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# MATHEMATICS — Paper II

Time Allowed: 2 1/2 Hours ]

[ Maximum | arks : 100

## PART - I

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

## SECTION - A

Choose the correct answer from the given alternatives:

 $20 \times 1 = 20$ 

1. If 
$$\begin{pmatrix} x+y & x-y \\ 7 & 6 \end{pmatrix} = \begin{pmatrix} 10 & 2 \\ 7 & z \end{pmatrix}$$
 then x, y, z are

a) 4, 6, 6

b) 6, 4, 6

c) 6, 6, 4

- d) 4, 4, 6.
- 2. If  $(1 \ 2 \ 3 \ 4) X = (6)$  then the order of X is
  - a) 1 × 4

b) 4 × 1

c) 4 × 4

d) 1 × 1.

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3. The n trix obtained by interchanging rows and columns of a matrix A is

a) - 1

b) A<sup>2</sup>

c) 1

d) A.

4. Two cords AB and CD of a circle intersect externally at P. If AP = 10 cm, CP = 0 cm and PD = 5 cm, then PB is,

a) 1 cm

b) 3 cm

c) 5 m

d) 6 cm.

5. Two c : les of radii 8.2 cm and 3.6 cm touch each other externally, the distance between their centres is

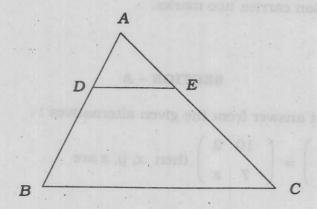
a) 4 cm

b) 11.8 cm

c) 4 cm

d) 1.8 cm.

6. In  $\triangle A$  ic,  $DE \mid\mid BC$ , AD = 2 cm, DB = 3 cm, AE = 3 cm, then AC =



a) 2 n

b) 5 cm

c) 4. cm

d) 7.5 cm.

7. If the 1 igths of the corresponding sides BC and QR of two similar triangles ABC are PQR are respectively 6 cm and 10 cm, then the ratio of the areas of  $\triangle ABC$  and  $\triangle PQR$  is

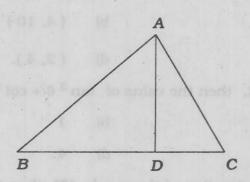
a) 3:5

b) 9:25

c) 25 9

d) 5:3.

8. In the given figure,  $\frac{AB}{AC} = \frac{BD}{DC}$ ,  $\angle B = 40^{\circ}$ ,  $\angle C = 60^{\circ}$ , then  $\angle I$   $D = 10^{\circ}$ 



a) 100°

b) 80°

c) 50°

- d) 40°.
- 9. The slope of the line 3x 2y = 6 is
  - a) 6

b)  $\frac{2}{3}$ 

c)  $\frac{3}{2}$ 

- d)  $-\frac{3}{2}$ .
- 10. The equation of the line passing through origin and parallel to the li

3x + 2y - 5 = 0 is

- a) 3x 2y + 5 = 0
- b) 2x + 3y = 0
- c) 3x + 2y = 0

- d) 2x 3y = 0.
- 11. The line 3x 2y + 6 = 0 meets Y-axis at the point
  - a) (2, 6)

b) (-2, -6)

c) (0,3)

- d) (3,0).
- 12. If lines ax 5y = 5 and 2x + y = 1 are perpendicular, then the value of a is
  - a) 2

b)  $\frac{5}{2}$ 

c)  $\frac{2}{5}$ 

d)  $\frac{1}{2}$ 

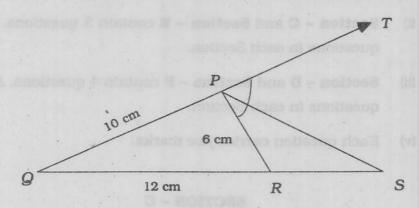
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13	. Th	point of intersection of $3x - y$	= 2 a	and $x + y =$	6 is
	a)	(4,4)	b)	(4, 10)	
	c)	(10, 4)	d)	(2, 4).	
14.	. If	$\sin \theta + \cot \theta = 2$ , then the value	of ta	an <sup>2</sup> θ + cot <sup>3</sup>	$^{2}\theta$ is
	a)	0	b)	1	
	c)	2	d)	4.	
15.	Witov	n the angle of elevation of the s r of height 60 metre is	sun is	45°, then t	he length of the shadow of
	a)	60√3 m	b) .	$\frac{60}{\sqrt{3}}$ m	°03 b
	c)	60 m	d)	120 m.	
16.	A c	cle is divided into 8 equal sect	ors. T	hen the tar	ngent of each angle at the
	a)	√3	b)	$\frac{1}{\sqrt{3}}$	g b.
	c)	all oils of fellows box cream the	d)	∞ .	
17.	The	alue of $\sin^2 18^\circ + \sin^2 72^\circ$ is			
	a)	- 1	b)	18	
	c)	72	d)	1. 0	
18.	If (	$-\cos^2\theta$ ) = $\frac{3}{4}$ then $\sin\theta$ =			
	a)	$\frac{\sqrt{3}}{2}$	b)	$\frac{1}{2}$	
	c)	10-2-6	d)	0.	18.2)
19.	The	robability of a sure event is			
	a)	wad and the the the the	b)	100	
	c)	ere perpendicular dica de	d)	0.1.	
20.	The	andard deviation is the		of variance.	2 6
	a)	ube	b)	square	
	c)	quare root	d)	cube root	

