

**ICSE SEMESTER 2 EXAMINATION**  
**SPECIMEN QUESTION PAPER**  
**MATHEMATICS**

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*Maximum Marks: 40*

*Time allowed: One and a half hours*

*Answers to this Paper must be written on the paper provided separately.*

*You will not be allowed to write during the first 10 minutes.*

*This time is to be spent in reading the question paper.*

*The time given at the head of this Paper is the time allowed for writing the answers.*

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*Attempt **all** questions from **Section A** and **any three** questions from **Section B**.*

*The intended marks for questions or parts of questions are given in brackets [ ].*

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**SECTION A**

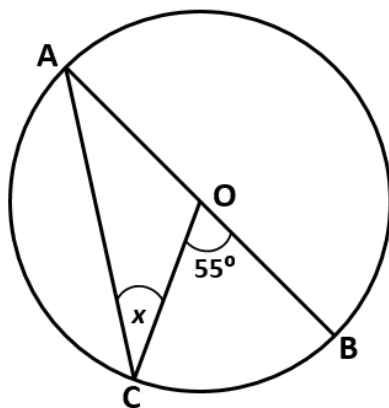
*(Attempt **all** questions from this Section.)*

**Question 1**

Choose the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.)

[10]

- (i) The point (3,0) is invariant under reflection in:
- (a) The origin
  - (b) x-axis
  - (c) y-axis
  - (d) both x and y axes
- (ii) In the given figure, AB is a diameter of the circle with centre 'O'. If  $\angle COB = 55^\circ$  then the value of x is:



- (a)  $27.5^\circ$
- (b)  $55^\circ$
- (c)  $110^\circ$
- (d)  $125^\circ$

(iii) If a rectangular sheet having dimensions 22 cm x 11 cm is rolled along its shorter side to form a cylinder. Then the curved surface area of the cylinder so formed is:

- (a)  $968 \text{ cm}^2$
- (b)  $424 \text{ cm}^2$
- (c)  $121 \text{ cm}^2$
- (d)  $242 \text{ cm}^2$

(iv) If the vertices of a triangle are (1,3), (2, - 4) and (-3, 1). Then the co-ordinate of its centroid is:

- (a) (0, 0)
- (b) (0, 1)
- (c) (1, 0)
- (d) (1, 1)

(v)  $\tan \theta \times \sqrt{1 - \sin^2 \theta}$  is equal to:

- (a)  $\cos \theta$
- (b)  $\sin \theta$
- (c)  $\tan \theta$
- (d)  $\cot \theta$

(vi) The median class for the given distribution is:

Class Interval	1 – 5	6 – 10	11–15	16 –20
Cumulative Frequency	2	6	11	18

- (a) 1 – 5
- (b) 6 – 10
- (c) 11 – 15
- (d) 11 – 20

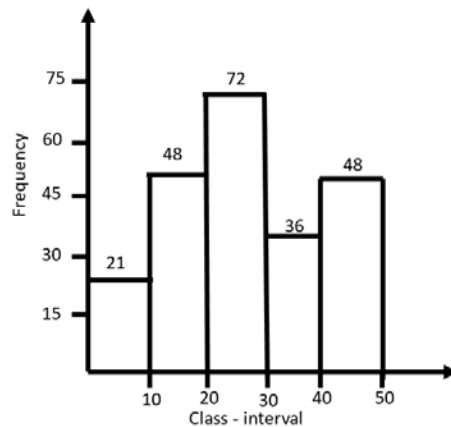
(vii) If the lines  $7y = ax + 4$  and  $2y = 3 - x$ , are parallel to each other, then the value of 'a' is:

- (a) - 1
- (b)  $\frac{-7}{2}$
- (c)  $\frac{-2}{7}$
- (d) 14

(viii) Volume of a cylinder is  $330 \text{ cm}^3$ . The volume of the cone having same radius and height as that of the given cylinder is:

- (a)  $330 \text{ cm}^3$
- (b)  $165 \text{ cm}^3$
- (c)  $110 \text{ cm}^3$
- (d)  $220 \text{ cm}^3$

(ix) In the given graph, the modal class is the class with frequency:



- (a) 72
- (b) 21
- (c) 48
- (d) 36

(x) If the probability of a player winning a game is 0.56. The probability of his losing this game is:

- (a) 0.56
- (b) 1
- (c) 0.44
- (d) 0

## SECTION B

(Attempt **any three** questions from this Section.)

