FOR OFFICE USE ONLY

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. If *A, B* and *C* are non-empty sets then the 'Intersection of sets is distributive over union of sets' is represented as

(A) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

(B) $A \cap (B \cap C) = (A \cap B) \cap (A \cap C)$

(C) $(A \cup B) \cap C = (A \cap C) \cup (B \cap C)$

(D) $(A \cap B) \cup C = (A \cup C) \cap (B \cup C)$

Ans. : _____

(SPACE FOR ROUGH WORK)

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2.   In a sequence, if $T_{n+1} = 4n + 5$ then T_n is

   (A) $4n - 5$ (B) $4n - 1$

   (C) $4n + 1$ (D) $4n + 5$.

Ans. : _____

3.   Which is the correct relation ?

   (A) $\dfrac{{}^nC_r}{{}^nP_r} = r$ (B) $\dfrac{{}^nP_r}{{}^nC_r} = \lfloor r$

   (C) $\dfrac{{}^nP_r}{{}^nC_r} = r$ (D) $\dfrac{{}^nC_r}{{}^nP_r} = \lfloor r$.

Ans. : _____

4.   The standard deviation (σ), mean $\left(\overline{X} \right)$ are given. The formula for calculating

   coefficient of variation (C.V.) is

   (A)   C.V. $= \dfrac{\sigma}{\overline{X}} \times 100$ (B)   C.V. $= \dfrac{\overline{X}}{\sigma} \times 100$

   (C)   C.V. $= \dfrac{\sigma \cdot \overline{X}}{100}$ (D) $\overline{X} = \dfrac{\text{C.V.}}{\sigma} \times 100$.

Ans. : _____

5.   *A* is a matrix of order 2 × 3 and *B* is a matrix of order 2 × 1. If *AX* = *B* then the
    order of the matrix *X* is

   (A)   1 × 2   (B)   3 × 1

   (C)   2 × 1   (D)   1 × 3.

Ans. : _____

(SPACE FOR ROUGH WORK)

6. The H.C.F. of $(a^2 - 9)$ and $(a^2 + 5a + 6)$ is

   (A) $(a - 9)$

   (B) $(a - 3)$

   (C) $(a + 3)$

   (D) $(a + 9)$.

Ans. : _____

7. A and B are the two algebraic expressions, H and L are the H.C.F. and L.C.M. of them, respectively. The correct relation among these is

   (A) $H \times B = A \times L$

   (B) $H + L = A + B$

   (C) $H + B = A + L$

   (D) $H \times L = A \times B$.

Ans. : _____

8. If $\displaystyle\sum_{a,b,c} a = 0$ then the value of $\displaystyle\sum_{a,b,c} [(a + b)^2 - c^2]$ is

   (A) 1

   (B) 0

   (C) 2

   (D) $- 2$.

Ans. : _____

9. If $a + b + c = 0$ then $3abc$ is equal to

   (A) $a^3 + b^3 + c^3$

   (B) $a^2 + b^2 + c^2$

   (C) $- (a^2 + b^2 + c^2)$

   (D) $- (a^3 + b^3 + c^3)$.

Ans. : _____

(SPACE FOR ROUGH WORK)

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10. If $a + b + c = 0$ then $a^2 - bc$ is equal to

(A) $(ab + bc + ca)$ (B) $(ab - bc - ca)$

(C) $-(ab - bc - ca)$ (D) $-(ab + bc + ca)$.

Ans. : _____

11. Which one of the following is not a pure quadratic equation ?

(A) $x^2 + 2 = 6$ (B) $2m^2 = 72$

(C) $P^2 = 9$ (D) $K^2 = K$.

Ans. : _____

12. The area (A) of a triangle, whose base is 4 units longer than its altitude (x) is

(A) $A = \dfrac{1}{2} x (x - 4)$ (B) $A = \dfrac{1}{2} x (x + 4)$

(C) $A = \dfrac{1}{2} (4x)$ (D) $A = \dfrac{1}{2} (x + 4x)$.

Ans. : _____

13. The reduced form of the surd $\sqrt[n]{a^{n+1} \cdot b^{n-1}}$ is

(A) $ab \sqrt[n]{\dfrac{b}{a}}$ (B) $ab \sqrt[n]{ab}$

(C) $ab \sqrt[n]{\dfrac{a}{b}}$ (D) $ab \sqrt[n]{a}$.

Ans. : _____

14. The sum of roots of the equation $ax^2 + bx + c = 0$ is

(A) $\dfrac{b}{a}$ (B) $\dfrac{-c}{a}$

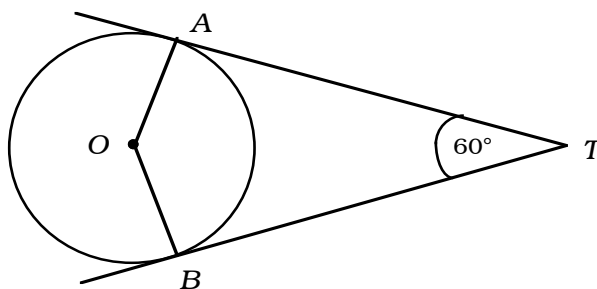(C) $\dfrac{c}{a}$ (D) $\dfrac{-b}{a}$.

