MATHEMATICS – CLASS 10

FULL MARKS – 80
TIME – 2hr 30min

Answers to this paper must be written on the paper provided separately. Attempt all the questions from section A and any four questions from section B. The time given at the head of the question paper is the time allotted for writing. All working including rough work must be clearly shown and done on the same sheet as rest of answers. Omission of essential working will result in loss of marks. The intended marks of each question is given in brackets [ ].

SECTION - A [40 MARKS]

Attempt all the questions from this section

QUESTION 1 [15]

Choose the correct answers to the questions from the given options. The correct option has to be written else the answer will not be considered.

1. If a matrix A is of the order 2 X 2 then the matrix A^2 will be of the order
   a. 2 X 1 b. 2 X 2 c. the matrix is not possible d. 2 X 1
2. The roots of the quadratic equation $x^2 + 2x + 1 = 0$ are:
   a. real and distinct b. real and equal c. distinct d. imaginary
3. The smallest value of x for the linear inequation $6x - 2 > -6 - 2x$, $x \varepsilon Z$ is:
   a. – 2 b. – 1 c. 0 d.1
4. Which term of the A.P 2, - 1, - 4,…. is – 70 ?
   a. 15^{th} b. 18^{th} c. 25^{th} d. 30^{th}
5. If the polynomial $2x^2 - 5x - 1$, is divided by (x – 3), the remainder is
   a. 2 b. -2 c. 0 d. – 1
6. The mean proportion between 6 and 24 is :
   a.144 b. 12 c.30 d.18
7. Mrs. Sahani deposited Rs. 1000 every month in a recurring deposit account for three years and received Rs. 40440 as the maturity value. the interest received by her is :
   a.Rs. 4440 b. Rs.2220 c.Rs.1480 d.Rs. 2960
8. Cards bearing numbers 2,4,6,8,10,12,14,16,18 and 20 are well shuffled and a card is drawn at random the probability that it is a prime number is:
   a. 0 b.1/10 c.1 d.none of these
9. The point A(2,3) is first reflected on the Y-axis followed by reflection on the X-axis the single transformation for the reflection will be:
   a. X-axis b.Y-axis c. origin d. all three
10. To estimate median for a grouped frequency distribution which of the following is used?
    a.ogive b. histogram c.frequency polygon d. all of the three
11. The co-ordinates of the third vertex of a triangle whose two vertices and centroid are (0, 0) , (5, 6) and (0, 3) respectively are:
    a. (8, 9) b.(9, 5) c. (5, 9) d. (- 5, 3)

12. (sin a + cos a) (sin a – cos a) is equal to:

a. 0 b. 1 c. $2 \sin^2 a - 1$ d. none of these

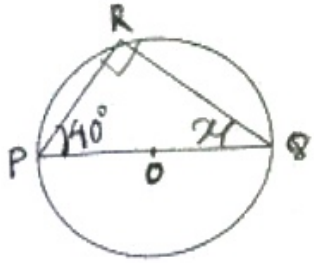
13. Value of tan 70° 12′ is equal to

a. 2.7475 b.2.7625 c.0.7776 d.2.7776

14. In the given figure if angle P = 40°, then the value of 'x' is

a. 40° b. 50°

c.60° d. 30°



15.If the sum of 3 numbers in A.P is 36, then the middle term is:

a. 12 b.15 c. 18 d.9

Question 2:

a. What number should be subtracted from $16x^3 - 8x^2 + 4x + 7$ so the resulting polynomial has $2x + 1$ as its factor. [4]

b. Sam has a recurring deposit account in a bank. He deposits Rs. 2500 per month for 2 years. If he gets Rs. 66250 at the time of maturity, find:

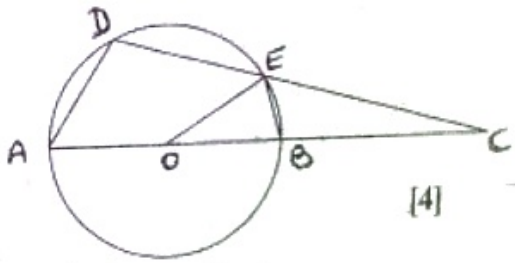
i)the interest paid by the bank ii) the rate of interest [4]

c. In the given figure , O is the centre of the circle with AB as the diameter.

