This Question Paper contains 8 Printed Pages.

New Syllabus

16E

MATHEMATICS, Paper - II

(Similar triangles, Tangents and Secants to a Circle, Mensuration, Trigonometry, Applied Trigonometry, Probability and Statistics)
(English version)

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

Instructions :

1. *Read the whole question paper and understand every question thoroughly without writing anything and 15 minutes of time is allotted for this.*
2. *Answer **all** the questions from the given **four** sections I, II, III and IV.*
3. *Write answers to the objective type questions on the answer-sheet only.*
4. *In section - III, every question has internal choice, answer **any one** alternative.*

SECTION - I

(Marks : 7×1=7)

NOTE : *Answer **all** the questions. Each question carries **1** mark.*

1. If a cylinder and a cone are of the same radius and height, then how many cones full of milk can fill the cylinder ? Answer with reasons.

2. In a ΔDEF ; A, B and C are the mid-points of EF, FD and DE respectively. If the area of ΔDEF is 14.4 cm^2, then find the area of ΔABC.

3. When a die is rolled once unbiased, what is the probability of getting a multiple of 3 out of possible outcomes ?

4. Show that $\tan^2\theta - \frac{1}{\cos^2\theta} = -1$.

5. How many tangents can be drawn to a circle from a point on the same circle ? Justify your answer.

6.

Class Interval	10-25	25-40	40-55	55-70	70-85	85-100
Frequency	2	3	7	6	6	6

How do you find the deviation from the assumed mean for the above data ?

7. A person from the top of a building of height 25 m. has observed another building's top and bottom at an angle of elevation 45° and at an angle of depression 60° respectively. Draw a diagram for this data.

SECTION - II

(Marks : 6×2=12)

NOTE : *Answer* ***all*** *the questions. Each question carries* **2** *marks.*

8. A ladder of 3.9 m length is laid against a wall. The distance between the foot of the wall and the ladder is 1.5 m. Find the height at which the ladder touches the wall.

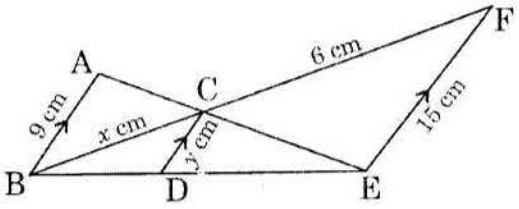
9. There are 12 red balls, 18 blue balls and 6 white balls in a box. When a ball is drawn at random from the box, what is the probability of not getting a red ball ?

10. Prove that "in two concentric circles, a chord of the bigger circle, that touches the smaller circle is bisected at the point of contact with the smaller circle."

11. Show that $\left(1+\cot^2\theta\right)(1-\cos\theta)(1+\cos\theta)=1$.

12. The radius of a spherical balloon increases from 7 cm to 14 cm as air is pumped into it. Find the ratio of the volumes of the balloon before and after pumping the air.

13. Observe the below diagram and find the values of x and y.



SECTION - III

(Marks 4×4=16)

NOTE :

1. *Answer **all** the questions.*
2. *Each question has internal choice to answer.*
3. *Each question carries 4 marks.*

14. In a village, an enumerator has surveyed for 25 households. The size of the family (number of family members) and the number of families is tabulated as follows :-

Size of the family (No. of members)	1-3	3-5	5-7	7-9	9-11
No. of families	6	7	9	2	1

Find the mode of the data.

OR

There are 100 flash cards labelled from 1 to 100 in a bag. When a card is drawn from the bag at random, what is the probability of getting ....

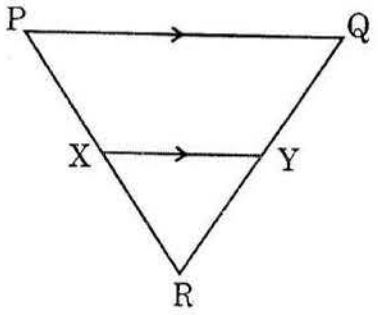
(i) a card with prime number from possible outcomes.

(ii) a card without prime number from possible outcomes.

15. Find the value of $\frac{\sec 15^\circ}{\text{cosec } 75^\circ} + \frac{\sin 72^\circ}{\cos 18^\circ} - \frac{\tan 33^\circ}{\cot 57^\circ}$

OR

Observe the figure given below :



In ΔPQR, if $XY \parallel PQ$, $\frac{PX}{XR} = \frac{5}{3}$ and $QR = 7.2$ cm, then find the length of RY.

