



## MODERN MIDDLE EAST INTERNATIONAL SCHOOL

Academic Year 2019 – 2020

### **PRE-BOARD EXAM-I**

<b>Name :</b>	<b>Class : 10</b>	<b>Sec:</b>	<b>Date: 3/12/2019</b>
<b>Subject : Mathematics</b>	<b>Duration : 3 hourS</b>	<b>Max. Marks : 80</b>	

#### General Instructions:

1. All questions must be answered.
2. The question paper consists of 40 questions divided into four sections A, B, C, and D.
3. Section A contains 20 questions of 1 mark each. Section B contains 6 questions of 2 mark each. Section C contains 8 questions of 3 mark each and Section D contains 6 questions of 4 mark each.
4. There is no overall choice. However, an internal choice has been provided in each section. You have to attempt only one of the alternatives in all such questions.
5. Use of calculator is not permitted.
6. Please check that this question paper contains 9 printed pages.

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#### SECTION A

*Question numbers 1 to 20 carry 1 mark each.*

**( 20 × 1= 20)**

- 1) The largest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is
- a) 13      b) 65      c) 875      d) 1750

2) Consider the following distribution:

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of the lower limits of the median class and the modal class is

- a) 15      b) 25      c) 30      d) 35
- 3) If two positive integers  $a$  and  $b$  are written as  $a = x^3y^2$  and  $b = xy^3$ , where  $x, y$  are prime numbers, then HCF ( $a, b$ ) is
- a)  $xy$       b)  $xy^2$       c)  $x^3y^3$       d)  $x^2y^2$
- 4) Aruna has only ₹ 1 and ₹ 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is ₹ 75, then the number of ₹ 1 and ₹ 2 coins are, respectively
- a) 35 and 15      b) 35 and 20      c) 15 and 35      d) 25 and 25
- 5) If  $\triangle ABC \sim \triangle EDF$  and  $\triangle ABC$  is not similar to  $\triangle DEF$ , then which of the following is not true? Give reason.
- a)  $BC \cdot EF = AC \cdot FD$   
 b)  $AB \cdot EF = AC \cdot DE$   
 c)  $BC \cdot DE = AB \cdot EF$   
 d)  $BC \cdot DE = AB \cdot FD$
- 6) If  $\sec \theta + \tan \theta = x$ , then  $\tan \theta =$
- a)  $\frac{x^2+1}{x}$       b)  $\frac{x^2-1}{x}$       c)  $\frac{x^2+1}{2x}$       d)  $\frac{x^2-1}{2x}$
- 7) If  $5\theta$  and  $4\theta$  are acute angles satisfying  $\sin 5\theta = \cos 4\theta$ , then  $2 \sin 3\theta - \sqrt{3} \tan 3\theta$  is equal to
- a) 1      b) 0      c) -1      d)  $1 + \sqrt{3}$
- 8) The ratio in which the line segment joining  $P(x_1, y_1,)$  and  $Q(x_2, y_2,)$  is divided by x-axis is

- a)  $y_1 : y_2$       b)  $-y_1 : y_2$       c)  $x_1 : x_2$       d)  $-x_1 : x_2$

9) If the distance between the points (4,p) and (1,0) is 5, then p= \_\_\_\_\_

- a)  $\pm 4$       b) 4      c) -4      d) 0

10) If the point P(x, y) is equidistant from the points A(5, 1) and B (1, 5), then

- a)  $5x=y$       b)  $x=5y$       c)  $3x=2y$       d)  $2x=3y$

**(Q11-Q15) Fill in the blanks**

11) The number of zeroes that polynomial  $f(x) = (x - 2)^2 + 4$  can have is \_\_\_\_\_

OR

A quadratic polynomial whose one zero is 6 and sum of the zeros is 0, is \_\_\_\_\_

12) If the radius of the base of a right circular cylinder is halved, keeping the height same, then the ratio of the volume of the reduced cylinder to that of the original cylinder is \_\_\_\_\_

13)  $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 180^\circ =$  \_\_\_\_\_

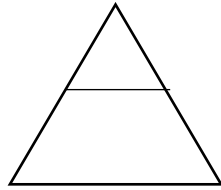
14) If the sum of first p term of an A.P is  $ap^2 + bp$ , then its common difference is \_\_\_\_\_

15) In a family of 3 children, the probability of having at least one boy is \_\_\_\_\_

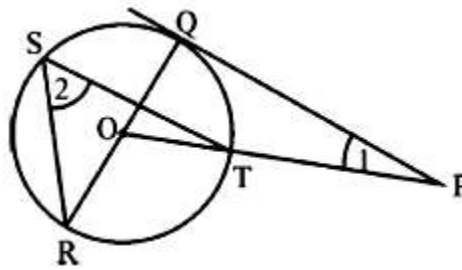
**(Q16-Q20) Answer the following**

16) Without actually performing the long division, find if  $\frac{987}{10500}$  will have terminating or non-terminating (repeating) decimal expansion. Give reasons for your answer.

