

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, MARCH 2021

SECOND YEAR [BATCH 2019-22]

ECONOMICS (HONOURS)

PAPER : V[CC5]

Date : 12/03/2021

Time : 11 am – 1 pm

Full Marks : 50

Unit - I

Answer **any three** questions of the following:

[3×4]

1. A monopolist faces the following demand function:

$$q = 150 - C.p$$

The constant C is not known, but the monopolist believes that there is an equal chance that it is either 10 or 15. What price should the monopolist charge so as to maximize expected revenue. Assuming there is no cost to the monopolist.

2. Suppose you have an utility function:

$$U(Y) = 1000Y - 10Y^2$$

You are asked to choose between two prospects:

- a) $Y = 30$ and $Y = 50$, each with probability $\frac{1}{2}$
b) $Y = 40$, with probability 1 (certainty)

Which one will you choose? What is the certainty equivalent income for choice in (a)? Define the cost of risk and risk premium for prospect (a).

3. Write short notes on –

- i) Adverse selection
ii) Signalling

4. What is Quasi – Rent? Illustrate with an appropriate example.

Unit - II

Answer **any one** question of the following:

[1×8]

5. Suppose you want to install a smoke alarm system in your house. The probability that the alarm gives a false signal is 0.05. The probability that you may have fire is 0.5.

- i) Draw the sequence of events in a probability tree (1)
ii) Calculate the corresponding probabilities of each terminal branch (2)
iii) Suppose the probability of having fire is very low, say, 0.10. Recalculate the probabilities in the terminal branches. (2)
iv) Calculate the probability of having fire provided the alarm is on. And also calculate the probability of having fire provided the alarm is off. (2)

- v) Suppose the cost of installing the fire alarm system is Rs. 200000. The benefit of installing the fire alarm system is realised only if there is actual fire. Otherwise, the cost of installation is sunk. Do you think the efficacy (in terms of probability) of the new device will induce you to invest Rs.200000 in it? (1)
6. i) Suppose, Satadru is an expected utility maximizer. He attaches utilities $U(1) = 1, U(2) = 4, \text{ and } U(3) = 6$, for the monetary pay offs 1, 2 & 3 respectively. Assume also that monetary pay off 2 is certain, but monetary pay offs 1 & 3 are uncertain, and there is 50-50 chance of getting either one. Which of the two alternatives Satadru will choose and why? (3)
- ii) In the probability triangle diagram sketch the expected utility of Satadru, and calculate the slope. (2)
- iii) Sangeeta, sister of Satadru, is another expected utility maximizer, but she attaches different utilities for same monetary pay offs 1, 2 & 3 are, $U(1) = 9, U(2) = 12, \text{ and } U(3) = 18$. Which of the two alternatives Sangeeta will choose and why, if monetary pay off 2 is certain, but monetary pay offs 1 & 3 are uncertain, and there is 50-50 chance of getting either one? (3)

Unit – III

Answer **any two** questions of the following: [2×15]

7. i) Derive the Clark –Wicksteed product exhaustion theorem. (7.5)
- ii) Explain the Clark – Wicksteed product exhaustion theorem intuitively. (7.5)
8. i) Explain the concept of the elasticity of the production function. (5)
- ii) If wage – rental ratio increases by 10% point due to some reason, and factor substitutability is inelastic, i.e., say $\sigma = 0.25$ then equivalent proportionate change in capital – labour ratio will be? (5)
- iii) What is relative factor share? Show that sum of the relative factor share in a competitive market is unity. (5)
9. i) Show that in a two factor model, when wage increases relative to rental price of capital, the relative share of labour that of capital will increase, remain unchanged or decrease according as $\sigma \lesseqgtr 1$ (5)
- ii) What is technological progress ? Define different types of it. (3)
- iii) Derive the relation between technological progress and relative factor share. (4)
- iv) Show that the relative share of labour increases, remains unchanged or falls, according as the technological progress is labour using (capital saving), neutral or capital using (labour saving) (3)
10. i) Define Arrow – Pratt coefficient of absolute risk aversion. Show that it is invariant to positive linear transformation of the utility function. (5)
- ii) If a decision maker prefers a 10% chance of winning Rs.5000 to a 20% chance of winning Rs.2000, explain which of the following choices are consistent with her preferences satisfying independence axiom – (5)
- a) She prefers 70% chance of winning Rs 2000 and 10% chance of winning Rs.5000 to a 90% chance of winning Rs.2000.
- b) She prefers 90% chance of winning Rs 2000 and 10% chance of winning Rs.5000 to a 20% chance of winning Rs.5000 to a 50% chance of winning Rs.2000.
- c) She prefers 10% chance of winning Rs 2000 and 10% chance of winning Rs.5000 to a 30% chance of winning Rs.2000

- iii) Malabika has a utility function of the form $U(x) = \sqrt{x}$, while her friend Montu, has an utility function of the form, $U(x) = x^{3/4}$. Can you state in general which of the two agents is the more risk –averse? And why? (5)

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