

## Ashoka University

### M.A. in Economics & Data Analytics Entrance Examination

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

Time: 35 min

Maximum Marks: 27

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#### Instructions

- This is a multiple choice exam. Only one answer is correct.
- All sections are compulsory.
- 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 3 points. Each wrong answer will cost you 1 point.
- Your objective should be to maximize your score.
- Please fill in your name, application number, signature and serial number of OMR sheet.
- 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!

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Name:

Signature:

Application No.:

OMR Serial No.:

## Section A: Statistics

1. A factory produces light bulbs, and the lifetime (in hours) of a randomly selected bulb is known to follow a distribution with mean  $\mu = 1,000$  hours and standard deviation  $\sigma = 200$  hours. Let  $\Phi(x)$  represent the cumulative distribution function (CDF) of the standard normal distribution where  $x$  is the  $z$ -score. A random sample of 25 bulbs is selected. What is the probability that the sample mean lifetime of the bulbs is greater than 1,040 hours?

- (a)  $\Phi(1)$
- (b)  $1 - \Phi(1)$
- (c)  $1 - \Phi(2)$
- (d)  $\Phi(2)$

**Answer: b**

2. If  $n$  letters are placed randomly in  $n$  envelopes, what is the probability that exactly  $n - 1$  letters are placed in correct envelope?

- (a)  $(n - 1)/n$
- (b)  $1/n$
- (c) 0
- (d)  $1/(n - 1)$

**Answer: c**

3. Let  $X$  be a Poisson random variable with parameter  $\lambda$ . Then  $E(X^2)$  is

- (a)  $\lambda^2$
- (b)  $\lambda$
- (c)  $\lambda^2 + \lambda$
- (d)  $2\lambda$

**Answer: c**

## Section B: Analytical and Logical Reasoning

1. A firm produces two products,  $A$  and  $B$ , using a single production line. The production line operates for 12 hours per day. Producing one unit of  $A$  takes 2 hours, while producing one unit of  $B$  takes 3 hours. The firm must produce at least 2 units of  $A$  and 1 unit of  $B$  per day. What is the maximum number of total units (of both  $A$  and  $B$ ) the firm can produce in one day while satisfying these constraints?

- (a) 5 units
- (b) 6 units
- (c) 7 units
- (d) 8 units

**Answer: a**

2. Five friends – Aditi, Bhavesh, Chitra, Divya, and Eshan – are sitting in a row. Aditi is sitting to the immediate right of Bhavesh. Chitra is sitting next to Divya. Eshan is sitting between Aditi and Chitra. Bhavesh is sitting at one of the ends of the row. Who is sitting at the extreme left of the row?

- (a) Bhavesh
- (b) Chitra
- (c) Eshan
- (d) Divya

**Answer: a**

3. If  $A$  is true and  $B$  is false, what can we conclude about “ $A$  and  $B$ ”?

- (a) “ $A$  and  $B$ ” is true.
- (b) “ $A$  and  $B$ ” is false.
- (c) It is not possible to determine the truth value of “ $A$  and  $B$ ”.
- (d) None of the above.

**Answer: b**

## Section C: Mathematics

1. Evaluate the following limit:

$$\lim_{x \rightarrow 0} \frac{\sqrt{1+4x} - \sqrt{1-3x}}{x}.$$

Which of the following is correct?

- (a)  $\frac{7}{2}$
- (b) 2
- (c)  $\frac{5}{2}$
- (d) 1

**Answer: a**

2. If  $s = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ , then which of the following is TRUE for  $s$  ?

- (a)  $s - 1 = s$
- (b)  $s - 1 = \frac{s}{2}$
- (c)  $s = \infty$
- (d)  $s = \frac{7}{4}$

**Answer: b**

3. From the equation,  $x^2 - 3xy + y^3 - 7 = 0$ , using the implicit function theorem, what is  $dy/dx$  around the point  $(4, 3)$ ?

- (a)  $\frac{1}{15}$
- (b)  $\frac{2}{5}$
- (c)  $\frac{2}{13}$
- (d)  $\frac{1}{5}$

**Answer: a**