 B.Sc.-CBCS/IS/ECO/H/C2T/17

2017

ECONOMICS

[Honours]

(CBCS)

[First Semester]

PAPER – C2T

Full Marks : 60

Time : 3 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP–A

1. Answer any *ten* questions from the following : 2×10

   (*a*) How is continuity of a function $f(x)$ at $x = a$ defined ?

   (*b*) What do you mean by the statement that indifference curves are convex to the origin ?

(*c*) Distinguish between a local maximum and the global maximum of a function.

(*d*) Let $y = \log x$ and $x = 2 + 3z + 5z^2$ find dy/dz.

(*e*) Define expectation of a random variable.

(*f*) In how many ways can the letters of the word ECONOMICS be arranged ?

(*g*) Write the probability density function of a normal random variable with mean μ and variance σ^2.

(*h*) What do you mean by a polynomial function ? Give an economic example.

(*i*) Define sample space.

(*j*) What are the axioms of probability theory ?

(*k*) Define Independent events.

(*l*) Distinguish between ordered pairs and unordered pairs.

(*m*) What is a rational function ? Give an economic application of it.

(*n*) If the Average Revenue function $AR = 46 - 3Q^2$, find the Marginal Revenue *MR*.

(*o*) Find the elasticity of demand if the demand fucntion is $Q = 62 - 3P^2$ at $p = 4$.

GROUP–B

Answer any **four** questions from the following : 5×4

2. Using Venn diagram show that

$$\{(A \cup B) \cap C)\} = (A \cap C) \cup (B \cap C)$$

3. What is the probability of getting a total of 10 points in three throws of a balanced dice ?

4. With usual notation, prove that

$$P(A+B) = P(A) + P(B) - P(A \cap B)$$

5. The marginal cost function of a company is given by $MC = 75 + 20x - 3x^2$. Find the total cost function when fixed cost is Rs. 1000.

6. Suppose, the demand curves is $P = f(Q) = 50 - 0{\cdot}1\ Q$ and the supply curve is $P = g(Q) =$

$0{\cdot}2\,Q + 20$. Find the equilibrium price and output. Compute the consumer's surplus and producers' surplus.

7. Define the point of inflexion. Find the point of inflexion for the following function :

$$Y = X^3 + 5X^2 + 3X + 9$$

GROUP–C

Answer any **two** questions from the following : 10×2

8. State and prove the Bayes' theorem of probability. There are three boxes containing white and black balls as shown in the table below :

	No. of white balls	No. of black balls
Box 1	4	6
Box 2	3	5
Box 3	5	2

A box is chosen at random and a ball is drawn from that. It is found to be white. What is the probability that Box 3 was chosen ? $5 + 5$

9. Distinguish between a difference equation and a differential equation. Given the demand and supply functions for the Cobweb model as follows, find the intertemporal equilibrium price, and examine whether the equilibrium is stable or not 4 + 6

$$Q_{dt} = 18 - 3P_t \text{ and } Q_{st} = 3 + 4P_{t-1}$$

10. Define first and second order conditions of maximisation of a function $y = f(x)$. The revenue $R(Q)$ and cost $C(Q)$ functions of a firm are $R(Q) = 1200\,Q - 2Q^2$ and $C(Q) = Q^3 - 16{\cdot}25\,Q^2 + 1528{\cdot}5Q + 2000$. Find the profit maximising output and the maximum profit of the firm. 4 + 6

11. (*i*) If, $Y_i = a + bX_i$, prove that

$$E(y^2) = a^2 + 2abE(X) + b^2E(X^2)$$

(*ii*) Evaluate

$$\int_2^5 e^{2x}\,dX$$

(*iii*) Examine if the function $y = x^6 + 5$ is monotonic. Find $\frac{dX}{dY}$ by applying the Inverse fucntion rule. 4 + 3 + 3
