This Question Paper contains 4 Printed Pages.

16E(A)

MATHEMATICS, Paper - II

(English version)

Parts A and B

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

Instructions :

1. *In the time duration of 2 hours 45 minutes, 15 minutes of time is allotted to read and understand the Question paper.*
2. *Answer the Questions under **'Part-A'** on a separate answer book.*
3. *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**

NOTE :

1. *Answer all the questions from the given three Sections - I, II and III of **Part - A.***
2. *In Section - III, every question has internal choice. Answer any **one** alternative.*

SECTION - I *(Marks : 7×1=7)*

NOTE :

(i) Answer all the questions.

*(ii) Each question carries **1** mark.*

1. If $\sin A = \frac{1}{\sqrt{2}}$ and $\cot B = 1$, prove that $\sin(A + B) = 1$, where A and B both are acute angles.

2. The length of the minute hand of a clock is 3.5 cm. Find the area swept by minute hand in 30 minutes. (use $\pi = \frac{22}{7}$)

3. Express $\cos\theta$ in terms of $\tan\theta$.

4. From the first 50 natural numbers, find the probability of randomly selected number is a multiple of 3.

5. Write the formula to find curved surface area of a cone and explain each term in it.

6. "The median of observations, $-2, 5, 3, -1, 4, 6$ is 3.5". Is it correct ? Justify your answer.

7. If $\cos\theta = \frac{1}{\sqrt{2}}$, then find the value of $4 + \cot\theta$.

SECTION - II

(Marks 6×2=12)

NOTE :

(i) Answer all the questions.

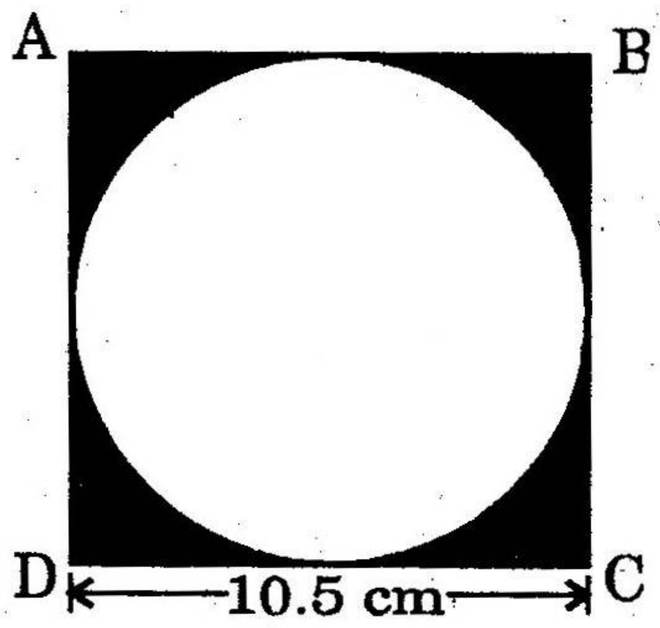
(ii) Each question carries 2 marks.

8. The diameter of a solid sphere is 6 cm. It is melted and recast into a solid cylinder of height 4 cm. Find the radius of cylinder.

