

Register  
Number

--	--	--	--	--	--

**MATHEMATICS — Paper II**Time Allowed :  $2\frac{1}{2}$  Hours ]

[ Maximum Marks : 100

**PART - I**

- N. B. :
- i) This Part contains *two* Sections, **Section - A** and **Section - B**.
  - ii) **Section - A** contains Multiple Choice Questions. Answer *all* the 20 questions. Each question carries *one* mark.
  - iii) **Section - B** contains 15 questions. Answer any *ten* questions. Each question carries *two* marks.

**SECTION - A**

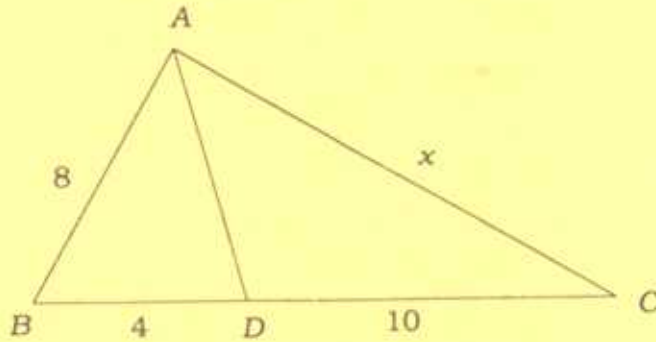
Choose the correct answer from the given alternatives :

 $20 \times 1 = 20$ 

1. If the order of  $A$  is  $4 \times 3$  and the order of  $B$  is  $3 \times 4$ , then  $AB$  is a ..... matrix.
  - a) null
  - b) diagonal
  - c) square
  - d) unit.
2. If  $(1 \ 2 \ 3 \ 4) x = (6)$ , then the order of  $x$  is
  - a)  $1 \times 4$
  - b)  $4 \times 1$
  - c)  $4 \times 4$
  - d)  $1 \times 1$ .

[ Turn over

3. If  $A$  and  $B$  are two matrices which satisfies  $A + B = B$ , then  $A$  is
- a) row matrix  
b) column matrix  
c) null matrix  
d) diagonal matrix.
4. In the figure,  $AD$  is the bisector of  $\angle A$ , then  $AC = ?$



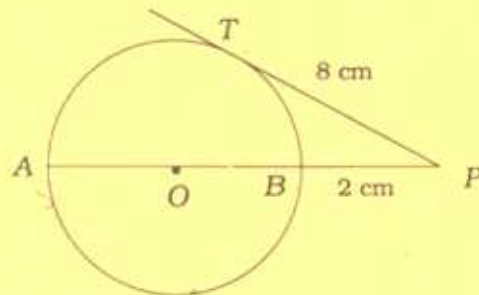
- a) 16  
b) 20  
c) 12  
d) 18.
5. If the ratio of the altitude of two similar triangles is  $4 : 5$ , then the ratio of their areas is
- a)  $1 : 2$   
b)  $16 : 25$   
c)  $4 : 5$   
d)  $5 : 4$ .
6. Two chords  $AB$  and  $CD$  cut internally at  $E$ . If  $AE = 6$  cm,  $EB = 8$  cm and  $EC = 4$  cm, then  $ED$  is equal to
- a) 14 cm  
b) 12 cm  
c) 10 cm  
d) 32 cm.
7. In  $\triangle ABC$ ,  $PQ$  is parallel to  $BC$ .  $AP = 3$  cm,  $PB = 6$  cm and  $AQ = 2$  cm. Then  $QC$  is equal to
- a) 6 cm  
b) 4 cm  
c) 1 cm  
d) 8 cm.





## SECTION - B

Answer any ten questions :

 $10 \times 2 = 20$ 21. Construct a  $3 \times 2$  matrix whose elements are given by  $a_{ij} = i + 2j$ .22. Solve :  $\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$ .23. In the figure,  $AB$  is a diameter of a circle and  $PT$  is a tangent to the circle. If  $PB = 2$  cm,  $PT = 8$  cm, calculate the radius of the circle.

