

# ARYAN INSTITUTE

SUBJECT : – MATHEMATICS

CLASS – X (FULL SYLLABUS)

Teacher Name : – SANTOSH SIR

Maximum Time : 3:00 Hrs.

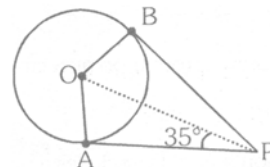
Maximum Marks –

## Section A

- Q.1 The largest number that will divide 398,436 and 542 leaving remainders 7,11 and 15 respectively is  
(a) 17 (b) 11  
(c) 34 (d) 45
- Q.2 Here are 312, 260 and 156 students in class X, XI and XII respectively. Buses are to be hired to take these students to a picnic. Find the maximum number of students who can sit in a bus if each bus takes equal number of students  
(a) 52 (b) 56  
(c) 48 (d) 63
- Q.3 If  $\alpha, \beta$  are the roots of the equation  $ax^2 + bx + c = 0$ ,  $\alpha\beta = 3$  and  $a, b, c$  are in A.P. then  $\alpha + \beta$  is equal to  
(A)  $-4$  (B)  $-1$   
(C)  $4$  (D)  $-2$
- Q.4 If the product of zeros of the polynomial  $f(x) = ax^3 - 6x^2 + 11x - 6$  is 4, then  $a =$   
(A)  $\frac{3}{2}$  (B)  $-\frac{3}{2}$   
(C)  $\frac{2}{3}$  (D)  $-\frac{2}{3}$
- Q.5 Ten years ago a man was 12 times as old as his son. Ten years hence he will be twice as old as his son. their present ages are  
(A) 34 years, 12 years  
(B) 26 years, 24 years  
(C) 20 years, 18 years  
(D) 17 years, 15 years
- Q.6 The values of  $x$  satisfying the equation is  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$ ;  $x \neq 2, 4$   
(A)  $3, \frac{3}{2}$  (B)  $5, \frac{5}{2}$   
(C)  $7, \frac{7}{2}$  (D)  $9, \frac{9}{2}$
- Q.7 PA and PB are the two tangents drawn to the circle. O is the centre of the circle. A and B are the

points of contact of the tangents PA and PB with the circle. If  $\angle OPA = 35^\circ$ , then  $\angle POB =$

- (A)  $55^\circ$   
(B)  $65^\circ$   
(C)  $75^\circ$   
(D)  $85^\circ$



- Q.8 If  $\sin \theta$  and  $\cos \theta$  are the roots of  $ax^2 + bx + c = 0$  ( $ac \neq 0$ ), then  
(A)  $a^2 + b^2 - 2ac = 0$  (B)  $a^2 - b^2 + 2ac = 0$   
(C)  $(a+c)^2 = b^2 + c^2$  (D)  $a^2 - b^2 = 0$
- Q.9 In an A.P.  $s_3 = 6$ ,  $s_6 = 3$ , then it's common difference is equal to :  
(A) 3 (B)  $-1$   
(C) 1 (D) None of these
- Q.10 The number of numbers between 105 and 1000 which are divisible by 7 is :  
(A) 14 (B) 128  
(C) 127 (D) None of these
- Q.11 If ABC is an isosceles triangles and D is a point on BC such that  $AD \perp BC$ , then -  
(A)  $AB^2 - AD^2 = BD \cdot DC$   
(B)  $AB^2 - AD^2 = BD^2 - DC^2$   
(C)  $AB^2 + AD^2 = BD \cdot DC$   
(B)  $AB^2 + AD^2 = BD^2 - DC^2$
- Q.12 Which point on y-axis is equidistant from (2, 3) and (-4, 1) ?  
(A) (0, 4) (B) (0, -1)  
(C) (0, 0) (D) (0, 5)
- Q.13 If  $\sin^4 \theta - \cos^4 \theta = \frac{1}{2}$  where  $\theta$  lies in the interval  $0^\circ$  to  $90^\circ$  then the correct statement  
(A)  $\tan \theta = 1/\sqrt{3}$  (B)  $\sec \theta = 2/\sqrt{3}$   
(C)  $\sin \theta = 1/\sqrt{2}$  (D)  $\cot \theta + \operatorname{cosec} \theta = \sqrt{3}$
- Q.14  $b \tan \theta = a$ , the value of  $\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta}$