9. Write the formula of mode for grouped data, and explain each term in it.

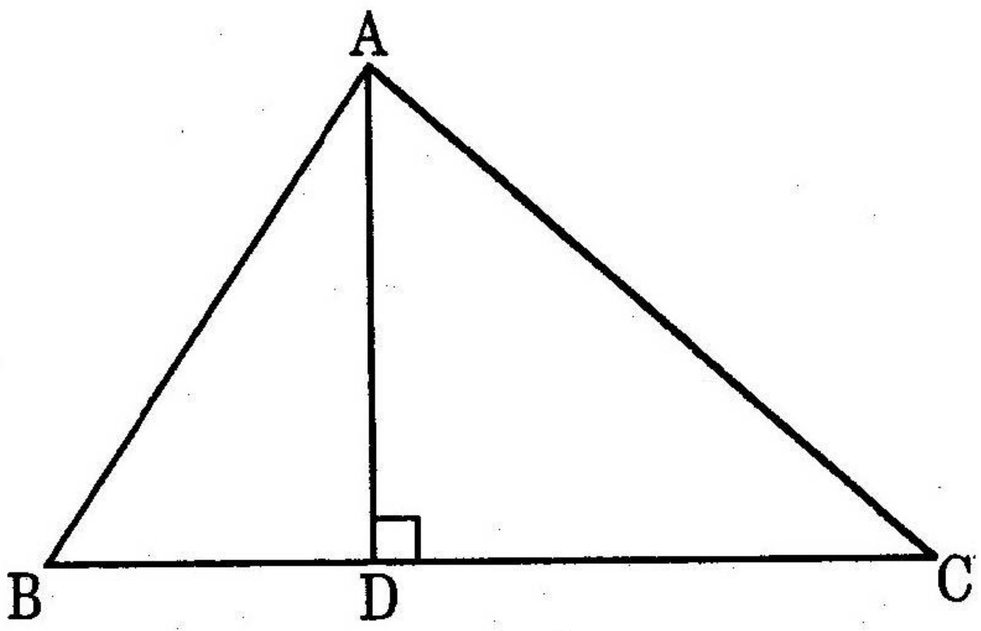
10. A person 25 mts away from a cell - tower observes the top of cell - tower at an angle of elevation 30°. Draw the suitable diagram for this situation.

11. Find the area of the shaded region in the given figure.
ABCD is a square of side 10.5 cm.



12. One card is selected from a well - shuffled deck of 52 cards. Find the probability of getting a red card with prime number.

13. In a ΔABC, $AD \perp BC$ and $AD^2 = BD \times CD$, prove that ΔABC is a right angled triangle.



SECTION - III

NOTE : *(Marks 4×4=16)*

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

(ii) In this section, every question has internal choice to answer.

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

14. The length of cuboid is 12 cm, breadth and height are equal in measurements, and its volume is 432 cm^3. The cuboid is cut into 2 cubes. Find the lateral surface area of each cube.

OR

Two poles are standing opposite to each other on the either side of the road which is 90 feet wide. The angle of elevation from bottom of first pole to top of second pole is 45°, the angle of elevation from bottom of second pole to top of first pole is 30°. Find the heights of poles. (use $\sqrt{3} = 1 \cdot 732$)

15. A bag contains some square cards. A prime number between 1 and 100 has been written on each card. Find the probability of getting a card that the sum of the digits of prime number written on it, is 8.

OR

The daily wages of 80 workers of a factory.

Daily Wages (Rs)	500-600	600-700	700-800	800-900	900-1000
Number of Workers	12	17	28	14	9

Find the mean daily wages of the workers of the factory by using an appropriate method.

16. Draw a circle of diameter 6 cm from a point 5 cm away from its centre. Construct the pair of tangents to the circle and measure their length.

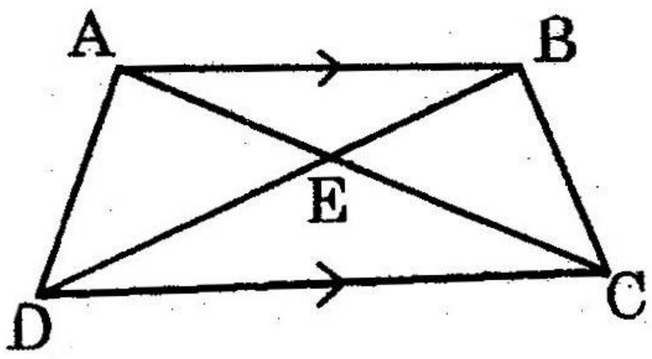
OR

The following data gives the information on the observed life span (in hours) of 90 electrical components.

Life span (in hours)	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	8	12	15	23	18	14

Draw both Ogives for the above data.

17. ABCD is a trapezium with $AB \| DC$, the diagonals AC and BD are intersecting at E. If ΔAED is similar to ΔBEC, then prove that $AD = BC$.



OR

Prove that $\left(1+\tan^2\theta\right)+\left(1+\frac{1}{\tan^2\theta}\right)=\frac{1}{\sin^2\theta-\sin^4\theta}$.