationalising factor of $2\sqrt[3]{x}$ is

(A) $\sqrt{x}$ (B) $4\sqrt{x}$

(C) $\sqrt[3]{x^2}$ (D) $\sqrt[3]{x}$.

Ans. : _____

(SPACE FOR ROUGH WORK)

10. If m and n are the roots of the quadratic equation $x^2 - 6x + 2 = 0$, then the value of $(m + n)^2$ is

(A) 36 (B) – 36

(C) 2 (D) – 2.

Ans. : _____

11. In the equation $ax^2 + bx + c = 0$, if one root is negative of the other then

(A) $a = 0$ (B) $b = 0$

(C) $c = 0$ (D) $a = c$.

Ans. : _____

12. $x + \frac{1}{x} = 3$ is in the form of

(A) adfected quadratic equation (B) pure quadratic equation

(C) linear equation (D) simple equation.

Ans. : _____

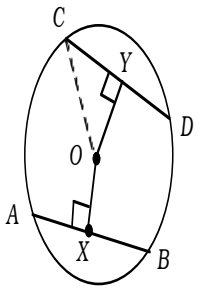
13. If $3x^2 - 27 = 0$, then the value of x^2 is

(A) ± 3 (B) + 3

(C) – 3 (D) 9.

Ans. : _____

14. In the given figure chord AB = chord CD = 8 cm and OX = 3 cm. Radius OC =



(A) 8 cm (B) 5 cm

(C) 4 cm (D) 3 cm.

Ans. : _____

(SPACE FOR ROUGH WORK)

15. ΔABC has sides of length 5 cm, 6 cm and 7 cm. The perimeter of ΔDEF is 360 cm. If $\Delta ABC \sim \Delta DEF$, then the ratio of the perimeters of ΔABC and ΔDEF is

(A) 1 : 2 (B) 2 : 1

(C) 1 : 20 (D) 20 : 1.

Ans. : _____

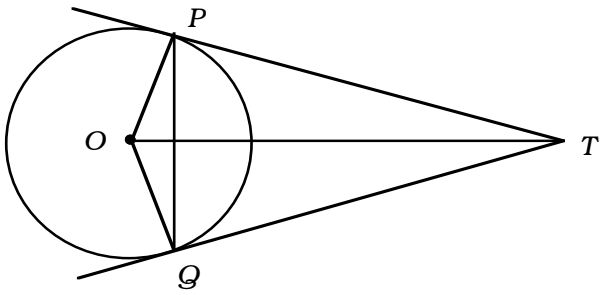
16. In ΔABC, D, E and F are mid-points of AB, BC and CA respectively. If area of ΔABC = 60 sq.cm then area of ΔDEF is

(A) 15 sq.cm (B) 30 sq.cm

(C) 45 sq.cm (D) 60 sq.cm.

Ans. : _____

17. In the given figure TP and TQ are tangents drawn to the circle with centre O. If $\angle PTQ = 40°$, then $\angle OPQ$ is



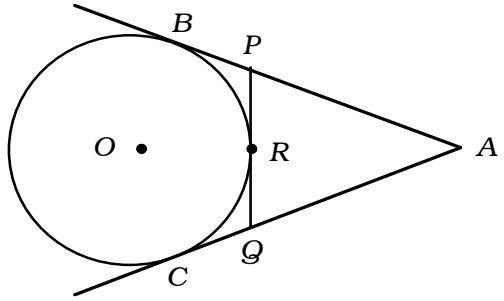
(A) 40° (B) 30°

(C) 20° (D) 10°.

Ans. : _____

(SPACE FOR ROUGH WORK)

18. In the given figure AB, AC and PQ are tangents to the circle with centre O. If the perimeter of ΔAPQ = 20 cm, then length of AB is



(A) 10 cm (B) 20 cm

(C) 15 cm (D) 30 cm.

Ans. : _____

19. If surface areas of two spheres are in the ratio 25 : 36, then the ratio of their radii is

(A) 625 : 1296 (B) 7 : 9

(C) 6 : 5 (D) 5 : 6.

Ans. : _____

20. The area of the base of a circular cylinder is 154 sq.cm and height is 10 cm. Its volume is

(A) 144 c.c. (B) 1540 c.c.

(C) 154 c.c (D) 15·4 c.c.

Ans. : _____

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

21. The reciprocals of the terms in Geometric Progression form ..... .

Ans. : _____

(SPACE FOR ROUGH WORK)

22. A is a square matrix of order 2×2. If $A = A^{I}$, then the matrix A is called ..... .

Ans. : _____

23. The value of ${}^{n}P_{0}$ is ..... .

Ans. : _____

24. The formula to find the coefficient of variation is ..... .

Ans. : _____

25. When one algebraic expression is divided by the other, if the last remainder is a constant but not zero, then their H.C.F. is ..... .

