ASHOKA UNIVERSITY

MA ECONOMICS ENTRANCE EXAMINATION

This is a sample paper only. The actual entrance exam will have more questions.

Time: 45 min Maximum Marks: 12

Instructions

- This is a multiple choice exam.
- Sections A and B are compulsory. In addition you must do either section C or section D, but not both.
- Mark your answers in the OMR sheet. You will be provided only one OMR sheet. So, be careful when you make your entries.
- Each correct answer will earn you 1 point. Each wrong answer will cost you 0.25 points. Your objective should be to maximize your score.
- Please fill in your name, application number, signature and serial number of OMR sheet on the bottom of this question paper.
- Space for rough work is provided at the back of this question paper.
- Please return the OMR sheet and the question paper once you have completed the exam.

Good Luck!

Name: _____ Application No.: _____

Signature: _____ OMR Serial No.: _____

SECTION A: STATISTICS

1. Suppose an urn has b blue balls and r red balls. We randomly pick a ball. If the drawn ball is red, we put two red balls back to the urn. If the drawn ball is blue, we put two blue balls back into the urn. Then we randomly pick a ball again. What is the probability that the second pick is red?

   (a) $\frac{r}{r+b}$

   (b) $\frac{b}{r+b}$

   (c) $\frac{2r}{2r+b}$

   (d) $\frac{2b}{2r+b}$

   Ans: (a)

2. John and Jenny are waiting for Amy at the movie theatre. John says, "If Amy has taken the metro, her probability of reaching on time is 0.7. However if she is driving or has taken a cab, her probability of reaching on time is 0.5 and 0.8, respectively." Jenny adds, "The probability of Amy taking the metro is 0.5, of driving is 0.3 and of traveling by cab is 0.2." Amy is not on time. What is the probability that she did not take a cab?

   (a) $\frac{3}{10}$

   (b) $\frac{17}{50}$

   (c) $\frac{15}{17}$

   (d) $\frac{3}{25}$

   Ans: (c)

3. A random sample of size 8 is drawn from a distribution with probability mass function

$$p(k;\theta) = \theta^k(1-\theta)^{(1-k)}, k = 0, 1; 0 < \theta < 1.$$

The sample values are $1, 0, 1, 1, 0, 1, 1, 0$. The maximum likelihood estimate of θ is

(a) 1

(b) 5/8

(c) 3/8

(d) 0

Ans: (b)

SECTION B: ANALYTICAL REASONING

4. If there are no economists that aren't social scientists and no statisticians that aren't economists, then which of the following statements is always true?

   (a) All social scientists are statisticians

   (b) All statisticians are social scientists

   (c) Any social scientist is also an economist.

   (d) None of the above

   Ans: (b)

5. Economic policy today must be flexible enough to change constantly and to adapt to outside and internal conditions even as they ..... Such an approach requires the ..... to be open to mid-course correction. Further, it calls for a ..... to shut down initiatives if it becomes clear that they are doomed to fail. Choose the combination most appropriate for the blanks in the passage:

   (a) evolve, policy maker, willingness

   (b) deteriorate, firms, patience

   (c) improve, citizens, foresight

(d) change, policy maker, patience

Ans: (a)

6. A study by a multilateral bank found that a particular state recorded the highest rate of industrial growth among states in India for a whole decade. From this the authors concluded that this state may be considered a manufacturing powerhouse. Which of the following, if true, would most undermine this description?

   (a) During the same period the state also recorded the highest agricultural growth among Indian states.

   (b) Oil refining by a single firm accounted for 75 percent of industrial output.

   (c) The state has disappointing human development indicators.

   (d) Industrial output accounts for less than 50 percent of the state domestic product.

   Ans: (b)

SECTION C: ECONOMICS

7. The Grand Theater is a movie house in a medium-sized college town. If the theater is open, the owners have to pay a fixed nightly amount of $500 for films, ushers, and so on, regardless of how many people come to the movie. For simplicity, assume that if the theater is closed, its costs are zero. The nightly demand for Grand Theater movies by students is

$$Q_S = 220\text{-}40P_S$$

   where Q_S is the number of movie tickets demanded by students at price P_S. The nightly demand for nonstudent moviegoers is

$$Q_N = 140\text{-}20P_N$$

The profit-maximizing number of tickets sold to the students and the non-students, respectively, are:

(a) $110, 70$

(b) $50, 70$

(c) $200, 110$

(d) $20, 20$

Ans: (a)

8. A monopolist faces demand

$$P = 10 - Q$$

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) $\frac{7}{2}$

(c) 2

(d) Both a and b

Ans: (b)

9. A utility function $u : \mathbb{R}_+ \times \mathbb{R}_+ \to \mathbb{R}$ over two commodities, both of which can be consumed in only non-negative amounts, is said to satisfy the property of local non-satiation (LNS) if for any commodity bundle $(x, y) \in \mathbb{R}_+ \times \mathbb{R}_+$ and any open set O containing this bundle, it is possible to find another commodity bundle $(x', y') \in (\mathbb{R}_+ \times \mathbb{R}_+) \cap O$ such that (x', y') is strictly preferred to (x, y), i.e., $u(x', y') > u(x, y)$. (Note that $\mathbb{R}_+$ denotes the set of non-negative real numbers)

Consider the following two utility functions:

$$\begin{aligned}\tilde{u}(x,y) &= x^{0.5}y^{0.5}\\ \hat{u}(x,y) &= -(x+y)\end{aligned}$$

Which of the following statements is true?

