MA Economics Entrance Examination
Ashoka University

Syllabus and Sample Questions

1 General Instructions

1. The entrance exam will be of a multiple choice format.

2. The exam will be of three hours duration and consist of 50 questions.

3. Each correct answer will earn you 1 point and each wrong answer will cost you 0.25 points. That is, there is negative marking.

4. You will not be allowed to use calculators or any other electronic device during the course of the exam.

5. The entrance will have questions from Microeconomics, Macroeconomics, Statistics, Mathematics and Logical/Analytical Reasoning. Syllabus and sample questions are provided below.

2 Microeconomics

2.1 Syllabus

<u>Topics</u>: Choice, Preferences and Utility; Consumer Theory; Producer Theory; Perfect Competition; Monopoly and Price Discrimination; Edgeworth Exchange Economies; Welfare Economics; Externalities.

<u>Recommended Textbook</u>: "Intermediate Micro Economics" by Hal Varian. Eighth Edition

2.2   Sample Questions

1. Let $X = \{x, y, z\}$. Let $\succsim \subseteq X \times X$, given by $\succsim = \{(x, x), (y, y), (z, z), (x, z), (z, x), (y, z), (z, y)\}$, denote the weak preference (binary) relation of a decision maker. Which of the following is true:

   (a) $\succsim$ is complete but not transitive

   (b) $\succsim$ is transitive but not complete

   (c) $\succsim$ is both complete and transitive

   (d) $\succsim$ is neither complete nor transitive

2. Person A's utility function is given by

$$U(x_1, x_2) = x_1^2 + x_2^2;$$
$$x_1, x_2 \geq 0$$

   Price of both the goods are same. Then, what must be true about the optimal bundle?

   (a) Consumer consumes good 1 and good 2 in 1-to-1 ratio

   (b) Consumer consumes only good 1

   (c) Consumer consumes only good 2

   (d) Consumer is indifferent between consuming only good 1 and consuming only good 2.

3. Demand function for roses is given by:

$$Q_d = 100 - p$$

   and supply is given by:

$$Q_s = 10 + 2p$$

   The Government levies a sales tax on roses after which the volume of sales drops to 60. Then, per unit tax is:

(a) 20

(b) 15

(c) 10

(d) 5

4. A consumer has utility function given by:

$$u(x_1, x_2) = \min\{2x_1 + x_2, x_1 + 2x_2\}$$

Given income $m = 100$, prices $p_1 = 20, p_2 = 30$, the amount of x_1 in her utility maximizing bundle is:

(a) 7

(b) 5

(c) 2

(d) 0

5. Consider a firm using two inputs to produce an output. It is known that greater use of any of the inputs leads to greater output. Moreover, for any combination of input prices, the firm employs in input combination of the form (x, ax), where $a > 0$ is a constant. Which of the following functions represent the firm's technology?

(a) $f(x, y) = \min\{x^a, y\}$

(b) $f(x, y) = \min\{ax, y\}$

(c) $f(x, y) = \min\{x, ay\}$

(d) $f(x, y) = \min\{x, y^a\}$

6. A monopolist faces demand

$$P = 8 - Q$$

in the market. The monopolist has a constant unit cost equal to 5 for the first two units of output, then it decreases to 3 per unit. It's profit maximizing output equals:

(a) $\frac{3}{2}$

(b) $\frac{5}{2}$

(c) 2

(d) Both a and b

7. Consider a world with two goods, x and y. Smriti happens to lexico-graphically prefer x to y. Smriti's preferences can be represented by the utility function:

(a) $u(x, y) = x$

(b) $u(x, y) = x^{0.99} y^{0.01}$

(c) $u(x, y) = \frac{x}{y}$

(d) none of the above

8. Consider a world with three individuals, A, B and C, and two goods, x and y. A lexicographically prefers x to y, whereas B and C's prefer-ences are represented by the utility functions $\min\{x, y\}$ and $\max\{x, y\}$, respectively. Which of the following statements is true:

(a) A and B's preferences are convex, but C's is not

(b) B and C's preferences are convex, but A's is not

(c) C and A's preferences are convex, but B's is not

(d) B's preferences are convex but A's and C's are not

9. Consider statements A and B:

A: Every general competitive equilibrium allocation is Pareto efficient

B: Every Pareto efficient allocation can be supported as a general competitive equilibrium allocation

Which of the following statements is true?

