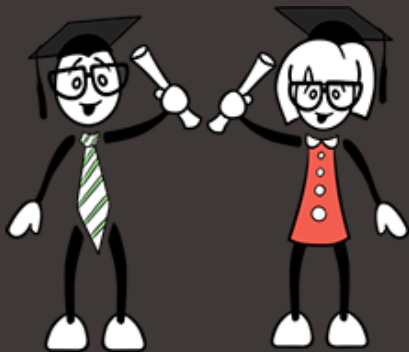


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Class	Subject	Exam	Date	Marks	Time	Total No. of Printed sides	Set A
10	Mathematics	Prelim	09.01.17	80	2 ½ Hrs	4	

General Instructions:

1. Attempt all questions from section-A.
2. Attempt any 4 complete questions from section B
3. All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.
4. Omission of essential working will result in loss of marks.
5. Mathematical tablet are provided.

SECTION A (40 Marks)

Attempt all questions from this section

Question 1

- A) The following numbers are arranged in descending order. Find the value of x If their median is 16. Also find its mean.
24, 20, x + 4, X + 3, x – 1, 12, 7, 3. [3]
- B) When $kx^3 + 9x^2 + 4x - 10$ is divided by $(x + 1)$, the remainder is Z. find the value of k. [3]
- C) If $A^T = \begin{bmatrix} 2 & -1 \\ -3 & 4 \end{bmatrix}$ and $B^T = \begin{bmatrix} 1 & p \\ -3 & q \end{bmatrix}$, find p and q such that $A^T - 6b = I$, where I is the unit matrix of order 2 x 2. [4]

Question 2

- A) In what time will a sum of Rs 2500 yield Rs 309 as compound interest ar the rate of 6% per annum. [3]
- B) A coin is tossed and a die is thrown simultaneously.
- a) Describe the Sample spaces.
 - b) Find the probability of getting I) a head and an odd number II) a tail. [3]

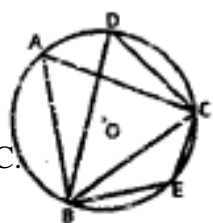
- C) A shopkeeper buys an article for Rs 12000 and marks up its price by 25%. The shopkeeper gives a discount of 10% in the marked-up price. He gives a further off-season discount of 5% on the balance. But the sales tax of 8% is charged on the remaining price.
 Find: I) the sales tax amount which the customer has to pay.
 II) the final price that the customer has to pay for the article. [4]

Question 3

- A) Without using trigonometric tables, evaluate:

$$\left[\frac{\sin 35^\circ}{\cos 55^\circ}\right]^2 - \left[\frac{\cos 55^\circ}{\sin 35^\circ}\right]^2 - 2 \sin 60^\circ$$
 [3]
- B) The radius of the cone is 10 cm. A sphere has the same radius and same volume as that of the cone. Find the total surface area of the cone (Take $\pi=3.14$) [3]
- C) A line segment intersects the y-axis at B. if P (-3, 5) be any point on the line segment AB which divides AB in the ratio 3 : 4, find the coordinates of A and B. Also find the length of PB. [4]

Question 4

- A) Solve the following in equation and graph the solution on the number line:
 $\frac{x}{2} + 5 \leq \frac{x}{3} + 6$, where x is a positive odd integer [3]
- B) In the given figure, O is the Centre of the circle and ΔABC is equilateral. Find i) $\angle BOC$ ii) $\angle BEC$ and iii) $\angle BDC$. [3]
- 
- C) Use a graph paper for this question. Plot the points A (0, 4) and B (-4, 0). These two points are vertices of a figure which is symmetrical about the x-axis and y-axis. Complete the figure on the graph. [4]
- Give the geometrical name of the figure formed.
 - Find the area of the figure.
 Find measure of $\angle ABO$ where O is the origin.

SECTION B

(Attempt any four complete questions from this section)

Question 5

- A) Solve the equation $x^2 - 9x - 12 = 0$ and give your answer correct to 3 significant figures. [3]
- B) If $X + Y = \begin{bmatrix} 5 & 2 \\ 1 & 3 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 1 & -10 \\ -5 & 7 \end{bmatrix}$, find matrices X and Y. [3]
- C) A page from a passbook of the saving bank account of Mrs. Patil is given below: [4]

Date (year 2003)	Particulars	Defits (in Rs)	Credits (in Rs)	Balance (in Rs)
April 1	B/F	-----	-----	3240.00
April 7	To cheque	700.00	-----	2540.00
April 10	By cash	-----	350.00	2890.00
May 3	By cash	-----	780.00	3670.00
May 13	To self	500.00	-----	3170.00
June 15	To self	400.00	-----	2770.00
June 22	To self	600.00	-----	2170.00
July 9	By cash	-----	251.00	2421.00

If she chooses her account on 31th July, 2003 calculate the amount she will receive, at the rate of 4.5% per amount.