### SECTION - B

Answer any ten questions:

 $10 \times 2 = 20$ 

- 21. Define a scalar matrix with an example.
- 22. Find p, q, r, s, if  $\begin{pmatrix} -2 & p & 4 & 0 \\ 3 & 2 & q & 3 \end{pmatrix} = \begin{pmatrix} -2 & 3 & r & 0 \\ 3 & 2 & 1 & s \end{pmatrix}$ .
- 23. The perimeter of two similar triangles ABC and PQR are respectively 36 cm and 48 cm. If PQ = 16 cm, find AB.
- 24. AB and CD are two chords of a circle intersecting at E. If E is the mid-point of CD, then prove that  $AE \times EB = CE^2$ .
- 25. In the given figure, PS is the bisector of the exterior  $\angle RP'$  meeting QR produced at S. If PQ = 10 cm, PR = 6 cm and QR = 12 cm, find S



- 26. Find the area of the  $\triangle$  POQ, given P(3, 4), Q(7, 8) and O is the origin.
- 27. The line joining A(-4, 6) and B(-1, -3) is perpendicular to the line joining C(0, -4) and D(3, a). Find a.
- 28. Find the intercepts cut-off by the line 2x 3y + 5 = 0 on the ax.
- 29. Write down the equation of the line perpendicular to 3x + 8y = 12 and passing through the point (-1, -2).
- 30. Prove that  $\frac{\tan^3 \theta 1}{\tan \theta 1} = \sec^2 \theta + \tan \theta$ .

- 31. Veri that  $\sin 90^{\circ} = \sin 60^{\circ} \cos 30^{\circ} + \cos 60^{\circ} \sin 30^{\circ}$ .
- 32. The ngle of elevation of a ladder leaning against a wall is 60° and foot of the ladd is 9.5 cm away from the wall. Find the length of the ladder.
- 33. If s  $(A+B)=2\sin(A-B)=1$ , find A and B.
- 34. Whe is the probability that a number selected from the first 25 natural num ers is a prime number?
- 35. The andard deviation of 7 values is 15. If each value is decreased by 8, find stan ard deviation and variance of the new set of values.

## 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

Answ any two questions:

2 x 5 = 10

- 36. State ngle Bisector Theorem and prove it.
- 37. L be point on the side QR of  $\triangle$  PQR. If LM and LN are drawn parallel to PR and ( ) meeting QP, PR at M, N respectively and MN meets produced QR in T, prove that  $LT^2 = RT \cdot QT$ .
- 38. Prove hat the ratio of the corresponding altitudes of two similar triangles is equal of the ratio of their corresponding sides.

### SECTION - D

Answer any three questions:

 $3 \times 5 = 15$ 

39. Prove that 
$$(x \ y) \begin{pmatrix} a & h \\ h & b \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = (ax^2 + 2hxy + by^2)$$
.

40. Find X and Y, if 
$$2X + Y = \begin{pmatrix} 4 & 4 & 7 \\ 7 & 3 & 4 \end{pmatrix}$$
 and  $X - 2Y = \begin{pmatrix} -3 & 2 & 1 \\ 1 & 1 & 2 \end{pmatrix}$ .

41. Find the variance of the following:

C.I.	20 - 30	30 - 40	40 - 50	50 - 60
f:	8	6	5	4

42. A number is selected at random from 40 to 80. Find the probabil y that it is divisible by 6 or 9.

## SECTION - E

Answer any two questions:

 $2 \times 5 = 10$ 

43. 
$$\frac{1}{\sec A + \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A - \tan A}$$

44. If 
$$\csc \phi = \sqrt{2}$$
, show that  $\frac{2 \sin^2 \phi + 3 \cot^2 \phi}{4 (\tan^2 \phi - \cos^2 \phi)} = 2$ .

45. From the top of a tree the angle of depression of an object on the horizontal ground is found to be 60°. On descending 20 ft from the top of the tree the angle of depression of the object is found to be 30°. Find the height of the tree.

#### SECTION - F

Answer any three questions:

 $3 \times 5 = 15$ 

- 46. Obtain the equation of the straight line passing through the intersaction of the lines x + 3y = 1 and x 2y + 4 = 0 and parallel to 3x + 4y = 0.
- 47. Without using distance formula, show that the points P(3, 2), (0, -1), R(-3, -2) and S(0, 1) are the vertices of a parallelogram.

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- 48. A (4 1), B (7, 4) and C (5, -2) are the vertices of  $\triangle$  ABC. Find the equation of the altitude through A.
- 49. Find the circumcentre of the  $\triangle$  PQR whose vertices are P(5, 1), Q(4, 4), R(4, 2).

## PART - III

- 1 B.: i) This Part contains Section G.
  - ii) Answer any one question.
  - iii) Each question carries ten marks.

#### SECTION - G

Answe any one question:

 $1 \times 10 = 10$ 

- 50. Draw circle of radius 2 cm. Take a point P at a distance of 4.5 cm from its centre From P, draw 2 tangents to the circle (using the centre). Calculate the length f the tangents and verify it.
- 51. Constitute at  $\triangle PQR$  in which PQ = 6 cm,  $m \angle R = 50^{\circ}$  and the median through R is 5. cm. Find the length of the altitude from A.