(a) Both statements A and B are necessarily true

(b) Statement A is necessarily true but not statement B

(c) Statement B is necessarily true but not statement A

(d) Neither statement A nor B is necessarily true

10. Consider a pure exchange competitive market economy with two individuals, A and B, and two commodities, x and y, whose prices are denoted by p_X and p_Y, respectively. Individual A lexicographically prefers x to y. Individual B's utility function is $\min\{x, y\}$. Both individual A's and B's endowment is $(50, 50)$. A competitive equilibrium price ratio, p_X/p_Y, for this economy

(a) exists and is equal to 1

(b) exists and is less than 1

(c) exists and is greater than 1

(d) does not exist

3   Macroeconomics

3.1   Syllabus

Topics: National income accounting; Keynesian Model of income determination and the multiplier; IS-LM Model; Models of aggregate demand and aggregate supply; Rational expectations; Solow model of growth; Money, banking and inflation.

Recommended Textbook: "Macroeconomics" by Dornbush, Fisher and Startz. Eleventh Edition.

3.2 Sample Questions

1. The Central Bank controls money supply in the economy by

   (a) printing currency notes and coins

   (b) setting bank loan rates

   (c) altering required reserve ratio

   (d) lending to government and large size firms

2. Which of the following is true?

   (a) a rise in foreign income, other things being equal, worsens home country's trade balance

   (b) a real depreciation by the home country improves the trade balance and hence decreases aggregate demand

   (c) a rise in home income raises import spending and hence improves trade balance

   (d) none of the above

3. Life cycle permanent income hypothesis predicts

   (a) marginal propensity to consume out of transitory income is higher than marginal propensity to consume out of permanent income

   (b) propensity to consume out of wealth is independent of age

   (c) consumption is smoother than income over one's lifetime

   (d) marginal propensity to consume is constant over one's lifetime

4. Which of the following is true?

   (a) unemployment is directly related to real GDP

   (b) jobless recovery is a phenomenon where output increases and unemployment rates decrease in an economy

    (c) frictional unemployment exists when the economy is less than its full employment levels

    (d) natural unemployment can be reduced by reducing unemployment benefits

5. Which of the following relations is not true?

    (a) GDP - Depreciation = NDP

    (b) GDP less Net Factor Payments Abroad = GNP

    (c) Disposable income = Income + Transfers - Taxes

    (d) GDP = Gross Value Added = Profits - Wages

6. The government wishes to raise equilibrium income by Rs. 1000 crores via in an economy in which the marginal propensity to consume is .75. Its chosen instrument is a tax cut. By how much should taxes be reduced?

    (a) Rs. 75 crores

    (b) Rs. 25 crores

    (c) Rs. 333.33 crores

    (d) The tax cut cannot guarantee an increase in income at all.

7. In the IS-LM model if investment demand does not vary with the interest rate:

    (a) both monetary and fiscal policy are ineffective

    (b) both monetary and fiscal policy are effective

    (c) monetary policy is effective, but fiscal policy is ineffective

    (d) monetary policy is ineffective, but fiscal policy is effective

8. In the Solow model of growth a rise in the rate of depreciation:

    (a) raises the steady state level of output per capita.

(b) lowers the steady state level of output per capita

(c) has no impact on output per capita as savings will adjust

(d) encourages technical progress as society must now replace capital faster

9. The nominal exchange rate on January 1 was "10 Mexican pesos = 1 US dollar." We are informed that the dollar has since depreciated in real terms. What does this imply?

