

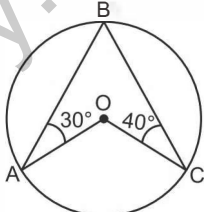
Time allowed: One and a half hours

Maximum Marks: 40

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 [].

SECTION - A

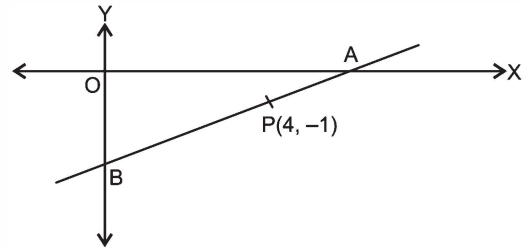
(Attempt all questions from this Section)

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 coordinates of the image of the point $(4, -1)$ when reflected in x -axis followed by reflection in y -axis are :
- (a) $(-4, -1)$ (b) $(-4, 1)$ (c) $(4, 1)$ (d) $(1, -4)$
- (ii) In the figure, if O is the centre of the circle. The measure of $\angle AOC$ is :
- (a) 70° (b) 110°
(c) 140° (d) 150°
- 
- (iii) The sum of the radius of the base and height of a solid cylinder is 37 m. If the total surface area of the cylinder is 1628 m^2 , then its volume is :
- (a) 2340 m^3 (b) 3250 m^3 (c) 4082 m^3 (d) 4620 m^3
- (iv) The coordinates of a point A , where AB is a diameter of a circle whose centre is $(2, -3)$ and B is the point $(1, 4)$ are :
- (a) $(2, -10)$ (b) $(-3, 10)$ (c) $(-2, -5)$ (d) $(3, -10)$
- (v) $(\operatorname{cosec}\theta - \cot\theta)^2$ is equal to :
- (a) $\frac{1-\cos\theta}{1+\cos\theta}$ (b) $\frac{1+\cos\theta}{1-\cos\theta}$ (c) $\frac{1+\cos\theta}{1-\sin\theta}$ (d) $\frac{1+\sin\theta}{1+\cos\theta}$
- (vi) The class mark of the class-next to the median class of the given distribution is :
- | | | | | | |
|-----------|-------|--------|---------|---------|---------|
| Class | 2 – 6 | 6 – 10 | 10 – 14 | 14 – 18 | 18 – 22 |
| Frequency | 5 | 10 | 16 | 6 | 3 |
- (a) 8 (b) 12 (c) 16 (d) 20
- (vii) If the lines $px + 3y = 2$ and $2x - qy + 5 = 0$ are parallel, then :
- (a) $p + q = 6$ (b) $pq = -6$ (c) $p - q = -6$ (d) $\frac{p}{q} = -6$
- (viii) The circumference of the base of a 12 m high solid cone is 22 m. The volume of the cone is:
- (a) 462 m^3 (b) 400 m^3 (c) 381 m^3 (d) 336 m^3
- (ix) The lower quartile of the data 40, 68, 18, 27, 12, 44, 17, 48, 55, 32, 47, 21 is:
- (a) 18 (b) 36 (c) 47 (d) 50
- (x) The probability of getting the bad egg in a lot of 400 eggs is 0.035. The number of bad eggs in the lot is :
- (a) 7 (b) 14 (c) 21 (d) 28

SECTION - B

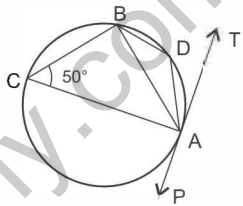
(Attempt any three questions from this Section)

2. (i) A line AB meets x -axis at A and y -axis at B. P(4, -1) divides AB in the ratio 1 : 2.
 (a) Find the coordinates of A and B.
 (b) Find the equation of the line through P and perpendicular to AB. [2]



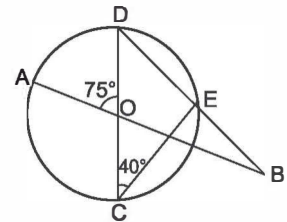
- (ii) A card is drawn at random from a pack of 52 playing cards. Find the probability that the drawn card is neither a red card nor a black king. [2]