Ans. : _____

(SPACE FOR ROUGH WORK)

15. In the given figure, *TA* and *TB* are tangents to the circle of centre *O*. If ∠ *ATB* = 60°, then ∠ *AOB* is

(A) 120°   (B) 90°   (C) 60°   (D) 240°.
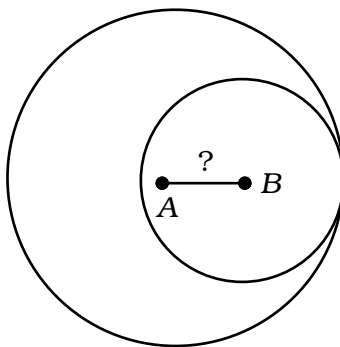
Ans. : _____

16. The Pythagorian triplets among the following is

(A) 8, 15, 17   (B) 5, 8, 17

(C) 5, 12, 17   (D) 3, 6, 9.

Ans. : _____

17. Two circles of radii 5 cm and 3 cm touch each other as shown in the figure. The distance between their centres is

(A) 8 cm   (B) 2 cm

(C) 5 cm   (D) 3 cm.

Ans. : _____

(SPACE FOR ROUGH WORK)

18. The volume (V) of a cylinder with radius of its base (r) and height (h), is calculated using the formula

(A) $V = \frac{1}{3} \pi r^2 h$

(B) $V = 2\pi r h$

(C) $V = \pi r^2 h$

(D) $V = \pi r h$.

Ans. : _____

19. The circumference of the circular base of a cone is 50 cm. If the slant height of it is 10 cm, the curved surface area of the cone is

(A) 125 sq.cm

(B) 2500 sq.cm

(C) 500 sq.cm

(D) 250 sq.cm.

Ans. : _____

20. If $\Delta ABC \;\||\; \Delta DEF$, $\angle A = \angle D$ and $\angle B = \angle E$ then $\dfrac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF}$ is

(A) $\dfrac{AC^2}{DF^2}$

(B) $\dfrac{AB^2}{DF^2}$

(C) $\dfrac{AC^2}{EF^2}$

(D) $\dfrac{BC^2}{DE^2}$.

Ans. : _____

II. Fill in the blanks with suitable answers : 10 × 1 = 10

21. The formula for finding n^{th} term of an Arithmetic progression, where

a = first term, d = common difference is ....

Ans. : _____

22. If A, G, H are Arithmetic Mean, Geometric Mean and Harmonic Mean respectively, then $\sqrt{AH}$ = ...

Ans. : _____

(SPACE FOR ROUGH WORK)

23. If A and B are two matrices conformable for multiplication then $(AB)^{/} = $ ....

Ans. : _____

24. $(a^2 + b^2 + c^2)$ can be expressed using $\sum$ notation as ....

Ans. : _____

25. The discriminant (Δ) of a quadratic equation $ax^2 + bx + c = 0$ is ....

Ans. : _____

26. A quadratic equation in x whose roots are m and n is ....

Ans. : _____

27. The H.C.F. of $(a + b)$ and $(a - b)$ is ....

Ans. : _____

28. In the figure $\angle ABC = \angle AED = 90°$, $\dfrac{AD}{AC} = \dfrac{DE}{BC} = \dfrac{?}{?}$
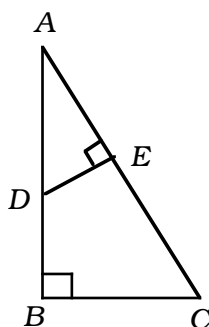
Ans. : _____

29. The formula to find the surface area of a sphere is ....

Ans. : _____

30. Euler's formula for verifying a network is generally given by ....

Ans. : _____

(SPACE FOR ROUGH WORK)

III.   31.   Universal set $U = \{ 1, 2, 3, 4, 5, 6, 7, 9 \}$ and

A = $\{ x : x$ is a prime number less than 10 $\}$

B = $\{ x : x$ is a multiple of 3 less than 10 $\}$. Verify $(A \cap B)' = A' \cup B'$.   2

(**SPACE FOR ROUGH WORK**)

32. Represent the following information in Venn diagram :

$n (U)$ = Number of families of TV viewers in a village = 1000

$n (K)$ = Number of families view Kannada programmes = 800

$n (E)$ = Number of families view Hindi programmes = 400

$n (K \cap E)$ = Number of families view both Kannada and Hindi programmes = 300.

