Test On MATHEMATICS

FM: 80 *~Zero2infinity*

Attempt all questions from Section A and Any Four questions from Section B
The intended marks for questions or parts of questions are given in brackets []

SECTION A
Attempt all questions from this Section

Question 1

(a) If A= $\begin{bmatrix} 2 & -1 \\ -1 & 13 \end{bmatrix}$ evaluate $A^2 - 3A + 2I$, where I is a unit matrix of order 2. [3]

(b) Find the value of a, if the division of a $x^3 + 9x^2 + 4x - 10$ by (x+3) leaves a remainder 5 [3]

(c) Karan sold x shares of Rs. 100 paying 10% dividend at a discount of 25% and invested the proceeds in Rs 100 shares paying 16% dividend, quoted at Rs 80 and thus increased his income by Rs 2000. Find the value of x. [4]

Question 2.

(a) If all even numbered cards are removed from a pack of 52 playing cards, what is the probability that a card picked up is [3]

(i) a face card

(ii) a multiple of 3 of clubs

(iii) a red multiple of 5.

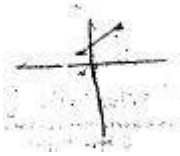
(b) Solve the following quadratic equation by using the formula. [3]

$\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

(c) Prove that $\frac{tanA}{1-cotA} + \frac{cotA}{1-tanA} = SecACosecA + 1$ [4]

Question 3.

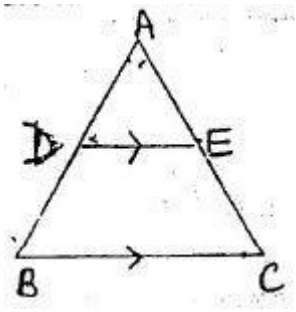
(a) The line segment joining A (-1, $\frac{5}{3}$) and B (a, 5) is divided in the ratio 1:3 at P, where P is the point where the line segment AB intersects Y-axis, calculate [3]



I. The value of a
II. The co-ordinates of the point P.

(b) Three numbers are in continued proportion and the middle number is 18 and the sum of first and last number is 39, find the numbers. [3]

(c) In the given figure, DE // BC



(i) Prove that Δ ADE and Δ ABC are similar.

(ii) Given that AD = $\frac{1}{2}$ BD, calculate DE if BC = 4.5 cm

(iii) If area of Δ ABC = 18 cm^2, find area of trapezium DBCE. [4]

Question 4

(a) Solve the given inequation and graph the solution on the number line. [3]

$-2\frac{1}{3} \leq \frac{x}{3} - 1\frac{1}{6} < \frac{5}{6}$, $x \in I$

(b) Mrs. Neeta deposited Rs. 350 per month in a bank for 1 year and 3 months under the recurring deposit scheme. If the maturity value of her deposits is Rs. 5565, find the rate of interest per annum. [3]

(c) Plot A (2,3) and B (6,3) [4]

(i) Reflect A in the origin to get the image D.

(ii) Reflect A in x-axis to get the image C.

(iii) Write the co-ordinates of C and D.

(iv) What kind of figure is ABCD? Find its area.

Section B (Any 4)

Question 5

(a) Solve the following linear equation and represent the solution set on the number line [3]

$4x - 19 < \frac{3x}{5} - 2 \leq -\frac{2}{5} + x$, $x \in R$

(b) Kamal has a recurring deposit account in a post office for 3 years at 8% p.a, simple interest, if he gets Rs. 1998 as interest at the time of maturity, find

(i) Monthly installment [3]

(ii) The amount of maturity

(c) Draw the histogram for the following and find mode [4]

Class mark	25	35	45	55	65
Frequency	7	15	18	12	8

Question 6.

(a) Solve the following equation $x - \frac{18}{x} = 6$. Give your answer correct to two significant figures. [3]

(b) Using ruler and a pair of compass only, construct a triangle ABC with BC = 6.4 cm, CA = 5.8 cm and ∠ABC = 60°, Draw its incircle. Measure and record the radius of the incircle. [3]

(c) Given that (x+1) and (x-2) are factors of $x^3 + a x^2 - bx - 6$, Find the values of a and b with these values of a and b, factorise the given expression completely. [4]

Question 7

(a)Given $\begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} . X = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$

Write down

(i) The order of the matrix X.

(ii) The matrix X. [3]

(b) A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) a green ball

(ii) a white or a red ball

(iii)Neither a green ball nor a white ball. [3]

(c) The printed price of an article is Rs. 60,000. The wholesaler allows a discount of 20% to the shopkeeper. The shopkeeper sells the article to the customers at the printed price. The sales tax (under VAT) is charged at the rate of 6% at every stage, find [4]

(i) The cost to the shopkeeper inclusive of tax.

(ii) VAT paid by the shopkeeper to the Government.

(iii)The cost to the customer inclusive of tax.

Question 8

(a) Prove the following: $\frac{1+Cos\theta}{1-Cos\theta} = \frac{tan^2\theta}{(Sec\theta-1)^2}$ [3]

(b) Construct an isosceles triangle ABC, such that AB = 6 cm and BC = AC = 4 cm. Bisect ∠C internally and mark a point P on the bisector such that CP = 4.5 cm. Find the point Q and R which are 4.5 cm from P and also 4.5 cm from the line AB. [3]

(c) If $x = \frac{\sqrt{3a+2b}+\sqrt{3a-2b}}{\sqrt{3a+2b}-\sqrt{3a-2b}}$ by using the property of proportion,

Prove that $bx^2 - 3ax + b = 0$. [4]

Question 9

(a) Using the step-deviation method, find the mean of the following frequency distribution [3]

C.I	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
F	10	6	8	12	5	9

(b) Draw a line AB = 6 cm. Construct a circle with AB as diameter. Mark a point P at a distance of 5 cm from the midpoint of AB. Construct two tangents from P to the circle with AB as a diameter. Measure the length of each tangent. [3]

(c) A man stands at a point A on the bank of a river and looks at the top of a tree exactly opposite to him on the other bank and finds that the angle of elevation of the top of the tree is 60°. When he moves 50 m away from the bank he finds the angle of elevation to be 30°. Calculate [4]

(i) The width of the river
(ii) The height of the tree

Question 10

(a) A man buys 400, twenty rupees shares at a discount of 20% and receives a

return of 12% on his money. Calculate [3]

(i) The amount invested by him
(ii) The rate of dividend paid by the company.

(b) The model of a building is constructed with the scale factor 1:30 [3]
(i) If the height of the model is 80 cm, find the actual height of the building in meter.
(ii) If the actual volume of a tank at the top of the building is 27 m^3, find the volume of the tank on the top of the model.

(c) A plane travels a distance of 2400 km at a certain speed. But on the return trip due to bad weather, it reduces its speed by 50 km / hr. and covers the same distance in 12 minutes more than that of onward journey, Find the original speed of the plane. [4]

Question 11

(a) A (2, -4), B (3, 3) and C (-1, 5) are the vertices of Δ ABC. Find the equation of [4]

(i) The median of the triangle through A.

(ii) The altitude of the triangle through B.

(b) Using a graph paper. Draw an ogive for the following distribution which shows

the marks obtained in the general knowledge paper by 100 students.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No of students	5	10	20	25	15	12	9	4

Use the ogive to estimate [6]

(i) The median

(ii) The upper quartile

(iii) The number of student who score marks above 65?

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