

MATHEMATICS, Paper - II

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.]

[Maximum Marks : 40

Instructions :

1. 15 minutes of time is allotted exclusively for reading the Question Paper and 2.30 hours for writing the answers.
2. **Part - A** answers should be written in separate answer book. Write the answers to the questions under Part-B on the question paper itself and attach it to the answer book of Part-A.
3. There are **three** sections in **Part-A**.
4. Answer **all** the questions.
5. Every answer should be written visibly and clearly.
6. There is internal choice in section - III

Part - A

Time : 2 Hours

Marks : 30

SECTION - I

(Marks : 4×1=4)

Note :

- (i) Answer **all** the questions.
 - (ii) Each question carries **1** mark.
1. A page is opened at random from a book containing 100 pages. Find the probability that the page number is a perfect square.
 2. Write two properties of similar triangles.
 3. Find the distance between $(a \cos \theta, 0)$ and $(0, a \sin \theta)$.
 4. Evaluate
 - (i) $\cos 76^\circ - \sin 14^\circ$,
 - (ii) $\frac{\tan 73^\circ}{\cot 17^\circ}$.

SECTION - II

(Marks : 5×2=10)

Note :

- (i) Answer **all** the questions.
- (ii) Each question carries **2** marks.

5. Find the point on X - axis, which is equidistant from (2, - 5) and (- 2, 9).
6. If a circle touches all the four sides of a quadrilateral ABCD at the points P, Q, R and S; then prove that $AB + CD = BC + DA$.
7. One card is drawn from a well - shuffled deck of cards. Find the probability of getting
- (i) an ace.
 - (ii) a red king.
8. Write the formula for Median of a grouped data and explain each letter in it.
9. If $\tan A = \frac{1}{\sqrt{3}}$ and $\tan B = \sqrt{3}$,
then find $\sin A \cdot \cos B + \cos A \cdot \sin B$. ($A, B < 90^\circ$).

SECTION - III

(Marks : 4×4=16)

Note :

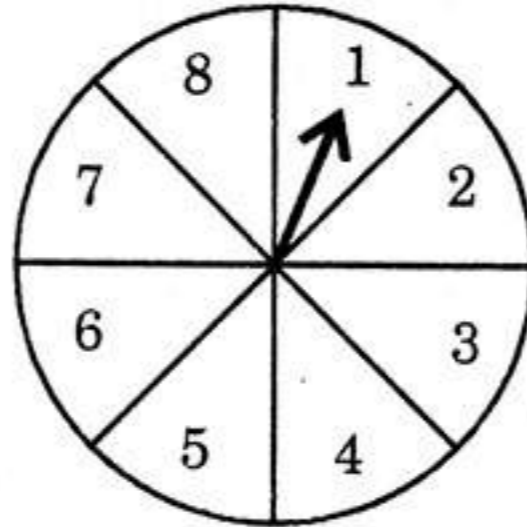
- (i) Answer **all** the questions.
- (ii) Choose any **one** from each question.
- (iii) Each question carries **4** marks.

10. (a) Prove that
 $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.

OR

- (b) Prove that the sum of the squares of the sides of a Rhombus is equal to the sum of the squares of its diagonals.

11. (a) A game consists of spinning an arrow, which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at
- (i) 8? (ii) an odd number?
- (iii) a number greater than 2? (iv) a number less than 9?



OR

- (b) The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹ 18. Find the missing frequency f .

Daily pocket allowance (in ₹)	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Number of children	7	6	9	13	f	5	4

12. (a) Find the area of the triangle formed by the points (2, 3), (-1, 3) and (2, -1) using Heron's formula.

OR

- (b) Two poles of equal heights are standing opposite to each other on the either side of a road, which is 120 feet wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distance of the point from the poles.

13. (a) Construct a triangle of sides 4 cm, 5 cm and 6 cm. Then construct a triangle similar to it, whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

OR

- (b) Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle.



16E(B)

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NOTE :

*Write the answers to the questions under **Part-B** on the question paper itself and attach it to the answer book of **Part-A**.*

Part - B

Time : 30 minutes

Marks : 10

SECTION - IV

Write the CAPITAL LETTERS (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

Instructions :

- (i) Answer **all** the questions.
- (ii) Each question carries $\frac{1}{2}$ mark.
- (iii) Marks will **not** be awarded in any case of over-written, rewritten or erased answers.

14. If $4 \cos^2 \theta - 3 = 0$, then $\sin \theta = \dots$ []

(A) $\frac{1}{2}$

(B) $-\frac{1}{2}$

(C) $\frac{1}{\sqrt{2}}$

(D) $\frac{\sqrt{3}}{2}$

15. PA and PB are two tangents drawn to a circle with centre O from an external point P. If $\angle APB = 30^\circ$, then $\angle AOB = \dots$ []
 (A) 60° (B) 90°
 (C) 70° (D) 150°
16. Median of the scores 1, 3, 5, 7, 9,, 99 is []
 (A) 51 (B) 50
 (C) 49 (D) 48
17. If $\operatorname{cosec} \theta + \cot \theta = 2$, then $\cos \theta = \dots$ []
 (A) $\frac{3}{5}$ (B) $\frac{4}{5}$
 (C) $\frac{5}{3}$ (D) $\frac{6}{5}$
18. If a die is rolled, then the probability of getting a prime number is []
 (A) $\frac{2}{5}$ (B) $\frac{1}{3}$
 (C) $\frac{1}{2}$ (D) $\frac{1}{6}$
19. If the angle of elevation of Sun is 45° , then the length of the shadow of a 12 m high tree is []
 (A) $12\sqrt{3}$ m (B) 16 m
 (C) 12 m (D) $\frac{12}{\sqrt{3}}$ m
20. The nearest point to origin is []
 (A) (2, -3) (B) (5, 0)
 (C) (0, -5) (D) (1, 3)
21. Which of the following cannot be the probability of an event? []
 (A) 0.2 (B) $\frac{2}{5}$
 (C) 0.72 (D) $1.\bar{3}$

22. If a line is passing through (2, 3) and (2, -3), then []
- (1) the line is parallel to X - axis.
 (2) the line is parallel to Y - axis.
 (3) the slope of the line is not defined.
 (4) the slope of the line is zero.
- (A) 2 and 3 are correct. (B) 1 and 2 are correct.
 (C) 1 and 3 are correct. (D) 2 and 4 are correct.