- (A)  $\frac{a-b}{a^2+b^2}$  (B)  $\frac{a-b}{a^2+b^2}$   
 (C)  $\frac{a^2+b^2}{a^2-b^2}$  (D)  $\frac{a^2-b^2}{a^2+b^2}$

Q.15 The area and perimeter of a sector of a circle with radius 6 cm if angle of the sector is  $60^\circ$ , is

- (A)  $18.86 \text{ cm}^2, 18.28 \text{ cm}$   
 (B)  $18.76 \text{ cm}^2, 18.14 \text{ cm}$   
 (C)  $18 \text{ cm}^2, 28 \text{ cm}$   
 (D)  $17 \text{ cm}^2, 17.14 \text{ cm}$

Q.16 The curved surface area of a solid cylinder is one-third of its total surface area. Determine its height if its radius is 2.5 cm.

- (A) 2 cm (B) 1.45 cm  
 (C) 1.35 cm (D) 1.25 cm

Q.17 The empirical formula for mode is given by

- (A) Mode = 3 median - 2 mean  
 (B) Mode - median = 2(mean - mode)  
 (C) Mean = 2 median - 3 mode  
 (D) Mode = 2 median - 3 mean

Q.18 Volumes of two solid spheres are in the ratio 125:64. Determine their radii, if the sum of their radii is 45 cm.

- (A) 25, 20 (B) 15, 30  
 (C) 35, 10 (D) 40, 5

Q.19 A bag contains 10 red balls and some white balls. If the probability of drawing a white ball is double that of a red ball, then number of white balls in the bag will be

- (A) 10 (B) 15  
 (C) 20 (D) 25

Q.20 A card is drawn at random from a well shuffled pack of 52 cards. Then the probability that the card is neither a red card nor a queen is

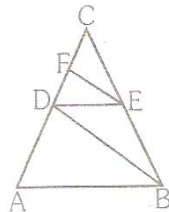
- (A)  $\frac{6}{13}$  (B)  $\frac{5}{13}$   
 (C)  $\frac{11}{13}$  (D)  $\frac{4}{13}$

## Section B

(5Q\*2M)

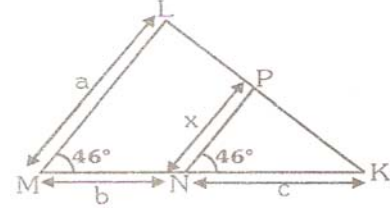
Q.21 If  $\alpha, \beta$  are the zeros of the polynomial  $f(x) = x^2 - p(x+1) - c$  such that  $(\alpha+1)(\beta+1) = 0$ , then  $c = ?$

Q.22 In fig.,  $AB \parallel DE$  and  $BD \parallel EF$ . Prove that  $DC^2 = CF \times AC$

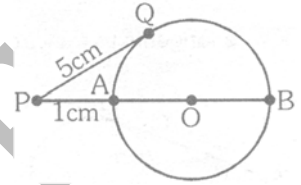


OR

In fig.  $\angle M = \angle N = 46^\circ$  Express  $x$  in terms of  $a, b$  and  $c$  where  $a, b$  and  $c$  are lengths of  $LM, MN$  and  $NK$



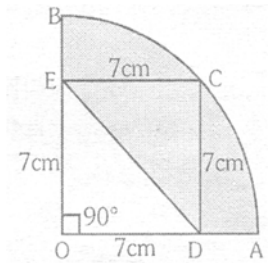
Q.23 In fig, O is the centre of the circle. PQ is tangent to the circle and secant PAB passes through the centre O.



If  $PQ = 5 \text{ cm}$  and  $PA = 1 \text{ cm}$ , then the radius of the circle is

Q.24  $\frac{1}{\sec \theta - \tan \theta} + \frac{1}{\sec \theta + \tan \theta} = 2 \sec \theta$

Q.25 In the given figure, ODCE is a square then the area of shaded region is



## Section C

(6Q\*3M)

Q.26 solve it

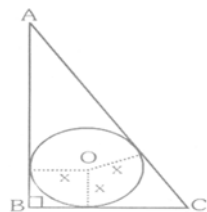
$$ax + by = 1$$

$$bx + ay = \frac{(a+b)^2}{a^2+b^2} - 1$$

Q.27 Divide 27 into two parts such that the sum of their reciprocals is  $\frac{3}{20}$ .

Q.28 Prove that  $\sqrt{3}$  is an irrational no.