Also shade the region of number of families who view neither of the programmes. 2

(SPACE FOR ROUGH WORK)

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33. Three numbers are in harmonic progression. The harmonic mean between 1st and 3rd numbers is 20. If the 1st number is twice the 3rd number then find the three terms of the progression. 2

34. Find the sum of the series 3 + 7 + 11 + ... up to 20 terms. 2

(**SPACE FOR ROUGH WORK**)

35. If $\begin{bmatrix} 3x^2 & 1 \\ 3 & 2 \end{bmatrix} + \begin{bmatrix} 6x & 5 \\ 2 & 7 \end{bmatrix} = \begin{bmatrix} 0 & 6 \\ 5 & 9 \end{bmatrix}$ then find x. 2

36. If $^{(n+1)}P_3 = 120$ then find the value of n. 2

(SPACE FOR ROUGH WORK)

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37. A square field has length of its side ($a + b$) units. At one end of its corner a square platform is made whose length of side is c units. Show that the remaining area of the field is $4s (s - c)$ where $\dfrac{a + b + c}{2} = s$. 2

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

(**SPACE FOR ROUGH WORK**)

39. Simplify by rationalising the denominator $\dfrac{5}{\sqrt{3} + \sqrt{2}}$. 2

40. Solve the equation $x^2 - 5x + 3 = 0$ by using formula. 2

(SPACE FOR ROUGH WORK)

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41. If m and n are the roots of the equation $2x^2 - 4x + 1 = 0$, find the value of $(m + n)^2 + 4mn$. 2

42. Construct Cayley's table for $S = \{2, 4, 6, 8\}$ under multiplication modulo 10.

2

(SPACE FOR ROUGH WORK)

5000000   [Turn over
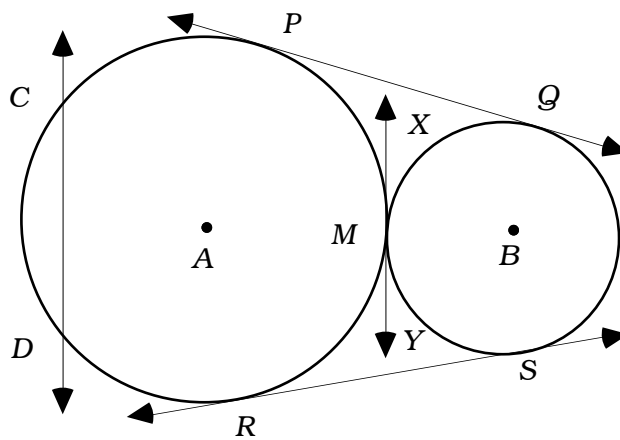
43. In a circle of radius 5 cm, construct a chord of length 8 cm. Measure the distance between the centre and the chord. 2

_____

(SPACE FOR ROUGH WORK)

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44. In the given figure, name (a) a pair of direct common tangents, (b) transverse common tangent, (c) a pair of equal tangents and (d) secant. 2

(SPACE FOR ROUGH WORK)

45. Water is filled in a hemispherical vessel of radius r units. If a solid spherical ball of radius $\left(\dfrac{r}{2}\right)$ units is immersed in it, the water spills out of the vessel. Show that the quantity of the water that spills is $\dfrac{\pi r^3}{2}$ cubic units.   2

(SPACE FOR ROUGH WORK)

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

[Scale : 20 m = 1 cm]

	To C (in m)	
	140	
To D 40	100	
	80	60 to B
To E 60	40	
	From A	

(**SPACE FOR ROUGH WORK**)

47. Draw the graph for the given matrix : 2

$$\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$$

48. Verify Euler's formula for 'Octahedron'. 2

(SPACE FOR ROUGH WORK)

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IV. 49. There are 5 bowlers and 10 batsmen in a cricket club. Sharath and David are good batsmen. Since Sharath is injured he is not participating in any matches. In how many ways a team of 11 be selected so that the team contains a maximum of 7 batsmen ?   3

(SPACE FOR ROUGH WORK)

50. Calculate the standard deviation for the given frequency distribution :   3

C.I.	f
10 – 14	2
15 – 19	3
20 – 24	5
25 – 29	3
30 – 34	2

(SPACE FOR ROUGH WORK)

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51. Find the L.C.M. of the given expressions

$x^3 - 3x^2 - 10x + 24$ and $x^3 - 2x^2 - 9x + 18$. 3

(SPACE FOR ROUGH WORK)

52. The area of an equilateral triangle whose side is x cm is $16\sqrt{3}$ sq.cm. Find the perimeter of the triangle. 3

(SPACE FOR ROUGH WORK)

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53. *AD* is the altitude from *A* to *BC* in the Δ *ABC* and *DB* : *CD* = 3 : 1. Prove that $BC^2 = 2\left(AB^2 - AC^2\right)$.   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)

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V.   55. In a geometric progression the sum of 2nd and 4th terms is 30. The difference of 6th and 2nd terms is 90. Find the 8th term of a geometric progression, whose common ratio is greater than 1.   4

(SPACE FOR ROUGH WORK)

56. Prove that, "the areas of similar triangles are proportional to the squares of the corresponding sides."   4

(SPACE FOR ROUGH WORK)

57. Two circles of radii 5 cm and 3 cm, have their centres 10 cm apart. Draw two direct common tangents to the circles and measure them.   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)

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