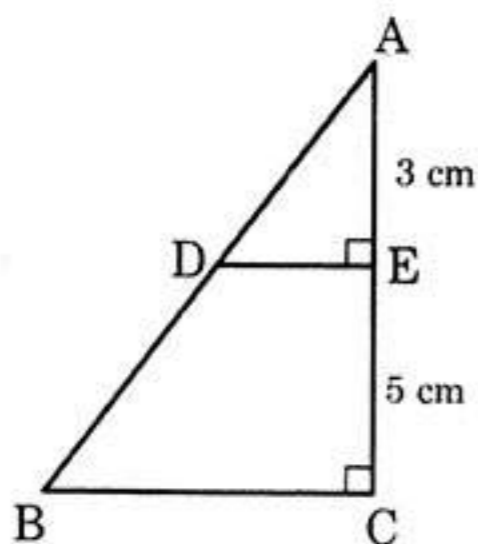
23. The number of parallel tangents of a circle with a given tangent is []
- (A) 1 (B) 2
 (C) 0 (D) infinite

24. If $P(E) = 0.09$, then $P(\text{not } E)$ in percentage is []
- (A) 9.1 % (B) 91 %
 (C) 0.91 % (D) 0.091 %

25. The altitude of an equilateral triangle of side 'x' cm is cm. []
- (A) $\frac{\sqrt{3}}{2} x$ (B) $\frac{2}{\sqrt{3}} x$
 (C) $\frac{\sqrt{3}}{4} x^2$ (D) $\frac{\sqrt{3}}{2} x^2$

26. If $\cos(A + B) = 0$, $\cos B = \frac{\sqrt{3}}{2}$, then $A = \dots\dots$ []
- (A) 15° (B) 60°
 (C) 30° (D) 45°

27. From the given figure,
 $ar(\triangle ADE) : ar(\triangle ABC) = \dots\dots$ []



- (A) 25 : 9
 (B) 9 : 64
 (C) 25 : 64
 (D) 9 : 25

28. The mode of the values $\sin 0^\circ$, $\cos 0^\circ$, $\sin 90^\circ$ and $\tan 45^\circ$ is []
- (A) 0 (B) $\sqrt{3}$
 (C) 1 (D) $\frac{1}{\sqrt{2}}$

29. Match the following : []

Set - A

Set - B

1. If the median of $\frac{x}{5}, \frac{x}{3}, \frac{x}{4}$ is 5, then $x = \dots$ (p) 15
2. Mean of the scores $1 - x, 1, x + 1$ is (q) 20
3. If the mode of $x, \frac{x}{2}, \frac{x}{2}, \frac{x}{3}, \frac{x}{3}, \frac{x}{3}$ is 5, then $x = \dots$ (r) 1

- (A) $1 \rightarrow r, 2 \rightarrow p, 3 \rightarrow q$ (B) $1 \rightarrow q, 2 \rightarrow r, 3 \rightarrow p$
- (C) $1 \rightarrow q, 2 \rightarrow p, 3 \rightarrow r$ (D) $1 \rightarrow p, 2 \rightarrow r, 3 \rightarrow q$

30. The point (0, 5) lies on []

- (A) Both X and Y - axis. (B) Origin.
- (C) Y - axis. (D) X - axis.

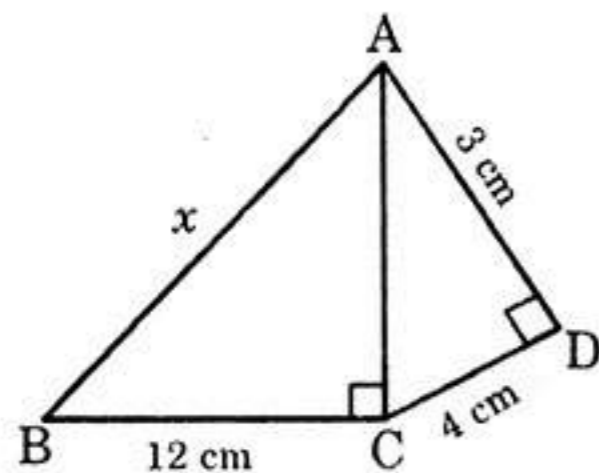
31. In $\triangle ABC$, E and F are the points on the sides AB and AC respectively. If $AE = 2$ cm, $EB = 2.5$ cm, $AF = 4$ cm and $FC = 5$ cm, then []

- (A) $EF \perp BC$ (B) $EF \perp AB$
- (C) $EF \parallel BC$ (D) $EF \parallel AB$

32. If $A(\log_2 8, \log_5 25)$ and $B(\log_{10} 10, \log_{10} 100)$, then the mid-point of AB is []

- (A) (2, 2) (B) (3, 2)
- (C) (1, 2) (D) (4, 4)

33. From the given figure, the value represented by 'x' is []



- (A) 12 cm
- (B) 11 cm
- (C) 13 cm
- (D) 16 cm