17) In  $\Delta ABC$ ,  $DE \parallel BC$  and  $AD = \frac{1}{2} BD$ . If  $BC=4.5\text{cm}$ , find DE.



- 18) PQ is a tangent from an external point P to a circle with centre O and OP cuts the circle at T and, QOR is a diameter. If  $\angle POR = 130^\circ$  and S is a point on the circle, find  $\angle 1 + \angle 2$ .



OR

The chord of a circle of radius 10 cm subtends a right angle at its center. Find the length of the chord (in cm).

- 19) The first term of AP is p and its common difference is q. Find its 10<sup>th</sup> term.  
 20) Is 0.2 a root of the equation  $x^2 - 0.4 = 0$ ? Justify your answer.

### SECTION B

*Question numbers 21 to 26 carry 2 mark each.*

**(6×2 =12)**

- 21) Determine k so that  $k^2 + 4k + 8$ ,  $2k^2 + 3k + 6$ ,  $3k^2 + 4k + 4$  are three consecutive terms of an AP.

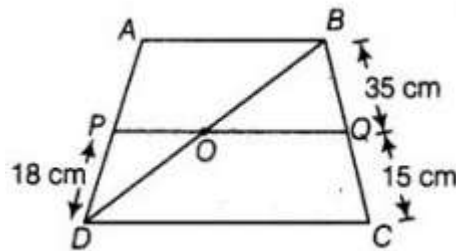
OR

If the 10<sup>th</sup> term of AP is 52 and 17<sup>th</sup> term is 20 more than the 13<sup>th</sup> term, find the A.P.

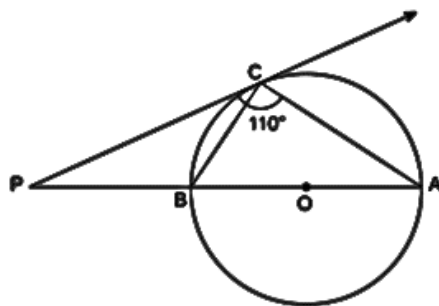
- 22) Corresponding sides of two similar triangles are in the ratio of 2 : 3. If the area of the smaller triangle is  $48 \text{ cm}^2$ , then find the area of the larger triangle.

OR

ABCD is a trapezium in which  $AB \parallel DC$  and P,Q are points on AD and BC respectively, such that  $PQ \parallel DC$ , if  $PD = 18 \text{ cm}$ ,  $BQ = 35 \text{ cm}$  and  $QC = 15 \text{ cm}$ , find AD.



- 23) An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of two planes from the same point on the ground are  $60^\circ$  and  $45^\circ$ . Find the vertical distance between the aeroplanes at that instant.
- 24) The tangent at a point C of a circle with centre O and a diameter AB, which when extended intersect at point P. If  $\angle PCA = 110^\circ$ , find  $\angle CBA$ .



- 25) The diameters of the internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14cm, find the height of the cylinder.

26) A carton of 24 bulbs contain 6 defective bulbs. One bulb is drawn at random. What is the probability that the bulb is not defective? If the bulb selected is defective and it is not replaced and a second bulb is selected at random from the rest, what is the probability that the second bulb is defective?

(OR)

A bag contains 24 balls of which  $x$  are red,  $2x$  are white and  $3x$  are blue. A ball is selected at random. What is the probability that it is (i) not red? (ii) white?

### SECTION C

*Question numbers 27 to 34 carry 3 mark each.*

**(8×3=24)**

27) Show that the square of any positive integer cannot be of the form  $6m+2$  or  $6m+5$  for any integer  $m$ .

OR

Find the HCF and LCM of 510 and 92 and verify that  $\text{HCF} \times \text{LCM} = \text{product of two given numbers}$ .

28) Given that  $\sqrt{2}$  is a zero of the cubic polynomial  $6x^3 + \sqrt{2}x^2 - 10x - 4\sqrt{2}$ , find its other two zeroes.