(a) Both $\tilde{u}$ and $\hat{u}$ satisfy LNS

(b) Neither $\tilde{u}$ nor $\hat{u}$ satisfy LNS

(c) $\tilde{u}$ satisfies LNS but $\hat{u}$ does not

(d) $\hat{u}$ satisfies LNS but $\tilde{u}$ does not

Ans: (c)

10. Charu loves apples and hates bananas. Her utility function is

$$U(a;b) = a - \frac{1}{4}b^2$$

where a is the number of apples she consumes and b is the number of bananas she consumes. Sandeep likes both apples and bananas. His utility function is

$$U(a;b) = a + 2\sqrt{b}$$

Charu has an initial endowment of no apples and 8 bananas. Sandeep has an initial endowment of 16 apples and 8 bananas. If apples is the numeraire commodity (i.e., its price is normalized to 1), then the only price of bananas at which Sandeep will want to consume exactly 16 bananas is

(a) 4

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) 1

Ans: (c)

11. Consider an exchange economy with two agents, A and B, and two goods, x and y. Agent A's endowment is $(0, 1)$ and Agent B's endowment is $(2, 0)$. The agents can consume only non-negative amounts of the goods. Agent A lexicographically prefers x to y, i.e., she strictly prefers a bundle containing more x, and if the bundles contain equal amounts of x then only she strictly prefers the one with more of y. Agent B, on the other hand, treats x and y as perfect substitutes, i.e., she likes a bundle (x, y) strictly more than (x', y') only if $x + y > x' + y'$.

    The competitive allocation for this economy is:

    (a) A gets $(0, 1)$, B gets $(2, 0)$

    (b) A gets $(2, 0)$, B gets $(0, 1)$

    (c) A gets $(\frac{3}{2}, 0)$, B gets $(\frac{1}{2}, 1)$

    (d) A gets $(1, 0)$, B gets $(1, 1)$

    Ans: (d)

12. Indicate which of the following statements are true.

    (i) When the output gap is zero the economy is on its short-run Phillips Curve but converse is not true.

    (ii) The output gap is the ratio of actual to natural real GDP.

    (iii) A shift of the supply curve results in a negative output gap.

    (iv) When the output gap is zero inflation is steady.

    The options are:

    (a) Statements (i), (ii) and (iv)

    (b) Statements (iii) and (iv)

    (c) Statements (ii), (iii) and (iv)

(d) Statements (ii) and (iv)

Ans: (a)

SECTION D: MATH

13. The function $f : \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = |3x| + 4$. For which of the following functions $g : \mathbb{R} \to \mathbb{R}$ does the graph of g intersect the graph of f? (Note that $\mathbb{R}$ denotes the set of real numbers. We use this notation at several places in subsequent questions as well.)

    (a) $g(x) = x - 2$

    (b) $g(x) = 2x - 2$

    (c) $g(x) = 3x + 3$

    (d) $g(x) = 4x - 2$.

    Ans: (d)

14. The function $f : \mathbb{R} \to \mathbb{R}$ is defined as $f(x) = \frac{(x^2-4)(x-1)}{x^2-a}$. For how many positive values of a is the function continuous at all values of x?

    (a) None

    (b) One

    (c) Four.

    (d) Two.

    Ans: (b)

15. The function $f : \mathbb{R}_+ \to \mathbb{R}$ is differentiable, strictly concave, strictly increasing and satisfies $f(0) = 0$. Which of the following statements is true about this function? (Note that $\mathbb{R}_+$ denotes the set of non-negative real numbers and f' denotes the first derivative of f)

    (a) $f'(x) < \frac{f(x)}{x}$, for all $x > 0$

(b) $f'(x) > \frac{f(x)}{x}$, for all $x > 0$

(c) $f'(x) = \frac{f(x)}{x}$, for some $x > 0$

(d) None of the above

Ans: (a)

16. What is the solution to the following optimization problem?

$$\max_{x \geq 0, y \geq 0} \{\alpha y - \beta x\}, \text{ where } \alpha, \beta > 0$$

subject to

$$x + y = 1$$

(a) $x = 1, y = 0$

(b) $x = 0, y = 1$

(c) $x = -1, y = 2$

(d) None of the above

Ans: (b)

17. What is the solution to the following optimization problem?

$$\min_{(x,y) \in \mathbb{R} \times \mathbb{R}} \{x + y\}$$

subject to

$$x^2 + y^2 \leq 1$$

(a) $x = 0, y = 0$

(b) $x = -\frac{1}{2}, y = -\frac{1}{2}$

(c) $x = -\frac{1}{\sqrt{2}}, y = -\frac{1}{\sqrt{2}}$

(d) None of the above

Ans: (c)

18. What is the solution to the following optimization problem?

$$\min_{(x,y)\in\mathbb{R}\times\mathbb{R}} \{y - 2x\}$$

subject to

$$y = ||x| - 1|$$

(a) $x = 0, y = 0$

(b) $x = 1, y = 0$

(c) $x = 0, y = 1$

(d) This problem does not have a solution

Ans: (d)