(a) there is inflation in the US but not in Mexico

(b) there is inflation in Mexico but not in the US

(c) inflation in the US exceeds that in Mexico

(d) inflation in Mexico exceeds that in the US

4 Statistics

4.1 Syllabus

Topics: Measures of Central Tendency and Dispersion; Elementary Probability Theory; Random variables; Special Discrete Distributions like Binomial, Hypergeometric and Negative Binomial; Special Continuous Distributions like Uniform and Normal; Joint Discrete Distributions; Sampling Distributions, Interval, Point Estimation and Hypothesis Testing for Population Means, Proportions and Variances.

Recommended Textbooks: (i) "Probability and Statistics for Engineering and the Sciences" by J.L. Devore. Seventh Edition. (ii) "John E. Freund's Mathematical Statistics with Applications" by Miller and Miller. Eighth Edition.

4.2   Sample Questions

1. Your neighbour has 2 children. You learn that he has a son, Joe. What is the probability that Joe's sibling is a brother?

   (a) 1/2

   (b) 1/3

   (c) 1

   (d) 2/3

2. Two cards from an ordinary deck of 52 cards are missing. What is the probability that a random card drawn from this deck is a spade?

   (a) 1/4

   (b) 1/2

   (c) 1/5

   (d) 1/13

3. Suppose you and a friend play a game. Two standard, fair, six-sided dice are thrown, and the numbers appearing on the dice are multiplied together. If this product is even, your friend gives you a quarter, but if this product is odd, you must give your friend one dollar. What is the expected value of this game for you?

   (a) 6.25 cents

   (b) -6.25 cents

   (c) -75 cents

   (d) 75 cents

4. Consider a positively skewed distribution. Find the correct answer on the position of the mean and the median:

   (a) Mean is greater than median

(b) Mean is smaller than median

(c) Mean and median are same

(d) None of the above

5. Let A and B be two mutually exclusive events with positive probability each, defined on the same sample space. Find the correct answer:

   (a) A and B are necessarily independent

   (b) A and B are necessarily dependent

   (c) A and B are necessarily equally likely

   (d) None of the above

6. Let p be the probability that a coin toss turns out to be 'Heads' and let $\hat{p}$ be an estimate of this probability. A coin is tossed 20 times. The coin turns out to be 'Heads' 7 times and 'Tails' 14 times. Which of the following would you conclude?

   (a) $p = 0.3$

   (b) $p = 0.5$

   (c) The expected value of $\hat{p}$ is p

   (d) None of the above

7. A soft-drink vending machine is set so that the amount of drink dispersed is a random variable with a mean of 200 milliliters and a standard deviation of 15 millilitres. 36 samples are taken randomly from the vending machine. The mean amount dispersed in the sample is 196 milliliters. What is the variance of the mean?

   (a) 225

   (b) 22.5

   (c) 2.5

   (d) Cannot be determined without more information

8. In 16 ten-kilometre runs, the petrol consumption of a car averaged 1 litres with a standard deviation of 0.4 litres. The t-ratio for testing the claim that the average petrol consumption (for 10 km run) of this car is 1.2 litres is

   (a) 4

   (b) -2

   (c) 0.4

   (d) -0.4

9. If $\hat{\theta}$ is an unbiased estimator of θ,then which of the following is true:

   (a) $a\hat{\theta} + b$ is an unbiased estimator of $a\theta + b$ for all possible values of a and b.

   (b) $a\hat{\theta} + b$ is an unbiased estimator of $a\theta + b$ only when both a and b are strictly positive

   (c) $a\hat{\theta} + b$ is an unbiased estimator of $a\theta + b$ only when a is strictly positive and $b = 0$.

   (d) $a\hat{\theta} + b$ is an unbiased estimator of $a\theta + b$ only when a is strictly positive and for all possible values of b.