If ∠AOE = 140° and ∠DAO=52°. Calculate

i) ∠CEB

ii) ∠CBE [4]



Question 3:

a. Using mathematical tables solve the following quadratic equation :

$5x(x + 2) = 3$. Give your answer correct to two significant figures. [4]

b. Prove the following identity:

$\frac{\cos A}{1-\sin A} = \sec A + \tan A$ [4]

c.Use graph sheet for this question. Take 1 cm = 1 unit on both the axes.

i) Plot the points A(- 4, 4) and B(2, 2,)

ii) Reflect A and B in the origin to get the points A′ and B′ respectively, and write their co-ordinates.

iii) Identify the geometrical name of the figure ABA′B′. [5]

SECTION – B [40 marks]

Attempt any four questions from this section.

Question 4

a.Solve the following inequation and graph the solution set: [3]

$-2\frac{5}{6} < \frac{1}{2} - \frac{2x}{3} \leq 2$, $x \in W$. Graph the solution set on the number line.

b. If $A = \begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$, find a matrix C such that

5A +5B + 2C is a null matrix. [3]

c. Draw a histogram representing the given distribution of daily pocket expenses of 200 students in a school. Estimate the mode from the graph and state the modal class. [4]

(Use 2 cm = Rs. 5 and 1 cm = 5 students)

Expenses in Rs	10-15	15-20	20-25	25-30	30-35
No. of students	28	48	60	40	24

Question 5

a. The king, queen and jack of clubs are removed from a deck of playing cards and then well shuffled. Find the probability of getting [3]

i) a king ii) a club iii) the 10 of hearts

b. Find the number of terms of the following A.P, [3]

$18, 15\frac{1}{2}, 13, \ldots\ldots\ldots\ldots, -47.$

c. Two men on either side of a temple 75 m high observe the angles of elevation of the top of the temple to be 30° and 60° respectively. Find the distance between the two men correct to 3 significant figures. [4]

Question 6

a. If $X = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$, show that $6X - X^2 = 9I$, where I is a unit matrix of order 2 X 2. [3]

b. Calculate the ratio in which the line joining A(- 4,2) and B (3,6) is divided by the point P(x,3). [3]

c. If the mean of the following distribution is 24, find the value of a. [4]

Marks	0 – 10	10 – 20	20 - 30	30 – 40	40 – 50
No. of students	7	a	8	10	5

Question 7

a. Using properties of proportion find x:y [3]

$$\frac{x^2 + y^2}{x^2 - y^2} = \frac{17}{8}$$

b. In the given figure ∠ DBC = 58°. [3]

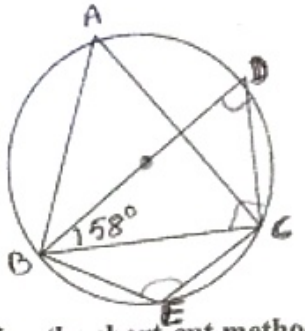
BD is the diameter of the circle.

Calculate:

i) ∠BDC

ii) ∠BEC

iii) ∠BAC



c. Calculate the mean of the following distribution using the short-cut method: [4]

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	5	12	35	24	16

Question 8

a. If a, b, c are in continued proportion prove that: [3]

$(a + b + c)(a - b + c) = a^2 + b^2 + c^2$

b. Find the sum of all multiples of 9 lying between 300 and 700. [3]

c. In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed was reduced by 100 km/hr. and time increased by 30 minutes. Find the original duration of time. [4]

Question 9

a.Using factor theorem, factorise $x^3 - 7x^2 + 14x - 8$ completely. [5]

b.The results of an examination are tabulated below : [5]

Marks less than	10	20	30	40	50	60	70	80	90	100
No. of students	8	20	40	75	125	160	188	192	197	200

Taking 2cm = 10 marks on one axis and 2cm = 20 students on the other axis , draw an ogive for the above and from the ogive determine

i) the median
ii) the number of students who failed if the pass marks was 35.
iii) the number of students who obtained grade A , if the lowest marks for grade A was 75.

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