This Question Paper contains 4 printed pages. **16E (A)**

MATHEMATICS, Paper-II

(English Version)

Parts A and B

Time : 2½ Hours **Maximum Marks : 50**

Instructions :

1. *Answer the questions under **Part 'A'** on a separate answer book.*
2. *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 A

Time : 2 Hours ***Marks : 35***

SECTION I **5 × 2 = 10**

Notes : 1. Answer **any five** questions, choosing at least **two** from each of the following groups, i.e. Group ***A*** and ***B***.

2. Each question carries **two** marks.

Group - A

(Similar Triangles, Tangents and Secants to a Circle, Mensuration)

1. A flag pole 4 m tall casts a 6 m shadow. At the same time, a nearby building casts a shadow of 24 m. How tall is the building?

2. Prove that "The lengths of the tangents drawn from an external point to a circle are equal".

3. A solid iron rod has a cylindrical shape. Its height is 11 cm and base diameter is 7 cm. Then find the total volume of 50 rods.

4. Find the volume of the largest right circular cone that can be cut out of a cube whose edge is 7cm.

Group - B

(Trigonometry, Applications of Trigonometry, Probability and Statistics)

5. The marks obtained by 20 students of class X of a certain school are given below. Find the mean marks obtained by the students.

Marks obtained (x_i)	5	10	15	20	35	40	50
Number of students (f_i)	1	4	5	2	4	3	1

6. A Kiddy bank contains hundred 50 p coins, fifty ₹ 1 coins, twenty ₹ 2 coins and ten ₹ 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50 p coin? (ii) will not be a ₹ 5 coin?

7. If $Sin(A-B)=\frac{1}{2}$, $Cos(A+B)=\frac{1}{2}$, $0^0 < A+B \leq 90^0$, and $A > B$, then find A and B.

8. If $TanA = CotB$, where A and B are acute angles, prove that $A+B=90^0$.

SECTION II

$4 \times 1 = 4$

Notes : 1. Answer **any four** of the following six questions.

2. Each question carries **one** mark.

9. Calculate the length of the tangent from a point 13 cm away from the center of a circle of radius 5 cm.

10. Find the volume of a sphere of radius 21 cm.(Take $\pi = \frac{22}{7}$)

11. Can $\frac{7}{2}$ be the probability of an event? Justify.

12. Write the formula for mode of a grouped data. Explain about the symbols with their usual meanings.

13. If $P(E) = \frac{3}{4}$, what is the probability of "not E"?

14. If $Cos\,A = \frac{12}{13}$, then find $Sin\,A$.

SECTION III

$4 \times 4 = 16$

Notes : 1. Answer **any four** questions, choosing at least **two** from each of the following groups, i.e. Group ***A*** and ***B***.

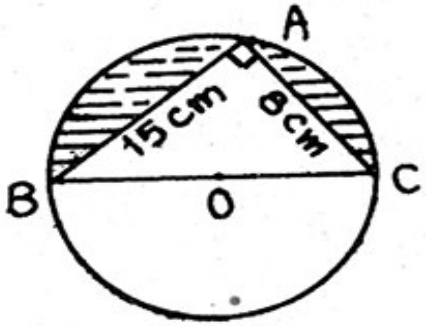
2. Each question carries **four** marks.

Group - A

(Similar Triangles, Secants and Tangents to a Circle, Mensuration)

15. Prove that "In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides".

16. Find the area of the segments shaded in the figure, if AB = 15 cm, AC = 8 cm and BC is the diameter of the circle with center 'O'. (Take $\pi = \frac{22}{7}$)



17. A self help group wants to manufacture joker's caps (conical caps) of 3 cm radius and 4 cm height. If the available color paper sheet is 1000 cm^2, then how many caps can be manufactured from that paper sheet?

18. How many spherical balls can be made out of a solid cube of lead, whose edge measures 44 cm and each ball being 4 cm in diameter?

Group - B

(Trigonometry, Applications of Trigonometry, Probability and Statistics)

19. If $Cosec\,\theta + Cot\,\theta = K$, then prove that $Cos\,\theta = \frac{K^2 - 1}{K^2 + 1}$.

20. The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in Kg)	40–45	45–50	50–55	55–60	60–65	65–70	70–75
Number of students	2	3	8	6	6	3	2

21. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground by making 30^0 angle with the ground. The distance between the foot of the tree and the top of the tree on the ground is 6 m. Find the height of the tree before falling down.

22. Two dice, one red and one yellow, are thrown at the same time. Write all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8 (ii) 13 (iii) less than or equal to 12?

SECTION IV

1 × 5 = 5

Notes : 1. Answer **any one** of the following questions.

2. The question carries **five** marks.

23. 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.

24. Two men on either side of a temple of 30 m height, observe its top at the angles of elevation 30^0 and 60^0 respectively. Find the distance between the two men.

This Question Paper contains 4 printed pages.

16E (B)

MATHEMATICS, Paper-II

(English Version)

Parts A and B

Time : 2½ Hours **Maximum Marks : 50**

Part B

Attach **Part 'B'** question paper to the main answer book of **Part 'A'**.

