KN-5876-77

KN-5876-77 Seat No._____

B. Sc. (Sem. III) Examination

November / December – 2014

(1) Subject Elective - 103 : Business Mathematics - I

(2) ES-31 : Business Mathematics - III

(New Course)

Time : 2 Hours] [Total Marks : 50

(1) Subject Elective - 103 : Business Mathematics - I

1. (a) Define the following terms: 3

Feasible Solution, Degenerate Solution, Slack & Surplus variables.

(b) Find the graphical solution of the following LPP. 11

Minimize z=x+y

Subject to the constraints,

$5x+10y \leq 50; x+y \geq 1; y \leq 4,\ x,\ y \geq 0.$

(c) Attempt any One: 11

(1) Solve graphically: Maximize Z = 2x+3y

Subject to the constraints,

$5x+4y \leq 200; 3x+5y \leq 150;$

$5x+4y \geq 100; 8x+4y \geq 80; x, y \geq 0.$

(2) Formulate the following problem into the standard LPP form :

A manufacturer decides to produce tables and chairs. Each table requires 4 hours in department A and 2 hours in department B. Each chair needs 2 hours and 5 hours in departments A and B respectively. There are 80 hours and 180 hours available in both the departments A and B. The profit on the sale of one table is Rs. 10 and Rs. 15 on a chair. Whatever units produced are sold in the market. Design a model for this programme.

2. (a) Explain the following terms : **3**

Positive & Negative correlation, Regression coefficients, Scatter Diagram.

(b) Find the correlation co-efficient for the data given below: **11**

X	20	29	21	28	22	27	23	26	24	25
Y	16	21	16	20	17	19	17	19	18	17

(c) Attempt any One : **11**

(1) Find the equations of regression lines if,

$\bar{x}=30.4, \bar{y}=26.5, \sigma_x=6.4, \sigma_y=8.0, r=0.56$

(2) Obtain the equations of regression lines from the following data :

X	1	5	3	2	1	2	7	3
Y	6	1	0	0	1	2	1	5

1 Attempt any three : 18

(a) If $y=\frac{x}{\log x+1}$ then find $\frac{dy}{dx}$.

(b) $\frac{d}{dx}\left(\tan^{-1}\frac{3x-x^3}{1-3x^2}\right)$.

(c) If $x\sqrt{1+y}+y\sqrt{1+x}=0$ then prove that $\frac{dy}{dx}=\frac{-1}{(1+x)^2}$.

(d) Find $\frac{dy}{dx}$ for $x^2+y^2+2gx+2fy+c=0$.

2 Attempt any **three** : 18

(a) Find $\int\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)dx$.

(b) $\int\frac{\sin x}{1+\sin x}dx$

(c) Evaluate : $\int\frac{x^2+1}{x+1}dx$.

(d) Find : $\int\frac{(2x+1)^2}{x-2}dx$.

3 Attempt any **two** : 14

(a) $\int \frac{\tan x}{\sec x + \tan x} dx$

(b) If $x^y = y^x$ then prove that

$$\frac{dy}{dx} = \frac{y(x \log y - y)}{x(y \log x - x)}$$

(c) If $y = \log\left(xe^x\right)$

then find $\frac{dy}{dx}$

(d) $\int \sin 2x \sin 4x \sin 6x \, dx$