Maths Paper - II

Instructions :

1. *Answer the questions under **Part 'A'** on a separate answer book.*
2. *Write the answers to the questions under **Part 'B'** on the question paper itself and attach it to the answer book of **Part (A)**.*

Time : 2 Hours]   **PART – A**   **[Marks : 35**

SECTION – I (Marks : 5 × 2 = 10)

Note :   1. *Answer **ANY FIVE** questions choosing at least **TWO** from each of the following **Groups A & B**.*

       2. *Each question carries **2** marks.*

Group – 'A'

1. ABCD is a rhombus, prove that $AB^2 + BC^2 + CD^2 + DA^2 = AC^2 + BD^2$.

2. Find the equation of the straight line passing through the point $(1, -6)$ and whose product of the intercepts on the coordinate axes is 1.

3. Find the coordinates of the centre of the circle having the points $(9, 3)$ and $(1, -1)$ as the end points of the diameter.

4. Write the merits of Arithmetic mean.

Group – 'B'

5. If $\sin \theta = \dfrac{5}{13}$, find the value of $\cos \theta$.

6. If $A = \begin{pmatrix} 1 & 3 \\ 0 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$, then find the matrix $2A - 3B$.

7. What are the types of operations, a Computer performs ?

8. What is a Flow Chart ?

SECTION – II (Marks : 4 × 1 = 4)

Note :   1. *Answer **ANY FOUR** of the following **SIX** questions.*

       2. *Each question carries **1** mark.*

9. Find the slope of the straight line perpendicular to the line $2x + 3y + 5 = 0$.

10. Express $\tan \theta$ in terms of $\cos \theta$.

11. Find the range of the first 'n' natural numbers.

12. Expand C.P.U.

13. If $A = \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$, then find AB.

14. State the Alternate Segment Theorem.

SECTION – III (Marks : 4 × 4 = 16)

Note :   1. *Answer ANY FOUR questions choosing at least TWO from each of the following groups.*

2. *Each question carries 4 marks.*

Group – 'A'

15. State and prove the Basic Proportionality Theorem. (Thales theorem).

16. Find the area of the quadrilateral, whose vertices are (– 1, 6), (– 3, – 9), (5, – 8) and (3, 9).

17. Find the equation of the straight line perpendicular to the line joining the points (3, – 5), (5, 7) and passing through (2, – 3).

18. Find the Arithmetic mean of the following frequency distribution by deviation method.

Class interval	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89
Frequency	32	42	40	56	20	6	2	2

Group – 'B'

19. Prove that $\dfrac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \dfrac{1 + \sin\theta}{\cos\theta}$.

20. Given that $A = \begin{pmatrix} 1 & -1 \\ 2 & -1 \end{pmatrix}$, $B = \begin{pmatrix} a & 1 \\ b & -1 \end{pmatrix}$ and $(A + B)^2 = A^2 + B^2$; then find a and b.

21. Solve the equations $3y = 4 - 2x$ and $x = \dfrac{y+1}{4}$ by using Cramer's method.

22. An article is purchased for Rs. 500/- and sold it for Rs. 600/-. Execute a Flow Chart using this data to determine the percentage of gain or loss.

SECTION – IV (Marks : 1 × 5 = 5)

Note :   1. *Answer ANY ONE question from the following questions.*

2. *The question carries 5 marks.*

23. Construct a triangle ABC, in which BC = 7 cm., ∠A = 70° and foot of the perpendicular D on BC from A is 4.5 cm away from B.

24. From the top of a tower 150 mts. high, the angle of depression of the top of the building and its bottom are observed to be 39°17' and 45° respectively. Find the height of the building.

Natural Tangent Table

Minutes								Mean Differences				
Degrees	0'	6'	12'	18'	24'	30'	36'	1'	2'	3'	4'	5'
39°	0·8098	·8127	·8156	·8185	·8214	·8243	·8273	5	10	15	20	24

ime : 30 Minutes]   **PART – B**   [Marks : 15

Note : 1.   *All questions carry equal marks, i.e., $\frac{1}{2}$ mark.*
2.   *Answers are to be written in the question paper as directed.*
3.   *All questions are to be answered.*
4.   *Marks will **not** be given for over written, re-written or erased answers.*

I. Write the 'CAPITAL LETTER' showing the correct answer in the bracket provided against each question.

1. $\triangle ABC \sim \triangle PQR$ and $\angle A = 50°$, then $\angle Q + \angle R = $ ....   [   ]
   A) 40°   B) 100°   C) 130°   D) 140°