24. If the bisector of an angle of a triangle bisects the opposite sides, prove that the triangle is isosceles.

25. The perimeter of two similar triangles  $ABC$  and  $PQR$  are respectively 36 cm and 24 cm. If  $PQ = 10$  cm, find  $AB$ .26. If the points  $(4, 1)$ ,  $(-2, -3)$  and  $(x, -5)$  are collinear, find  $x$ .27. Find the  $X$  and  $Y$  intercept of the line  $2x - 3y - 12 = 0$ .28. Write down the equation of the line perpendicular to  $3x + 8y = 12$  and passing through the point  $(-1, -2)$ .29. Find  $P$ , if the slope of a line joining  $(-5, 15)$  and  $(4, P)$  is  $-\frac{1}{9}$ .30. Prove that  $(1 + \cot^2 \theta)(1 - \cos \theta)(1 + \cos \theta) = 1$ .

31. Find the value of

$$\sin 60^\circ \cdot \cos 30^\circ - \cos 60^\circ \cdot \sin 30^\circ + 3 \cos 0^\circ + 5 \sin 90^\circ.$$

[ Turn over

32. Find  $A$ , if  $\tan A = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$ .
33. A ladder 24 m long leans on the top of the building making an angle  $30^\circ$  with the horizontal. Find the height of the building.
34. What is the probability that a leap year selected at random will have 53 Sundays ?
35. The variance of 65 scores is 64. If each of them is divided by 2, find the standard deviation and variance of the new scores.

### PART - II

- N. B. : i) This Part contains *four* Sections, **Section - C**, **Section - D**, **Section - E** and **Section - F**.
- ii) **Section - C** and **Section - E** contain 3 questions. Answer any *two* questions in each Section.
- iii) **Section - D** and **Section - F** contain 4 questions. Answer any *three* questions in each Section.
- iv) Each question carries *five* marks.

### SECTION - C

Answer any *two* questions :

$2 \times 5 = 10$

36. Prove that if a straight line is drawn parallel to one side of a triangle, it cuts the other two sides proportionally.
37. Prove that the line segments joining the mid-points of the adjacent sides of a rhombus form a rectangle.
38.  $ABCD$  is a trapezium with  $AB \parallel DC$ . The diagonal  $AC$  and  $BD$  intersect at  $E$ . If  $\triangle AED \parallel \triangle BEC$ , prove that  $AD = BC$ .

**SECTION - D**Answer any *three* questions : $3 \times 5 = 15$ 

39. If  $A = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$ ,  $B = \begin{pmatrix} -1 & -3 \\ -4 & -4 \end{pmatrix}$ , verify that  $(AB)^T = B^T A^T$ .

40. Find  $X$  and  $Y$ , if  $X + Y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix}$  and  $X - Y = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$ .

41. Find the variance of the following :

$x :$	10	15	18	20	25
$f :$	3	2	5	8	2

42. A natural number less than or equal to 25 is chosen. Find the probability that it is even or a multiple of 5.

**SECTION - E**Answer any *two* questions : $2 \times 5 = 10$ 

43. Find the value of  $\sin 45^\circ \cos 45^\circ + \tan 60^\circ \cos 30^\circ + \sin 90^\circ \cos 0^\circ$ .

44. Find the area of an isosceles triangle with base 10 cm and vertical angle  $47^\circ$ .

45. The shadow of a tower, when the angle of elevation of the sun is  $45^\circ$  is found to be 10 metres longer than when it is  $60^\circ$ . Find the height of the tower.

**SECTION - F**Answer any *three* questions : $3 \times 5 = 15$ 

46. Find the equation of the line passing through  $(-3, 10)$  and making intercepts  $a, b$  on the  $x, y$  axis whose sum is 8.

47. Write down the equation of the line perpendicular to  $3x + 8y = 12$  and passing through the point  $(-1, -2)$ .

[ Turn over

48. A line joining the points  $(2, 3)$  and  $(-1, 2)$  meets the line  $3x - 4y + 11 = 0$  at A. Find the coordinates of A.
49. Find the equation of the line which passes through  $(1, 1)$  and is concurrent with the lines  $x + y = 7$  and  $2x + y = 16$ .

### PART - III

- N. B. : i) **Section - G** of this Part contains 2 questions. Answer any *one* question.
- ii) Each question carries *ten* marks.

### SECTION - G

Answer any *one* question :

$1 \times 10 = 10$

50. Draw a circle of diameter 8 cm. Take a point  $P$  at a distance of 5.5 cm from its centre. Using the centre of the circle, draw two tangents to the circle. Measure the lengths of the tangents.
51. Construct a  $\Delta ABC$  such that  $AB = 6$  cm,  $m\angle C = 40^\circ$  and altitude from  $C$  to  $AB$  is of length 4 cm. Measure the length of the median through  $C$ .
-