### Question 2

(i) Find the ratio in which the x-axis divides internally the line joining points A (6, -4) and B (-3, 8). [2]

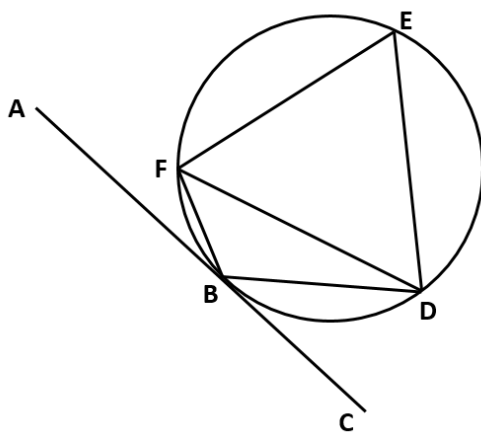
(ii) Three rotten apples are accidentally mixed with twelve good ones. One apple is picked at random. What is the probability that it is a good one? [2]

(iii) In the given figure, AC is a tangent to circle at point B.  $\triangle EFD$  is an equilateral triangle and  $\angle CBD = 40^\circ$ . Find: [3]

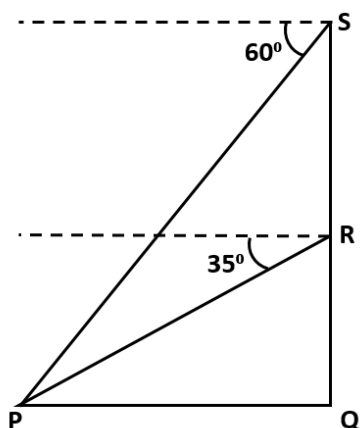
(a)  $\angle BFD$

(b)  $\angle FBD$

(c)  $\angle ABF$



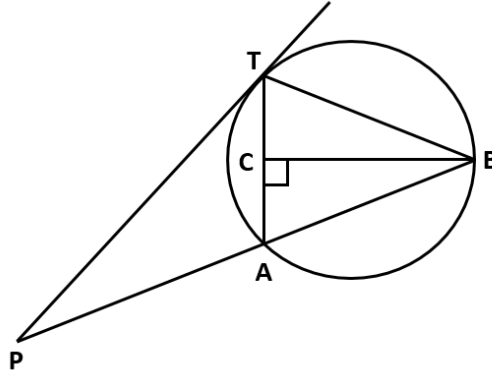
(iv) A drone camera is used to shoot an object P from two different positions R and S along the same vertical line QRS. The angle of depression of the object P from these two positions are  $35^\circ$  and  $60^\circ$  respectively as shown in the diagram. If the distance of the object P from point Q is 50 metres, then find the distance between R and S correct to the nearest meter. [3]



### Question 3

- (i) In the given figure, PT is a tangent to the circle at T, chord BA is produced to meet the tangent at P. Perpendicular BC bisects the chord TA at C. If PA = 9cm and TB = 7cm, find the lengths of: [2]

- (a) AB  
(b) PT



- (ii) How many solid right circular cylinders of radius 2 cm and height 3 cm can be made by melting a solid right circular cylinder of diameter 12 cm and height 15 cm? [2]
- (iii) Prove that: [3]

$$\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$$

- (iv) Use graph paper for this question, take 2 cm = 10 marks along one axis and 2 cm = 10 students along the other axis.