Ans. : _____

26. The summation of the terms is denoted by the symbol ..... .

Ans. : _____

27. If two triangles are equiangular then their corresponding sides are ..... .

Ans. : _____

28. The lengths of the tangents drawn to a circle from an external point are ..... .

Ans. : _____

29. The formula to find the volume of a sphere is ..... .

Ans. : _____

30. Shape of each face of a hexahedron is ..... .

Ans. : _____

(SPACE FOR ROUGH WORK)

III. 31. A and B are the subsets of the universal set U. Draw Venn diagrams to represent

(i) $(A - B)$ (ii) $(A \cup B)'$. 2

32. $A = \{2, 4, 8\}$, $B = \{1, 2, 6, 8\}$ and $C = \{1, 5, 6, 8\}$ then show that

$A - (B \cap C) = (A - B) \cup (A - C)$. 2

(SPACE FOR ROUGH WORK)

33. The first term of a G.P. is 50 and fourth term is 1350. Find its fifth term. 2

(SPACE FOR ROUGH WORK)

34. If a, H, b are in H.P., show that $H = \frac{2ab}{a + b}$. 2

35. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then find A^2 . 2

(SPACE FOR ROUGH WORK)

36. If $5 \cdot {}^{n}P_{3} = 4 \cdot {}^{n+1}P_{3}$, find n. 2

37. Rationalise the denominator and simplify. 2

$$\frac{3}{\sqrt{3}-\sqrt{2}} .$$

(SPACE FOR ROUGH WORK)

38. Simplify : $8\sqrt{\frac{1}{2}} - \frac{1}{2}\sqrt{8}$. 2

39. Solve for x by using formula : 2

$x^2 - 2x - 2 = 0.$

(SPACE FOR ROUGH WORK)

40. Solve for x :

$$2\left(x^2 - 1\right) = x\left(1 - x\right).$$ 2

(SPACE FOR ROUGH WORK)

41. The perimeter of a rectangle is 36 cm and its area is 80 square cm. Find its length and breadth. 2

42. Find the value of k so that the equation $49x^2 - kx - 81 = 0$, has one root as the negative of the other. 2

(SPACE FOR ROUGH WORK)

43. Find the values of

i) $(3 \approx_7 6) \approx_7 4$

ii) $(4 \ f_{11} \ 3) \ f_{11} \ 7.$ 2

(SPACE FOR ROUGH WORK)

44. In a circle of radius 3·5 cm, draw two radii such that the angle between them is 70°. Draw two tangents at the non-centre ends of the radii. 2

45. The radius of the base of a right circular cylinder is doubled and the height is halved. What is the ratio of volume of the new cylinder to that of the original cylinder ? 2

(SPACE FOR ROUGH WORK)

46. Draw a plan of the field from the surveyor's field book given below : 2

Scale : 25 m = 1 cm.

	To D (in m)	
to E 50	300 200 150 100	100 to C 75 to B
	From A	

(SPACE FOR ROUGH WORK)

47. Write the two conditions of traversibility of a network. 2

(SPACE FOR ROUGH WORK)

48. Draw the graph for the given matrix : 2

$$\begin{bmatrix} 0 & 3 & 0 \\ 3 & 0 & 2 \\ 0 & 2 & 0 \end{bmatrix}$$

(SPACE FOR ROUGH WORK)

IV. 49. Raju is one among 15 boys. In how many ways can a cricket team of 11 be chosen ? How many of these contain Raju ? 3

(SPACE FOR ROUGH WORK)

50. Find the standard deviation of the following frequency distribution : 3

C.I. :	1 – 5	6 – 10	11 – 15	16 – 20
f :	2	3	4	1

(SPACE FOR ROUGH WORK)

51. Find the L.C.M. of $(a^3 - 3a^2 - 10a + 24)$ and $(a^3 - 2a^2 - 9a + 18)$ by division method. 3

(SPACE FOR ROUGH WORK)

52. If $xy\,(x + y) = 1$, show that $\frac{1}{x^3 y^3} - x^3 - y^3 = 3$. 3

(SPACE FOR ROUGH WORK)

53. Prove that the areas of similar triangles have the same ratio as the squares of corresponding altitudes. 3

(SPACE FOR ROUGH WORK)

54. Prove that if two circles touch each other externally, the point of contact and the centres of the circles are collinear. 3

(SPACE FOR ROUGH WORK)

V. 55. In an Arithmetic Progression the sum of first 10 terms is 175 and the sum of the next 10 terms is 475. Find the Arithmetic Progression. 4

(SPACE FOR ROUGH WORK)

56. Construct a transverse common tangent to two circles of radii 3 cm and 2 cm, whose centres are 10 cm apart. Measure the length of the tangent. 4

(SPACE FOR ROUGH WORK)

57. Prove that in a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. 4

(SPACE FOR ROUGH WORK)

58. Draw the graphs of $y = x^2$ and $y = 2x + 3$ and hence solve the equation $x^2 - 2x - 3 = 0$. 4

(SPACE FOR ROUGH WORK)