



# PETRODICE ACADEMY

Head office: Hyderabad branch

Topic: Probability and Statistics

Time Allowed: 45 Min

Maximum Marks:25

Read the following instructions carefully.

01. (i) Question Numbers 01 to 05 (05 questions) will carry one mark each.

(ii) Question Numbers 06 to 15 (10 questions) will carry two marks each.

02. **Wrong answers carry 33% negative marks. In Q. 01 to Q.05, 1/3 mark will be deducted for each wrong answer and in Q. 06 to Q.15, 2/3 mark will be deducted for each wrong answer. However, there is no negative marking for numerical answer Type questions.**

## GROUP – I

Each question carries ONE mark

$$5 \times 1 = 5$$

1. A fair coin is tossed 3 times in a succession. If the first toss produces a head, then the probability of getting exactly two heads in three tosses is

- a)  $1/8$                       b)  $1/2$   
c)  $3/8$                       d)  $3/4$

2. The probability that a new Airport will get an award for its design is 0.16. The probability that it will get an award for its efficient use of materials is 0.24 and probability that it will get both the awards is 0.11. What is the probability that it will get only one of the two awards?

- a) 0.29                      b) 0.18  
c) 0.21                      d) 0.19

3. A fair dice is rolled twice. The probability that an odd number will follow an even number is

- a)  $1/2$                       b)  $1/6$   
c)  $1/3$                       d)  $1/4$

4. A probability density function is of the form

$$p(x) = Ke^{-\alpha|x|}, x \in (-\infty, \infty)$$

The value of K is

- a) 0.5                      b) 1  
c)  $0.5\alpha$                       d)  $\alpha$

5. If E denotes expectation, the variance of a random variable X is given by

- a)  $E[X^2] - E^2[X]$   
b)  $E[X^2] + E^2[X]$   
c)  $E[X^2]$   
d)  $E^2[X]$

## GROUP – II

Each question carries TWO mark

$$10 \times 2 = 20$$

1. In a manufacturing plant, the probability of making a defective bolt is 0.1. The mean

and standard deviation of defective bolts in a total of 900 bolts are respectively

- a) 90 and 9
- b) 9 and 90
- c) 100 and 10
- d) 10 and 100

2. The probability that two friends share the same birth-month is

- a)  $1/6$                       b)  $1/12$
- c)  $1/144$                     d)  $1/24$

3. A box contains 5 black balls and 3 red balls. A total of three balls are picked from the box one after another, without replacing them back. The probability of getting two black balls and one red ball is

- a)  $3/8$                       b)  $2/15$
- c)  $15/28$                     d)  $1/2$

4. A box contains 5 black and 5 red balls. Two balls are randomly picked one after another from the box, without replacement. The probability for both balls being red is

- a)  $1/90$
- b)  $1/2$
- c)  $19/20$
- d)  $2/9$

5. If P and Q are 2 random events, then which of the following is true?

a) Independence of P and Q implies that Probability  $(P \cap Q) = 0$

b) Probability  $(P \cap Q) \geq$  Probability (P) + Probability (Q)

c) If P and Q are mutually exclusive then they must be independent

d) Probability  $(P \cap Q) \leq$  Probability (P)

6. If a random variable X satisfies the Poissons distribution with a mean value of 2, then the probability that  $X \geq 2$  is

- a)  $2e^{-2}$                       b)  $1 - 2e^{-2}$
- c)  $3e^{-2}$                       d)  $1 - 3e^{-2}$

7. Determine the probability p, that a non-defective bolt will be found next, if out of 600 bolts already examined, 12 were defective?

- a) 0.02                      b) 0.04
- c) 0.96                      d) 0.98

8. A class of first year B. Tech. Students is composed of four batches A, B, C and D, each consisting of 30 students. It is found that the sessional marks of students in Engineering Drawing in batch C have a mean of 6.6 and standard deviation of 2.3. The mean and standard deviation of the marks for the entire class are 5.5 and 4.2, respectively. It is decided by the course instructor to normalize the marks of the students of all batches to have the same mean and standard deviation as that of the entire class. Due to this, the marks of a student in batch C are changed from 8.5 to

- a) 6.0                      b) 7.0
- c) 8.0                      d) 9.0

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9. If the standard deviation of the spot speed of vehicles in a highway is 8.8 kmph and the mean speed of the vehicles is 33 kmph, the coefficient of variation in speed is

- a) 0.1517      b) 0.1867  
c) 0.2666      d) 0.3645

10. The mean of 25 values was calculated as 78.4, but while taking them an item 69 was misread as 96, the correct mean is

- a) 77.32      b) 78.4  
c) 76          d) 69

10.