29) Vijay had some bananas and he divided them into two lots A and B. He sold the first lot at the rate of Rs 2 for 3 bananas and the second lot at the rate of Re 1 per banana, and got a total of Rs 400. If he had sold the first lot at the rate of Rs 1 per banana and the second lot at the rate of Rs 4 for 5 bananas, his total collection would have been Rs 460. Find the number of bananas he had.

OR

Solve the following system of equations:

$$\frac{1}{2x} - \frac{1}{y} = -1$$

$$\frac{1}{x} + \frac{1}{2y} = 8, x, y \neq 0$$

30) Find the sum of  $1 + (-2) + (-5) + (-8) + \dots + (-236)$ .

31) The line segment joining the points A(3,2) and B(5,1) is divided at the point P in the ratio 1:2 and P lies on the line  $3x-18y+k=0$ . Find the value of k.

32) Prove the following identity:

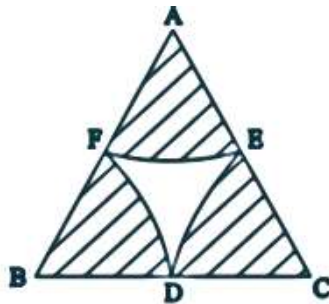
$$2 \sec^2 \theta - \sec^4 \theta - 2 \operatorname{cosec}^2 \theta + \operatorname{cosec}^4 \theta = \cot^4 \theta - \tan^4 \theta$$

OR

If  $\tan \theta + \sin \theta = m$  and  $\tan \theta - \sin \theta = n$ , show that

$$m^2 - n^2 = 4\sqrt{mn}$$

33) In Fig. 11.11, arcs are drawn by taking vertices A, B and C of an equilateral triangle of side 10 cm. to intersect the sides BC, CA and AB at their respective mid-points D, E and F. Find the area of the shaded region (Use  $\pi = 3.14$ ).



34) The monthly income of 100 families are given as below.

Income (In Rs)	Number of families
0 - 5000	8
5000 - 10000	26
10000 - 15000	41
15000 - 20000	16
20000 - 25000	3
25000 - 30000	3
30000 - 35000	2
35000 - 40000	1

Calculate the modal income.

### SECTION D

*Question numbers 35 to 40 carry 4 mark each.*

**(6 × 4 =24)**

35) Find whether the following equations have real roots. If real roots exist, find them.

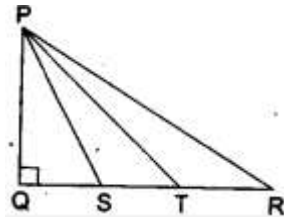
$$\frac{1}{2x - 3} + \frac{1}{x - 5} = 1, x \neq \frac{3}{2}, 5$$

OR

At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Find the present ages of both Asha and Nisha.

36) In the given figure below,  $\Delta PQR$  right-angled at Q and the points S and T trisect the side QR. Prove that  $8PT^2 = 3PR^2 + 5PS^2$ .





37) A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height  $h$ . At a point on the plane the angle of elevation of the bottom & the top of the flagstaff are respectively  $\alpha$  and  $\beta$ . Prove that the height of the tower is  $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$ .

38) Draw a right triangle in which the sides (other than hypotenuse) are of lengths 8 cm and 6 cm. Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the first triangle.

OR

Draw two tangents to a circle of radius 3.5cm from a point P at a distance of 6.2cm from its center.

39) Two dairy owners A and B sell flavored milk filled to capacity in mugs of negligible thickness, which are cylindrical in shape with a raised hemispherical bottom. The mugs are 14 cm high and have diameter of 7 cm as shown in given figure. Both A and B sell flavored milk at the rate of ₹ 80 per litre. The dairy owner A uses the formula  $\pi r^2 h$  to find the volume of milk in the mug and charges ₹ 43.12 for it. The dairy owner B is of the view that the price of actual quantity of milk should be charged. What according to him should be the price of one mug of milk? ( Use  $\pi = \frac{22}{7}$  )



OR

500 persons are taking a dip into a cuboidal pond which is 80 m long and 50 m broad. What is the rise of water level in the pond, if the average displacement of the water by a person is  $0.04\text{m}^3$ ?

40) The following is the frequency distribution of duration for 100 calls made on a mobile phone.

Duration (in sec)	Number of calls
95-125	14
125-155	22
155-185	28
185-215	21
215-245	15

Calculate the average duration ( in sec) of a call and also find the median from a cumulative frequency curve.