The following table shows the distribution of marks in a 50 marks test in Mathematics:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
No. of Students	6	10	13	7	4

Draw the ogive for the above distribution and hence estimate the median marks. [3]

### Question 4

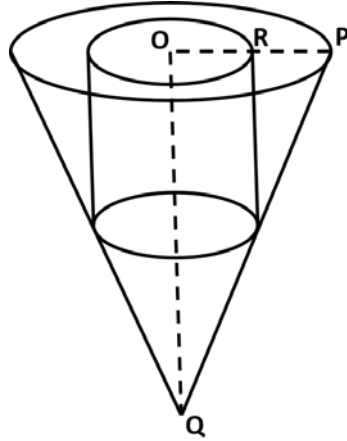
- (i) Find the equation of the perpendicular dropped from the point P (-1,2) onto the line joining A (1,4) and B (2,3). [2]
- (ii) Find the mean for the following distribution: [2]

Class Interval	20 – 40	40 – 60	60–80	80 –100
Frequency	4	7	6	3

- (iii) A solid piece of wooden cone is of radius  $OP = 7$  cm and height  $OQ = 12$  cm. A cylinder whose radius and height equal to half of that of the cone is drilled out from this piece of wooden cone. Find the volume of the remaining piece of wood.

(Use,  $\pi = \frac{22}{7}$ )

[3]



- (iv) Use a graph sheet for this question, take 2cm = 1 unit along both x and y axis:

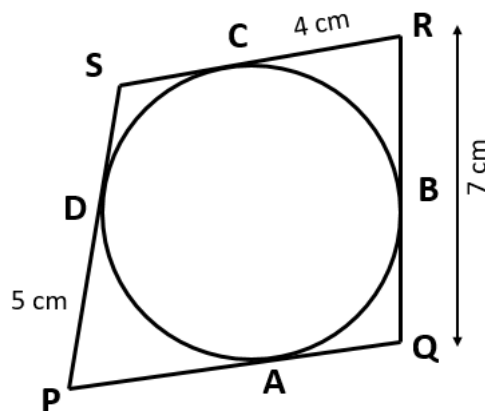
[3]

- Plot the points A (3,2) and B (5,0). Reflect point A on the y-axis to A'. Write co-ordinates of A'.
- Reflect point B on the line AA' to B'. Write the co-ordinates of B'.
- Name the closed figure A'B'AB.

### Question 5

- (i) In the given figure, the sides of the quadrilateral PQRS touches the circle at A, B, C and D. If  $RC = 4$  cm,  $RQ = 7$  cm and  $PD = 5$  cm. Find the length of PQ:

[2]

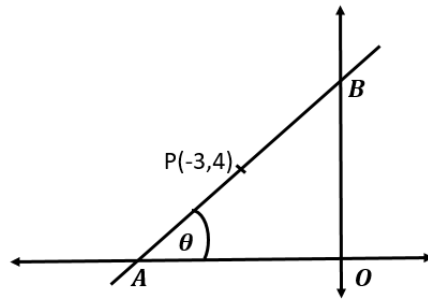


- (ii) Prove that:

[2]

$$\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta} = 1 - \sin \theta \cos \theta$$

- (iii) In the given diagram,  $OA = OB$ ,  $\angle OAB = \theta$  and the line AB passes through point P (-3, 4). [3]



Find:

- (a) Slope and inclination ( $\theta$ ) of the line AB  
 (b) Equation of the line AB
- (iv) Use graph paper for this question. Estimate the mode of the given distribution by plotting a histogram. [Take 2 cm = 10 marks along one axis and 2 cm = 5 students along the other axis] [3]

Daily wages(in ₹)	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
No. of Workers	6	12	20	15	9

### Question 6

- (i) A box contains tokens numbered 5 to 16. A token is drawn at random. Find the probability that the token drawn bears a number divisible by:  
 (a) 5  
 (b) Neither by 2 nor by 3 [2]
- (ii) Point M (2, b) is the mid-point of the line segment joining points P (a, 7) and Q (6, 5). Find the values of 'a' and 'b'. [2]
- (iii) An aeroplane is flying horizontally along a straight line at a height of 3000 m from the ground at a speed of 160 m/s. Find the time it would take for the angle of elevation of the plane as seen from a particular point on the ground to change from  $60^\circ$  to  $45^\circ$ . Give your answer correct to the nearest second. [3]
- (iv) Given that the mean of the following frequency distribution is 30, find the missing frequency 'f' [3]

Class Interval	0 – 10	10 – 20	20–30	30 –40	40 – 50	50 – 60
Frequency	4	6	10	f	6	4