Time : 30 Minutes ***Marks : 15***

Instructions :

1. *Answer **all** the questions.*
2. *Each question carries ½ mark.*
3. *Answers are to be written in the question paper only.*
4. *Marks will not be awarded in case of any overwriting, rewriting or erased answers.*

I. Write the 'CAPITAL LETTER' showing the correct answer for the following questions in the brackets provided against each question. **10 × ½ = 5**

1. $\Delta ABC \sim \Delta DEF$ and their areas are respectively 64 cm^2 and 121 cm^2, then $\frac{BC}{EF}$ = ... [ ]

(A) $\frac{11}{8}$ (B) $\frac{8}{11}$

(C) $\frac{64}{121}$ (D) $\frac{121}{64}$

2. If the volume of a cube is 216 cm^3, then its side is ..... cm. [ ]

(A) 6 (B) 4

(C) 8 (D) 16

3. $Tan\,26^0 \cdot Tan\,64^0$ = ... [ ]

(A) 0 (B) 1

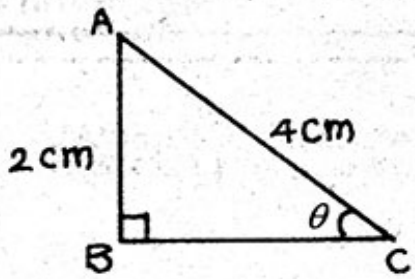
(C) 90 (D) 180

4. The mid value of the class 10–19 is ..... [ ]

(A) 12.5 (B) 13.5

(C) 14.5 (D) 24.5

5. The angle 'θ' in the figure = ... [ ]



(A) 30^0

(B) 45^0

(C) 60^0

(D) 90^0

6. The probability of getting a head when a coin is tossed once is .... [ ]

(A) 0 (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) 1

7. Which one of the following can not be the probability of an event? [ ]

(A) 0.7 (B) $\frac{2}{3}$ (C) -1.5 (D) $\frac{4}{5}$

8. $\frac{1-Tan^2 45^0}{1+Tan^2 45^0} =$ ..... [ ]

(A) $Tan\,90^0$ (B) 1

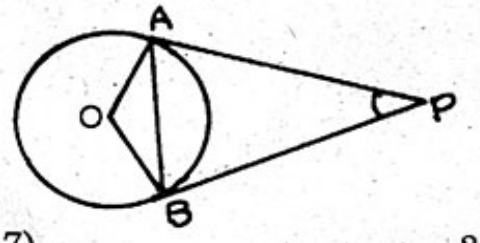
(C) $Sin\,45^0$ (D) 0

9. The curved surface area of a right circular cylinder is ..... sq. units. [ ]

(A) $\pi r^2 h$ (B) $2\pi r(h+r)$

(C) $2\pi rh$ (D) πrl

10. In the figure, AP and BP are two tangents drawn to a circle with center 'O'. If $\angle OAB = 30^0$, then $\angle APB =$ ..... [ ]



(A) 90^0

(B) 60^0

(C) 45^0

(D) 30^0

II. Fill in the blanks with the suitable answers. **$10 \times ½ = 5$**

Each question carries ½ mark.

11. In ΔPQR, $PQ^2 = PR^2 + QR^2$, then $\angle R$ = ... degrees.

12. The mode of 16, 15, 17, 16, 15, x, 19, 17, 14, is 15, then x = ...

13. A cylinder and cone have bases of equal radii and are of equal heights. Then the ratio of their volumes is .....

14. The probability of getting an odd prime number when a dice is thrown once is .....

15. If a circle touches all the four sides of a quadrilateral $ABCD$, then $AB + CD$ = ...

16. From the letters of the word "MASTER", a letter is selected. The probability that the letter is a vowel is .....

17. ..... can be calculated from the point of intersection of two ogives.

18. The surface area of a ball of radius 7 cm is ..... cm^2.

19. $(Sec\,A + Tan\,A) = P$, then $(Tan\,A - Sec\,A)$ = ...

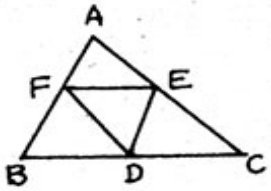
20. The length of the shadow of a vertical pole is equal to its height. Then the angle of elevation of the sun = ... degrees.

III. Match the following by writing the letter of the correct answer in the brackets, choosing from **Group B**.

'A' $5 \times \frac{1}{2} = 2\frac{1}{2}$

Group 'A'		*Group 'B'*
21. A ladder 25 m long reaches a window of building 20 m above the ground. The distance between the foot of the ladder from the building is ..... m. [ ]	(A)	Perpendicular
	(B)	1
	(C)	Parallel
	(D)	15
22. For $0^0 \le A \le 90^0$, the maximum value of $Sin\,A =$ ..... [ ]	(E)	$Cot\,A$
23. $\frac{Tan\,A}{Sec\,A} =$ ..... [ ]	(F)	$Sin\,A$
24. The tangents to a circle at the end points of a diameter are ..... [ ]	(G)	$Cos\,A$
25. $Tan(90^0 - A) =$ ..... [ ]	(H)	10

'B' $5 \times \frac{1}{2} = 2\frac{1}{2}$

Group 'A'		*Group 'B'*
26. The curved surface area of a right circular cone of radius and slant height 4 cm and 7 cm respectively is ..... cm^2 [ ]	(I)	4 : 1
	(J)	0
	(K)	1
27.  D, E, F are the mid points of the sides of ΔABC, then the ratio of the areas of ΔDEF and $\Delta ABC =$ ..... [ ]	(L)	88
	(M)	1 : 4
28. $Cos\,60^0 Cos\,30^0 - Sin\,60^0 Sin\,30^0 =$ ..... [ ]	(N)	Rectangle
29. $Cot\,1^0 \cdot Cot\,2^0 \cdot Cot\,3^0 ..... \cdot Cot\,89^0 =$ ..... [ ]	(O)	66
30. Parallelogram circumscribing a circle is a ..... [ ]	(P)	Rhombus