BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
FIRST SEMESTER – 2017-18
MIDSEM

COURSE NO.:ECON F213
COURSE TITLE: MSM
Closed Book Test

Marks 60 (Weightage-30%)
Date: 9th October, 2017
Duration-90 Minutes

Instructions- Answer every parts of each question together. Do not over-write. Values in brackets at the end of every question denote marks of respective question. Answer either question number 6 or 7. Rest of questions are compulsory. Any wrong or undoable question can be challenged with valid logic to get full credit.

1) Verify the Roy's identity for the given utility function $U=X_1^{\alpha}X_2^{\beta}$ where α and β are positive constants. Price of per unit of X_1 and X_2 are P_1 and P_2 respectively. Assume total money is M. **(8)**

2) Out of 8000 graduates in BITS, 800 are females and out of 1600 graduate employees 120 are females. Use chi-square test statistic to determine if any distinction is made in appointment on the basis of gender.

Assume critical value of chi-square at 5% level of significance for 1 degree of freedom is 3.84 **(8)**

3) A consumer has a utility function $U(x_1,x_2) = 2x_1+x_2$. If consumer's income is 100 and price of x_1 and x_2 are 20 and 30 respectively then what are the utility maximizing values of x_1 and x_2.

What will happen to optimal values of x_1 and x_2 if utility function is changed to $(2x_1+3x_2)$ but prices and income remain unchanged. **(5+3=8)**

4) Two independent random variables X and Y have same probability density function (p.d.f.) and it is given by- **(8)**

$f(x) = c(1+x)$ when $x \in [0,1]$ and c is a constant number.

$= 0$ otherwise

Calculate Variance of (X+Y).

5) A market model is given by- **(8)**

$Q_d = \alpha - \beta P_t$

$Q_s = -\gamma + \delta p_t$

$P_{t+1} = P_t - \sigma (Q_s - Q_d)$

Where α, β, γ, δ, σ are positive constants and suffix t refers to time. Q_d is quantity of demand and Q_s is quantity of supply. Solve the difference equation and derive the condition in terms of β, δ and σ for uniform oscillation and explosive oscillation of time path of P_t

6) Show that for any utility function U=U(X,Y) for a given budget constraint $M=P_xX + P_YY$, $\frac{d2y}{dx2}$ or double derivative (second order condition) can be expressed as $|H|$/Marginal utility of $Y*P_Y^2$,