10. If a random sample of size $n = 20$ from a normal population with the variance $\sigma^2 = 225$ has the mean 64.3, the 95% confidence interval for population mean is

    (a) (44.3, 84.3)

    (b) (57.7, 70.9)

    (c) (49.3,79.3)

    (d) None of the above

5 Mathematics

5.1 Syllabus

<u>Topics</u>: Elementary Set Theory and Logic; Functions; Single and Multi-variable Calculus, Linear Algebra, Constrained optimization.

<u>Recommended Textbook</u>: "Essential Mathematics for Economic Analysis" by Sydsaeter, Hammond and Strom. Fourth Edition

5.2 Sample Questions

1. Which of the following equations has the largest number of real solutions?

   (a) $x^2 + x + 12 = 17 - 2x$

   (b) $6x + 8 = 4 - 12x$

   (c) $x^4 + x^2 + 8 = 0$

   (d) $e^x + \frac{9}{e^x} = 6$

2. If $f(x) = \begin{cases} 5x^2 & x \leq 2 \\ -3x^3 & x > 2 \end{cases}$, which of the following statements is true?

   (a) f is continuous and differentiable everywhere

   (b) f is continuous and differentiable for $x > 2$

   (c) f is continuous everywhere but not differentiable at $x = 2$

   (d) None of the above

3. Let f be a function defined by $f(x) = e^{2x+1}$. Then $\lim_{x \to 0} \frac{f(f(x)) - f(e)}{x} =$

   (a) e^{2e+1}

(b) $2e^{2e+2}$

(c) $4e^{2e+2}$

(d) $8e^{2e+1}$

4. How many stationary points does the following function have: $f(x, y) = x^2 + 2x + y^2 e^x$

(a) 0

(b) 1

(c) 2

(d) 3

5. The matrix A is always invertible for the following values of a and b.
$$A = \begin{pmatrix} a & 0 & b \\ ab & b & a \\ a & a & b \end{pmatrix}$$

(a) $a = 0; b = 1$

(b) $a \neq b$

(c) $a = 1; b = 0$

(d) None of the above

6. If $L = \lim_{x \to \infty}[(x^5 - x^4)^3 - x]$, then L equals

(a) $1/5$

(b) $1/4$

(c) 0

(d) None of the above

7. If $y = e^{-x-5}$, then $\frac{dx}{dy}$ equals

(a) $-y$

(b) $-1/y$

(c) $-1/y^2$.

(d) $1/5$

8. If the function $f(x, y) = x^2 + y^2$ is maximised subject to $g(x, y) = x^2 + xy + y^2 = 3$, then the following is a solution

    (a) $(1, 1)$

    (b) $(-1, -1)$

    (c) $(2, -2)$

    (d) $(3, -\sqrt{3})$

9. Let $f(x) = \frac{x^2}{x^2+2}$. Then, $-1/3\sqrt{6}$ is

    (a) A local minimum

    (b) A maximum

    (c) A global minimum

    (d) A point of inflection

10. $e^x - 1$ is

    (a) greater than $x + x^2/2$ for $x > 0$

    (b) less than $x + x^2/2$ for $x > 0$

    (c) greater than $x + x^2/2$ only for $x > 2$

    (d) greater than $x + x^2/2$ only for $x > 1$

11. If $z = e^{x^2} + y^2 e^{xy}$, $x = 2t + 3s$, $y = t^2 s^3$, then $\frac{\partial z}{\partial t}(t, s)$ at $t = 1, s = 0$ is

    (a) e^4

    (b) $16e^2$

    (c) $8e^4$

    (d) $8e^2$

6 Analytical and Logical Reasoning

6.1 Sample Questions

1. Although spinach is rich in calcium, it also contains large amounts of oxalic acid, a substance that greatly impedes calcium absorption by the body. Therefore, other calcium-containing foods must be eaten either instead of or in addition to spinach if a person is to be sure of getting enough calcium. Which of the following, if true, most seriously weakens the argument above?

   (a) Rice, which does not contain calcium, counteracts the effects of oxalic acid on calcium absorption.

