## Q.P. Code :24871

**[Time: 2:30 Hours]** **[ Marks:75]**

Please check whether you have got the right question paper.

N.B:

**Q.1** **All questions are compulsory.** **10**

a) Solve the following using Cramer's Rule.
4x +3y=850 ; 3x + 2y =600

b) F(x) = $x^3 - 5$. Find f(2) , f (-2) , f (0), f (-1)

c) Fund 3A -5B where A=$\begin{bmatrix} -1 & 2 \\ 3 & -4 \end{bmatrix}$ and B $\begin{bmatrix} 0 & 2 \\ 4 & -6 \end{bmatrix}$

d) For the following Arithmetic progression find. $t_7$, $t_{10}$
4,7,10,13,……..

e) A= $\{1,2,4,8,10\}$ B = $\{2,6\}$ C = $\{1,6,8\}$
Find (i) (A ∩ B) UC (ii) (A ∩ B) U (B ∩ C)

**Q.2** **Attempt any three** **15**

a) If for an Arithmetic Progression; $t_1 = 5$ and $t_{12} = 38$. Find common difference and $16^{th}$ term.

b) Explain any 2 types of functions with an example each

c) Sagar borrowed Rs.4,000 for his office at 4% per annum, to be compounded half yearly. Find the amount due to him after 3 years.

d) Find $\frac{dy}{dx}$ where y = $\sqrt[5]{x} - e^8 + 3x^5 - 15$

e) From 4 professors and 6 students, a committee of 3 is to be formed. In how many ways, this can be done, if the committee contains:
i) Exactly 1 professor
ii) At least 2 professor

**Q.3** **Attempt any two** **20**

a) Find inverse by adjoint method
A = $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 5 & 0 \\ 2 & 4 & 3 \end{bmatrix}$

b) A loan of Rs. 10000 at 12% interest p.a. If he is supposed to return the money in 4 equal monthly instalment, then
i) Find EMI using reducing balance method
ii) Make amortization table
iii) Find instalment using flat interest rate method.

c) Find maxima and minima of the function
f(x) = $2x^3 - 15x^2 + 36x + 5$.

**Q.4** **Attempt any three** **30**

a) Differentiate the following w.r.t. x

i) $Y = (2x^2 + 3)(4x^3-5)$

ii) $Y = \frac{(2x+3)(x-5)}{x^3+1}$

b) Evaluate the following integrals:

(i) $\int(4x^5 - 4.5^x + 6e^x - \frac{8}{x})dx$

(ii) $\int(5x^2 - 2x^{3/2} + 4\sqrt{x} + 8)dx$

(iii) $\int(\frac{4}{x^2} + 10\sqrt{x})(x^2 + 1)dx$

(iv) $\int(x+3)(x-7)dx + \int\frac{(4x-3)(2x+1))}{x}dx$

c) Find 3 numbers in an A.P. such that their sum is 75 and sum of squares is 1925.

d) From a pack of cards, two cards are to be selected at random. Find the number of selections in each of the following cases.

(i) Exactly one card is a king

(ii) One card is a king and other is a queen

(iii) Both are red cards

(iv) One red card and one black card

*********