2. The range of the data 10, 18, 15, 12, 13, 15, 16 is   [   ]
   A) 15   B) 8   C) 12   D) 13

3. A histogram consists of   [   ]
   A) Sectors   B) Triangles   C) Squares   D) Rectangles

4. Two circles of radii 8 cm and 5 cm touch externally, then the distance between their centres is .... cm.   [   ]
   A) 8   B) 13   C) 5   D) 3

5. Slope of the straight line parallel to $3x - 2y + 1 = 0$ is   [   ]
   A) $\frac{2}{3}$ B) $-\frac{2}{3}$ C) $\frac{3}{2}$ D) $-\frac{3}{2}$

6. Find the sum of the intercepts made by $3x + 4y = 12$ on the axes   [   ]
   A) 4   B) 7   C) 3   D) 12

7. The order of the matrices A and B are 3×4 and 5×3 respectively. Find the order of the product of B.A.   [   ]
   A) 5×4 B) 4×5 C) 3×5 D) 3×3

8. If $\sin \theta = \cos 2\theta$, then cot $3\theta = $ ....   [   ]
   A) $\sqrt{3}$ B) $\frac{1}{\sqrt{3}}$ C) 0   D) ∞

9. Express 72° sexagesimal measure as radian (circular) measure   [   ]
   A) $\frac{2\pi^c}{5}$ B) $\frac{5\pi^c}{2}$ C) $\frac{3\pi^c}{4}$ D) $\frac{4\pi^c}{3}$

10. Vacuum tubes are used in .... generation computers.   [   ]
    A) Fourth   B) First   C) Second   D) Third

II. Fill in the blanks with suitable answers.

11. 'O' is the centre of the circle,
    If $\angle BOA = 140°$ and $\angle COA = 100°$,
    then $\angle BAC = $ ....

12. The area of the triangle formed by the points (0, 0), (1, 0) and (0, 1) = ...

13. The slope of the line joining the points (2, – 5) and (8, 1) = ...

14. The mid value of the Class is used to calculate for ....
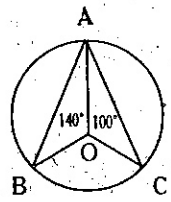
15. $\begin{vmatrix} \sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{vmatrix} = $ ....

16. $\begin{pmatrix} x \\ y \end{pmatrix} (5 \quad 2) = $ ....

17. If $M \times \begin{pmatrix} 1 & 2 \\ 0 & 5 \end{pmatrix} = (2 \quad 3)$, then the order of the matrix M is ....

18. If $\cos \theta = \dfrac{\sqrt{3}}{2}$, then $\sin \theta = $ ....

19. All the parts of a Computer are controlled by ....

20. .... is used to make a diagrammatic representation of an Algorithm.

III. For the following questions under Group A, choose the correct answers from the Master list (Group B) and write the letter of the correct answer in the brackets provided against each item.

i)	Group – 'A'		Group – 'B'	
21.	Two circles touch externally, then the number of their common tangents is/are	[ ]	A)	0
22.	Slope of the line y = 5 is	[ ]	B)	5
23.	The average of the data 3, 8, x, 10, 9 and 6 is 7. Then find the value of x = ...	[ ]	C)	3
24.	In $\triangle ABC$, AB = BC = CA = 2 cm., then the length of the median of the $\triangle$ is = ...	[ ]	D)	7
25.	The mode of the data 5, 8, 9, 4, 5, 6, 4, 7, 5 is ...	[ ]	E)	4
			F)	$\sqrt{3}$
			G)	6

ii)	Group – 'A'		Group – 'B'	
26.	$\begin{pmatrix} 4 & -6 \\ 6 & 3x \end{pmatrix}$ is a singular matrix, then x = ...	[ ]	H)	1
27.	$\begin{pmatrix} a & 3 \\ 1 & 2 \end{pmatrix}\begin{pmatrix} 2 \\ -1 \end{pmatrix} = \begin{pmatrix} -7 \\ 0 \end{pmatrix}$, then a = ...	[ ]	I)	$- 1$
28.	$\cos 360° = $	[ ]	J)	$- 3$
29.	$\sec (- 60°) = $	[ ]	K)	$- 4$
30.	Slope of the line making an angle of 135° with the positive direction of the X-axis is	[ ]	L)	$- 2$
			M)	2
			N)	$- 6$

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