16. An observer flying in an aeroplane at an altitude of 900 m observes two ships in front of him, which are in the same direction at an angles of depression of 60° and 30° respectively. Find the distance between the two ships.

OR

A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. If the length of the cylinderical part of the capsule is 14 mm and the diameter of hemisphere is 6 mm, then find the volume of medicine capsule.

17. Draw a circle with radius 3 cm and construct a pair of tangents from a point 8 cm away from the centre.

OR

Daily expenditure of 25 householders is given in the following table :

Daily expenditure of a household (in rupees)	100-150	150-200	200-250	250-300	300-350
No. of households	4	5	12	2	2

Draw a "less than type" cumulative frequency Ogive curve for this data.

SECTION - IV

(Marks : 10 × ½ = 5)

NOTE :

1. *Answer **all** the questions.*
2. *Read the following. Choose the correct option and write A, B, C or D in your answer booklet.*

18. When we construct a triangle similar to a given triangle as per given scale factor, we construct on the basis of .....

(A) SSS similarity.

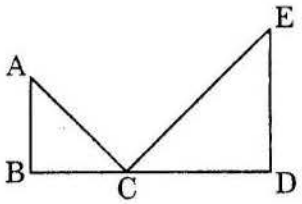
(B) AAA similarity.

(C) Basic proportionality theorem.

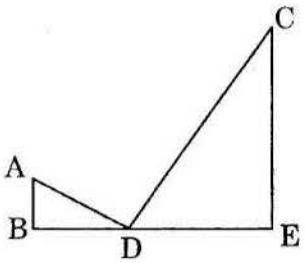
(D) A and C are correct.

19. If $\Delta ABC \sim \Delta EDC$, then which of the following representation of figures is true ?

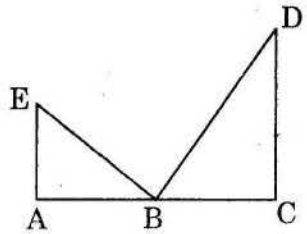
(A)



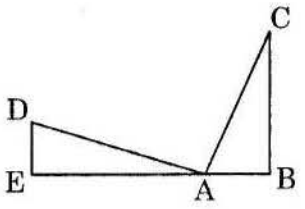
(B)



(C)



(D)



20. The number of pair of tangents can be drawn to a circle, which are parallel to each other, are .....

(A) 0

(B) 2

(C) 4

(D) infinite

21. For a right circular cone with radius = r, height = h and slant height = l, which of the following is not true ?

(A) Always $l > h$

(B) Always $l > r$

(C) Always $r > \pi$

(D) $l^2 = r^2 + h^2$

22. If $\cot A = \frac{5}{12}$, then $\sin A + \cos A$ is .....

(A) $\frac{17}{13}$

(B) $\frac{12}{13}$

(C) $\frac{5}{13}$

(D) $\frac{20}{13}$

23. Which of following values is not a possible value of $\sin x$?

(A) $\frac{3}{4}$

(B) $\frac{3}{5}$

(C) $\frac{4}{5}$

(D) $\frac{5}{4}$

24. A ladder 'x' meters long is laid against a wall making an angle 'θ' with the ground. If we want to directly find the distance between the foot of the ladder and the foot of the wall, which trigonometrical ratio should be considered ?

(A) $\sin \theta$

(B) $\cos \theta$

(C) $\tan \theta$

(D) $\cot \theta$

25. If $P(E) = 0.82$, then $P(\overline{E}) = ...$

(A) 0.18

(B) 0.28

(C) 0.38

(D) $P(E) = P(\overline{E})$

26. In "more than Ogive curve", we consider in drawing .....

(A) more than cumulative frequency, lower limits.

(B) more than cumulative frequency, upper limits.

(C) less than cumulative frequency, lower limits.

(D) less than cumulative frequency, upper limits.

27. Observe the following tables :-

(1)

Class Interval	Frequency *(f)*	Class mark *(x)*	*fx*

(2)

Class Interval	Frequency *(f)*	Lower limit *(x)*	*fx*

For finding Arithmatic Mean by Direct method, the suggested frequency distribution table is .....

(A) Only (1) is true.

(B) Only (2) is true.

(C) (1) and (2) are true.

(D) None of the above.
