New Pattern

16E(A)

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) $\cos 76° - \sin 14°$,

   (ii) $\dfrac{\tan 73°}{\cot 17°}$.

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 $\tan A = \dfrac{1}{\sqrt{3}}$ and $\tan B = \sqrt{3}$,

    then find $\sin A \cdot \cos B + \cos A \cdot \sin B$. $(A, B < 90°)$.

Note :

    (i)   Answer **all** the questions.

    (ii)   Choose any **one** from each question.

    (iii) Each question carries **4** marks.

10.   (a) Prove that

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

<div align="center">OR</div>

    (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.
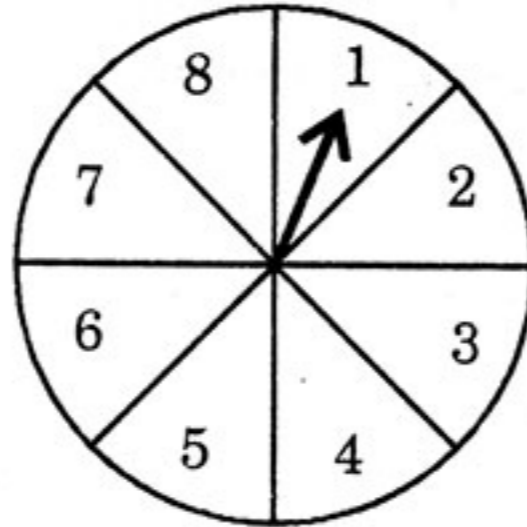
11. *(a)* A game consists of spinning an arrow, which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at .....

    (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.

———————

New Pattern

16E(B)

MATHEMATICS, Paper - II
(English version)
(Parts A and B)

Time : 2 hrs. 45 min.]   *[Maximum Marks : 40*

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 = $ .....   [   ]

   (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 $\angle APB = 30°$, then $\angle AOB = $ ......   [   ]

(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 = $ ......   [   ]

(A) $\dfrac{3}{5}$ (B) $\dfrac{4}{5}$

(C) $\dfrac{5}{3}$ (D) $\dfrac{6}{5}$

18. If a die is rolled, then the probability of getting a prime number is ....   [   ]

(A) $\dfrac{2}{5}$ (B) $\dfrac{1}{3}$

(C) $\dfrac{1}{2}$ (D) $\dfrac{1}{6}$

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) $\dfrac{12}{\sqrt{3}}$ 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) $\dfrac{2}{5}$

(C) 0.72   (D) $1.\overline{3}$

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.
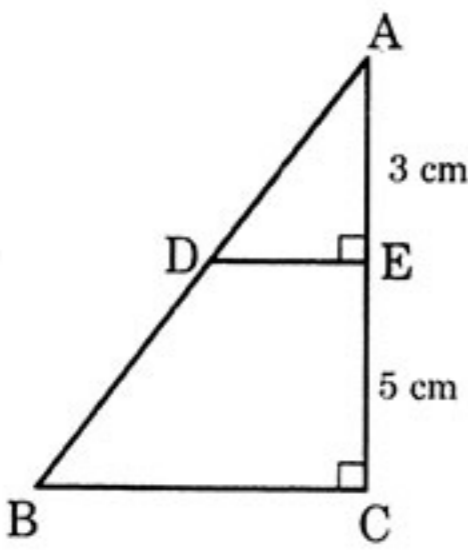   (C)   1 and 3 are correct.   (D)   2 and 4 are correct.

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 (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) $\dfrac{\sqrt{3}}{2} x$ (B) $\dfrac{2}{\sqrt{3}} x$

    (C) $\dfrac{\sqrt{3}}{4} x^2$ (D) $\dfrac{\sqrt{3}}{2} x^2$

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

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

    (A) $25 : 9$

    (B) $9 : 64$

    (C) $25 : 64$

    (D) $9 : 25$

28. The mode of the values $\sin 0°$, $\cos 0°$, $\sin 90°$ and $\tan 45°$ is ..... [   ]
    (A)   0   (B) $\sqrt{3}$

    (C)   1   (D) $\dfrac{1}{\sqrt{2}}$

29. Match the following : [   ]

Set - A	Set - B

1. If the median of $\dfrac{x}{5}, \dfrac{x}{3}, \dfrac{x}{4}$ is 5, then $x =$ ..... (p) 15

2. Mean of the scores $1 - x, 1, x + 1$ is ..... (q) 20

3. If the mode of $x, \dfrac{x}{2}, \dfrac{x}{2}, \dfrac{x}{3}, \dfrac{x}{3}, \dfrac{x}{3}$ is 5, then $x =$ .... (r) 1

(A) $1 \to r, \ 2 \to p, \ 3 \to q$ (B) $1 \to q, \ 2 \to r, \ 3 \to p$

(C) $1 \to q, \ 2 \to p, \ 3 \to r$ (D) $1 \to p, \ 2 \to r, \ 3 \to q$

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) $EF \perp AB$
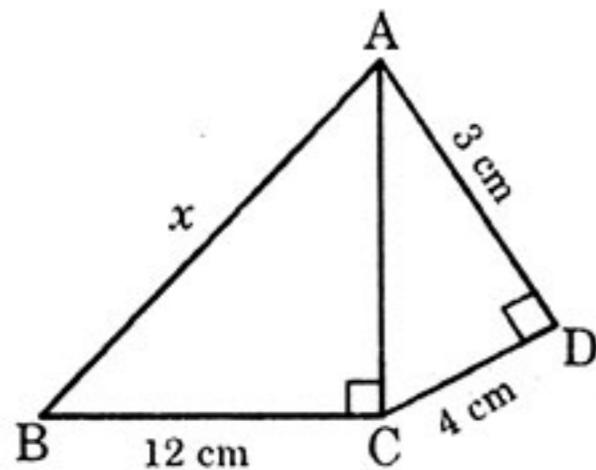(C) $EF \| BC$ (D) $EF \| AB$

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