GAF-488-489 Seat No._____

B. Sc. (Sem. V) Examination

November / December – 2015

Mathematics

1. SE - EC-103 : Business Mathematics - I

2. ES-21 : Business Mathematics - III

(Elective Subject)

Time : **2** Hours] [Total Marks : **50**

1. SE - EC-103 : Business Mathematics - I

Instructions :

(1) There are **two** questions.

(2) Figure to the right indicates the mark of the corresponding questions.

1 Solve the following L.P. Problem : (Any **three**) **30**

(a) Minimize : $2Z = 3x + 3y$

Subject to

$x+y-2\geq 0;\ x+3y-3\geq 0;\ x\geq 0;\ y\geq 0$

(b) Maximize : $Z = 3x + 4y$

Subject to

$120-5y-2x\geq 0;\ 80-2y-4x\geq 0;\ x\geq 0;\ y\geq 0.$

(c) Minimize : $Z = x + y$

subject to

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

(d) Maximize : $Z = 5x + 7y$

subject to $x \geq 0,\ y \geq 0;\ 4 - x - y \geq 0;\ 3x + 8y - 24 \leq 0.$

2 Attempt any **two** : **20**

(1) Find coefficient of rank correlation between following x and y :

x	50	55	55	60	65	65	65	60	60	50
y	11	13	14	16	16	15	15	14	13	13

(2) Find the regression coefficient of the following data :

x	16	17	28	20	21	22	23	24	25
y	12	14	14	18	19	22	21	23	22

(3) 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. ES-21 : Business Mathematics - III

(Elective Subject)

Instructions :

(1) There are **two** questions.

(2) Figure to the right indicates marks of corresponding questions.

1 (a) Attempt any **two** : **10**

(1) If $y = ae^{px} + be^{qx}$

then prove that $y_2 - (p+q)y_1 + pqy = 0$

(2) Prove that :

$$\frac{d}{dx} \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) = \frac{2}{1+x^2} \quad if \quad x > 0$$

$$= \frac{-2}{1+x^2} \quad if \quad x < 0$$

(3) Find $\frac{d}{dx} \sin^3 (x^2 - x + 1)$

(b) Attempt any **two** : **10**

(1) If $\sin (x+y) = x - y$ then prove that

$$\frac{dy}{dx} = \tan^2\left(\frac{x+y}{2}\right)$$

(2) If $y = \log (\log x)$ then prove that

$$\frac{d^2y}{dx^2} = -\frac{(1+\log x)}{(x \log x)^2}$$

(3) If $x = a \sin^3 \theta$, $y = b \cos^3 \theta$, then find $\frac{dy}{dx}$.

(c) Attempt any **one** : 5

(1) If $x = \sqrt{a^{\sin^{-1} t}}$ $y = \sqrt{a^{\cos^{-1} t}}$ then

prove that $\frac{dy'}{dx} = -y/x$

(2) If $y = \cos x^x + \sin x^x$ then find $\frac{dy}{dx}$.

2 (a) Attempt any **two** : 10

(1) $\int \frac{x+3}{x^2+6x+4} dx$

(2) $\int \cos 2x \cos 4x \cos 6x \, dx$

(3) $\int \frac{x}{\sqrt{x+1}} dx$

(b) Attempt any **two** : 10

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

(2) $\int \tan^3 x \, dx$

(3) $\int \frac{1}{(x-1)^{\frac{3}{2}} (x-2)^{\frac{1}{2}}} dx$

(b) Attempt any **one** : 5

(1) $\int x^2 \sqrt{a^6 - x^6} \, dx$ where $0 < x < a$

(2) $\int \sin^2 x \cos^4 x \, dx$