- (iii) In the figure, PAT is a tangent at A. If $\angle ACB = 50^\circ$, find (a) $\angle TAB$ and (b) $\angle ADB$. [3]



- (iv) A straight highway leads to the foot of a tower of height 50 m. From the top of the tower, the angles of depression of two cars, standing on the highway are 30° and 60° . What is the distance between the two cars and how far is each car from the tower? [3]

3. (i) In the figure, the straight lines AB and CD pass through the centre O of the circle. If $\angle AOD = 75^\circ$ and $\angle OCE = 40^\circ$, find : (a) $\angle CDE$ (b) $\angle OBE$ [2]



- (ii) Water flows through a cylindrical pipe of internal diameter 7 cm at 36 km/h. Calculate the time in minutes it would take to fill a cylindrical tank, the radius of whose base is 35 cm and height 1 m. [2]
 (iii) If $\sec \theta + \tan \theta = m$, show that $\frac{m^2 - 1}{m^2 + 1} = \sin \theta$. [3]
 (iv) Construct an ogive for the following data and hence estimate the median from it. [3]

Class	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30
Frequency	2	7	18	10	8	5

4. (i) A (2, 7) and B (-3, 5) are two given points. Find
 (a) the gradient of AB, (b) the equation of AB. [2]
 (ii) Find the mean of the following distribution : [2]

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	3	5	9	5	3

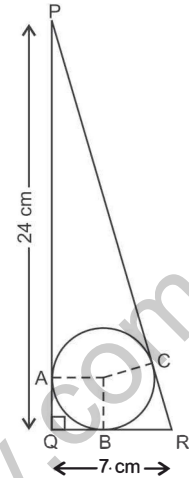
- (iii) A cylindrical vessel with internal diameter 10 cm and height 10.5 cm is full of water. A solid cone of base diameter 7 cm and height 6 cm is completely immersed in water. Find the volume of : [3]
 (a) Water displaced out of the cylindrical vessel.
 (b) Water left in the cylindrical vessel. [Take $\pi = 22/7$]

- (iv) A triangle with vertices A(1, 2), B(4, 4) and C(3, 7) is first reflected in the line $y = 0$ onto $\Delta A'B'C'$ and then $\Delta A'B'C'$ is reflected in the origin onto $\Delta A''B''C''$. Write down the co-ordinates of (a) A', B' and C' (b) A'', B'' and C''.

[3]

5. (i) In ΔPQR ; $\angle PQR = 90^\circ$, $PQ = 24$ cm and $QR = 7$ cm. Find the radius of the inscribed circle.

[2]



- (ii) Prove that : $\frac{\cos \theta}{\operatorname{cosec} \theta + 1} + \frac{\cos \theta}{\operatorname{cosec} \theta - 1} = 2 \tan \theta$

[2]

- (iii) Find the equation of the line parallel to $2x + 5y - 9 = 0$ and passing through the mid-point of the line segment joining A(2, 7) and B(-4, 1).

[3]

- (iv) Use graph paper for this question. Estimate the mode of the given distribution by plotting a histogram.

[3]

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	4	8	10	12	10	4	2

6. (i) If the probability of winning a game is 0.26, what is the probability of losing it?
- (ii) Find the equation of a line which has y -intercept 4 and is parallel to the line $2x - 3y = 7$. Find the coordinates of the point where the line cuts x -axis.
- (iii) A man observes the angle of elevation of the top of the tower to be 45° . He walks towards it in a horizontal line through its base. On covering 20 m, the angle of elevation changes to 60° . Find the height of the tower correct to 2 significant figures.
- (iv) The mean of the following frequency distribution is 53. Find the missing frequencies f_1 and f_2 .

[2]

[2]

[3]

[3]

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	Total
Frequency	15	f_1	21	f_2	17	100