Q.29  $\Delta ABC$  is right-angled triangle with  $AB = 12 \text{ cm}$  and  $AC = 13 \text{ cm}$ . A circle with centre O has been inscribed inside the triangle. Calculate the value of  $x$ , the radius of the inscribed circle.



Q.30  $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \sec A + \tan A = \frac{1 + \sin A}{\cos A} \sqrt{\frac{1 + \sin A}{1 - \sin A}}$

Q.31 A pair of dice is thrown simultaneously. Find the probability of getting

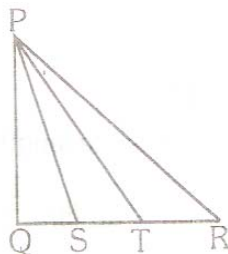
(i) a multiple of 3 on both dice

- (ii) sum of the numbers on two dice is always less than 7.  
 (iii) an odd number on the first die and a prime number on the other

## Section D

(5Q\*4M)

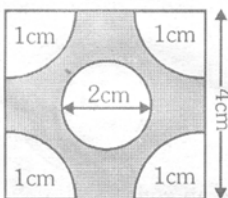
- Q.32 In figure, S and T trisect the side QR of a right triangle PQR. Prove that  $8PT^2 = 3PR^2 + 5PS^2$ .



OR

If BL and CM are medians of a triangle ABC right-angled at A, then prove that  $4(BL^2 + CM^2) = 5BC^2$

- Q.33 Find the perimeter and area of the shaded region shown in the figure. The four corners are circle quadrants and at the centre, there is a circle. [Take  $\pi = 3.14$ ].



- Q.34 If the median of the following frequency distribution is 28.5, find the missing frequencies.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	$f_1$	20	15	$f_2$	5	60

- Q.35 A solid toy is in the form of a right circular cylinder with a hemispherical shape at cone end and a cone at the other end. Their common diameter is 4.2 cm and the heights of the cylindrical and conical portions are 12 cm and 7 cm respectively. Find the volume of the solid. (Take  $\pi = 22/7$ )

## Section E

(3Q\*4M)

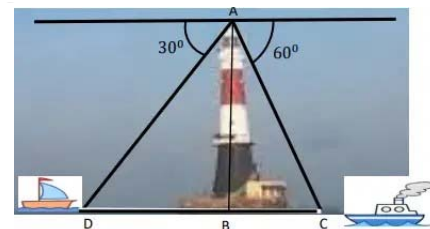
- Q.36 Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs 1,18,000 by paying every month starting with the first instalment of Rs 1000. If he increases the instalment by Rs 100 every month, answer the following



- (1) The amount paid by him in 30th installment is

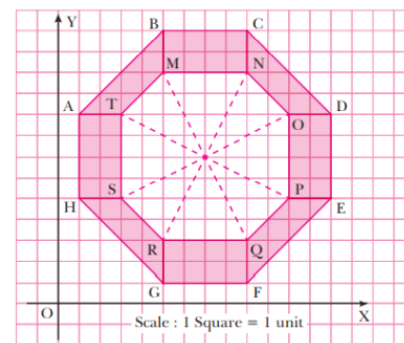
- (2) The amount paid by him in the 30 installments is  
 (3) What amount does he still have to pay offer 30th installment?  
 (4) If total installments are 40 then amount paid in the last installment?

- Q.37 A lighthouse is a tall tower with light near the top. These are often built on islands, coasts or on cliffs. Lighthouses on water surface act as a navigational aid to the mariners and send warning to boats and ships for dangers. Initially wood, coal would be used as illuminators. Gradually it was replaced by candles, lanterns, electric lights. Nowadays they are run by machines and remote monitoring. Prongs Reef lighthouse of Mumbai was constructed in 1874-75. It is approximately 40 meters high and its beam can be seen at a distance of 30 kilometres. A ship and a boat are coming towards the lighthouse from opposite directions. Angles of depression of flash light from the lighthouse to the boat and the ship are  $30^\circ$  and  $60^\circ$  respectively.



- (1) Which of the two, boat or the ship is nearer to the light house. Find its distance from the lighthouse?  
 (2) Find the time taken by the boat to reach the light house if it is moving at the rate of 20 km per hour.

- Q.38 (1) The distance between the points A and B is



- (2) The coordinates of the mid point of line segment joining points M and Q are  
 (3) If G is taken as the origin, and x, y axis put along GF and GB, then the point denoted by coordinate (4, 2) is