   (b) Dairy products, which contain even more calcium than spinach does, are often eaten by people who eat spinach on a regular basis.

   (c) Neither the calcium nor the oxalic acid in spinach is destroyed when spinach is cooked.

   (d) Oxalic acid has little effect on the body's ability to absorb nutrients other than calcium.

2. What is the negation of the following sentence: *All Chinese citizens speak Mandarin.*

   (a) No Chinese citizen speak Mandarin.

   (b) At least one Chinese citizen speaks Mandarin.

   (c) Some Chinese citizens do not speak in Mandarin.

   (d) None of the above.

3. Which of the following statements are NOT equivalent to the statement: *If an animal is a primate, then it is a mammal.*

   (a) All primates are mammals.

(b) There does not exist a primate that is not a mammal.

(c) If an animal is not a mammal, then it is not a primate.

(d) If an animal is not a primate, then it is not a mammal.

4. Find the missing number in the following series from the options given below

$$6, 5, 24, 25, 144, -$$

(a) 150

(b) 155

(c) 175

(d) 180

5. There are six persons A, B, C, D , E and F. C is the sister of F. B is the brother of E's husband. D is the father of A and grandfather of F. There are two fathers, three brothers and a mother in the group. Which of the following is a group of brothers ?

(a) ABD

(b) ABF

(c) BFC

(d) BDF

6. There are three persons X, Y, Z. One of them is a truth-teller (always tells the truth), another is a Liar (always lies) and the third is a normal person (sometimes lies, sometimes tells the truth). They all know of each others? and their own types.

X said : "I am a normal person."

Y said: "X and Z sometimes tell the truth."

Z said : "Y is a normal person."

Which of the following is true?

(a) These statements are insufficient to determine who is a liar

(b) X is a normal person, Y is a truth-teller and Z is a liar.

(c) These statements are insufficient to determine who is a liar, or a truth-teller, or a normal person.

(d) X is a liar, Y a normal person, Z is truth-teller.

7. The WOW language has only two letters in its alphabet, O and W. The language obeys the following rules: (i) deleting successive letters WO from any word which has more than two letters gives another word of the same meaning. (ii) inserting OW or WWOO in any place in a word yields another word of the same meaning. O, OWOOW, WOO, OWW are 4 words in this language.

Which of the following is false?

(a) The words WOO and OWW necessarily have the same meaning

(b) WOO and OWW may not have the same meaning

(c) O and OWOOW must have the same meaning

(d) (b) and (c) are true

8. A group of medical professionals found that while 75 percent of Indian women surveyed in 1965 revealed creeping osteoporosis the figure for 2000 was 50 percent of the same population. The researchers concluded that the incidence of osteoporosis among Indians had declined between 1965 and 2000. Which of the following, if true, would most undermine the researchers' conclusion?

(a) The individuals surveyed came from a variety of income backgrounds.

(b) The individuals surveyed were all whom the medical professionals actually knew personally.

(c) The accuracy of the methods of measuring bone density has improved dramatically even in India.

(d) Those surveyed in 2000 were younger on average than those surveyed in 1965.

9. Two young persons are discussing the preservation of the species.

Meena: "Since attempting to preserve every species that is currently endangered is prohibitively expensive, the endangered species whose value to humanity is the greatest should be accorded the highest priority for preservation."

Saif: "But such a policy would be unsound because it is impossible to predict the future value of a species, nor is it always possible to assess the present value of species whose contributions to humanity, though significant, are indirect."

Which of the following is the main point of Saif's response to Meena?

(a) Since the methods for deciding which species have the most value to humanity are imperfect, informed decisions cannot be made on the basis of the assessment of such value.

(b) Although it would be desirable to preserve all endangered species, doing so is not economically feasible.

(c) Even if the value to humanity of a given species is known, that value should not be a factor in any decision on whether to expend effort to preserve that species.

(d) Species whose contributions to humanity are direct should have a higher priority for preservation efforts than species whose contributions to humanity are only indirect.