

Timothy

No. of Printed Pages : 6

Roll No. 32.....

FAS/Mathematics/X/Half Yearly Exam./2017-18

Time : 3 hrs.]

[M.M. : 80

General Instructions :

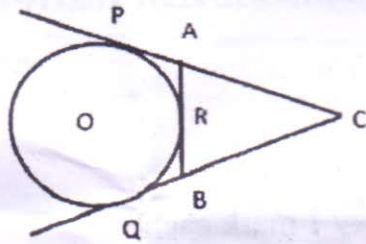
- (i) All questions are compulsory
- (ii) Question 1- 6 carry 1 mark each.
- (iii) Question 7-12 carry 2 marks each.
- (iv) Question 13-22 carry 3 marks each.
- (v) Question 23 - 30 carry 4 marks each.

Section-(A)

Question 1- 6 carry 1 mark each.

- 1 Has the rational number $\frac{441}{2^2 \cdot 5^7 \cdot 7^2}$ a terminating or a non-terminating decimal representation?
- 2 If α and β are zeroes of the polynomial $2y^2 + 7y + 5$, find the value of $\alpha + \beta + \alpha\beta$
- 3 Find the number of solutions of the following pair of linear equations:
$$x + 2y - 8 = 0$$
$$2x + 4y = 16$$
- 4 A tower is 20 m high and its shadow on the ground is $20\sqrt{3}$ m long. Find the Sun's altitude.
- 5 CP and CQ are tangent from an external point C to a circle with centre O. AB is another tangent which touches the circle at R. If CP=11cm and BR=4cm, then find the length of BC.

(2)



6 Write the median class of the following distribution :

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	8	10	12	8	4

Section-(B)

Question 7-12 carry 2 marks each.

- 7 Find LCM and HCF of 120 and 144 using Fundamental Theorem of Arithmetic.
- 8 If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $(ax + b)$, find a and b
- 9 Solve the following pair of linear equations :

$$y - 4x = 1$$

$$6x - 5y = 9$$

- 10 Find the value of k for which the pair of linear equations $kx + 3y = k - 2$ and $12x + ky = k$ has no solution.
- 11 Evaluate :

$$\frac{\tan^2 60^\circ + 4 \cos^2 45^\circ + 3 \sec^2 30^\circ + 5 \cos^2 90^\circ}{\operatorname{cosec} 30^\circ + \sec 60^\circ - \cot^2 30^\circ}$$

(3)

- 12 Calculate mode of the following data :

Marks Obtained	No. of students
0-20	8
20-40	10
40-60	12
60-80	6
80-100	3

Section-(C)

Question 13-22 carry 3 marks each.

- 13 Prove that $\sqrt{7}$ is an irrational number.
- 14 Find the zeroes of the polynomial $3x^2 - 2$ and verify the relationship between the zeroes and the coefficients.
- 15 If 2 and -3 are the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$, then find the values of a and b.
- 16 Solve the following pair of linear equations :

$$\frac{10}{x+y} + \frac{2}{x-y} = 4; \quad \frac{15}{x+y} - \frac{5}{x-y} = -2$$

- 17 The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator are increased by 3, their ratio becomes 2:3. Determine the fraction.
- 18 Without using trigonometric table evaluate :

$$\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 55^\circ}$$

(4)

- 19 From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower and in same straight line with its base with angles of depression 30° and 45° respectively. Find the distance between the cars. [Use $\sqrt{3} = 1.732$]
- 20 Prove that the parallelogram circumscribing a circle is a rhombus.
- 21 For helping poor girls of their class, students saved pocket money as shown in the following table :

Money saved (in Rs)	5-7	7-9	9-11	11-13	13-15
No. of students	6	3	9	5	7

Find mean and median for this data.

- 22 The median of the following distribution is 35. Find the value of x :

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	3	x	6	5	3	2

Section-(D)

Question 23 to 30 carry 4 marks each.

- 23 Obtain all the zeroes of the polynomial $x^4 + 4x^3 - 2x^2 - 20x - 15$ if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$
- 24 Solve the equations graphically :

$$2x + y = 2; 2y - x = 4$$

What is the area of the triangle formed by the two lines and the line $y = 0$?

25 There are some students in the class. Mr. X brought 130 chocolates and distributed to the students equally, then he was left with some chocolates. Mr. Y brought 170 chocolates and distributed equally to the students. He was also left with the same no of chocolates as Mr. X was left. Mr. Z brought 250 chocolates, did the same thing and left with the same no of chocolates. What is the max possible no of students that were in the class?

26 If $\sin(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, find the value of

(i) $\tan A + \cot B$

(ii) $\sec A - \operatorname{cosec} B$

27 Prove the following identity :

$$\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$$

28 A person, standing on the bank of a river, observes that the angle subtended by a tree on the opposite bank is 60° . When he moves 20 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the breadth of the river ?

[Use $\sqrt{3} = 1.732$]

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

(6)

30 Draw a less than type ogive for the following distribution :

Marks	No. of students
0-10	5
10-20	4
20-30	8
30-40	10
40-50	15
50-60	18

Find median from the graph.