

SMT M.M.K COLLEGE OF COMMERCE AND ECONOMICS
 SYJC TERMINAL EXAMINATION -2018
 MATHEMATICS AND STATISTICS

M.M:40

TIME:1: 45MINS

DATE:27 /10/18

SECTION -I

Q1) Attempt any 3 of the following:

(6)

- i) If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix}$ prove that $|AB| = |A| |B|$
- ii) Find $\frac{dy}{dx}$ at $t=3$, if $x = at^2$ and $y = 2at$
- iii) Write the negation of the following statements:
 - a) If it rains then match will be cancelled
 - b) Kiran is rich if and only if he is honest
- iv) Divide 30 into two parts such that sum of their square is minimum

Q2) Attempt any 2 of the following:

(6)

- i) If $x^y = e^{-y}$, prove that $\frac{dy}{dx} = \frac{\log x}{(\log x + 1)^2}$
- ii) Using the truth table verify the equivalence of the following logical statement
 $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$
- iii) Discuss the continuity of the function f at $x = 0$

$$\text{Where } f(x) = \frac{5^x + 5^{-x} - 2}{\cos 2x - \cos 6x} \text{ for } x \neq 0$$

$$= \frac{1}{8} (\log 5)^2 \text{ for } x = 0$$

Q3) Attempt any 2 of the following:

(8)

- i) If $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 3 & 1 \end{bmatrix}$ then find A^{-1} using adjoint method
- ii) Find maximum and minimum values of $2x^3 - 15x^2 + 36x + 10$
- iii) The demand y for a commodity when its price x is given by $y = \frac{x+3}{x-2}$. Find the elasticity of demand when its price is 3 units.

SECTION - II

Q1) Attempt any 3 of the following:

(6)

- i) A salesman allows 4% commission on the total sales made by him plus a bonus of $\frac{1}{4}$ % on sales over Rs. 5000 . If his total earnings amount to Rs 625 , Find the sales made by him.
- ii) Calculate the coefficient of correlation between X and Y for the following data :
 $n=15, \bar{x} = 25, \bar{y} = 18, \sigma_x = 3.01, \sigma_y = 3.03, \sum (x - \bar{x})(y - \bar{y}) = 122.$
- iii) From the two regression equations $y = 4x-5$ and $3x=2y+5$, find \bar{x} and \bar{y} .
- iv) Find the age specific death rate for the following data

Age group in years	Population	No. of deaths
0-20	7000	140
20-45	20000	180
45-65	10000	120
65 and above	4000	160

Q2) Attempt any 2 of the following:

(6)

- i) The income of an agent remain unchanged though the rate of commission is increased from 5% to 6.25% . Find the percentage of reduction in the value of business .
- ii) For a bivariate data $\bar{x} = 53$ and $\bar{y} = 28$, $b_{yx} = -1.5$, $b_{xy} = -0.2$ find
 - a) Correlation coefficient between x and y
 - b) Estimate of y for x=50
 - c) Estimate of x for y=25
- iii) A scooter worth Rs 18000 is insured for Rs. 15000. In an accident it is damaged to the extent of Rs.9000. Find the amount of compensation that can be claimed under the policy.

Q3) Attempt any 2 of the following:

(8)

i)

For the following table find the terms marked by ?

x	l_x	dx	q_x	p_x	L_x	T_x	e^0_x
5	90	?	0.11	?	?	290	----
6	80	----	----	----	----	?	?

- ii) A bill of Rs25500 was drawn on 18th February 2006 for 9 months . It was encashed on 28th June 2006 at 5% p.a. Calculate the banker's gain and true discount.
- iii) Find the least number of years for which an annuity of Rs 3000 per annum must run in order that it's amount just exceeds Rs 60000 at 10% compounded annually.