Question 6

- A) A shopkeeper buys an article at a discount of 15% from the wholesaler, the printed price of the article being Rs 8000 and the rate of sales tax (under VAT) is 5%. The shopkeeper sells it to a customer at the printed price and charges tax at the same rate. Calculate: i) the amount of VAT paid by the shopkeeper ii) the price at which the article can be bought.

[3]

- B) An employer reduces the number of employees in the ratio of 15: 8 and increases their wages in the ratio of 14:25. In what ratio, the wage bill is increased or decreased?

[3]

- C) In the given figure, ABCD is a piece of cardboard in the shape of a Trapezium in which $AB \parallel DC$ and $\angle BCD = 90^\circ$. From this piece, a Quarter circle BFEC is removed. Given $AB = BC = 3.5$ cm and $DE = 2$ cm, Calculate the area of the remaining place of the cardboard correct to 2 decimal places



[4]

Question 7

- A) Prove that: $\frac{\sin \theta \tan \theta}{1 - \cos \theta} = 1 + \sec \theta$

[3]

B) Two chords AB and CD of a circle intersect at a point P inside the circle such that $AB=12$ cm, $AP=2.4$ cm and $PD = 7.2$ cm, find CD. [3]

C) Rohan invested Rs 9600 in Rs 100 shares at Rs 20 premium paying 8% dividend. He sold the shares when the price rose to Rs 160. He invested the proceeds in 10%, Rs 50 shares at Rs 40. Find the i) original number of shares ii) number of new shares iii) change in his annual income.

[4]

Question 8

A) When a building under construction was observed from a point P on the ground which is 120 meters away from its base, the angle of elevation of the top was 30° . After its demolition, when it was again observed from the same point in the angle changed to 60° . How much higher was the building raised, from the time it was first observed?

[4]

B) Use graph paper for this question. The following table shows the distribution of the monthly income of 120 employees: [6]

Monthly income (in Rs)	8000-9000	9000-10000	10000-11000	11000-12000	12000-13000	13000-14000	14000-15000	15000-16000	16000-17000
No. of employees	5	9	16	22	26	18	11	8	5

Using the scale $2\text{cm} = \text{Rs } 1000$ on one axis and $2\text{cm} = 20$ employees on the other axis, draw the ogive for the above distribution. Use your graph to estimate the following:

- The median income
- The number of employees whose monthly income is above Rs. 15500
- Percentage of employees whose monthly income is below Rs. 10500

Question 9

A) Manish opened a recurring deposit account with the Bank of Maharashtra and deposits Rs 200 per month for $1\frac{1}{4}$ years. Calculate the maturity value on this account, if the bank pays interest at the rate of 9% per annum. [3]

B) Using properties of proportion, solve for a:

$$\frac{a^4+9}{6a^2} = \frac{5}{3} \quad [3]$$

C) Find the mean of following frequency distribution by short cut method. [4]

Class interval	1-50	51-100	101-150	151-200	201-250	251-300
frequency	7	8	11	10	9	5

Question 10

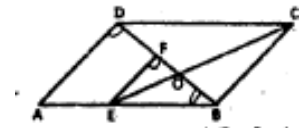
- A) A two digit number is such that the product of its digits is 6. When 9 is added to this number the digits interchange their places. Find the number. [3]
- B) Find the equation of the line which is perpendicular to the line $3x - 2y = 6$ at the point where the given line meet y-axis. [3]
- C) Using ruler and compasses only, construct a ΔABC in which $AB = 6$ cm, $BC = 8$ cm and median $AM = 5$ cm. Draw the circumscribed circle of ΔABC . Locate a point P on the circumference of the circle such that P is equidistant from AB and BC. [4]

Question 11

- A) A man invests Rs. 46875 at 4% per annum compound interest for 3 years. Calculate the i) interest for the first year. ii) amount standing to his credit at the beginning of the third year. [3]
- B) If B (9, -2) and D (5, 6) are the vertices of a parallelogram ABCD and diagonal AC is inclined at 45° with the positive direction of x-axis, find the equation of diagonal AC.

[3]

- C) In the adjoining figure, ABCD is a parallelogram. E is a Point on AB. CE intersects the diagonal BD at O and $EF \parallel BC$. If $AE : EB = 2 : 3$, find area of ΔABD : area of trapezium AEFD.



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