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F.Y.B.Sc.(General)(Minor Statistics)

COURSE CODE: STA12203 COURSE NAME: Discrete and continuous probability distributions

(Semester II)

**Program: (BScGen)
Program Specific: General B.Sc.
Course Type: F.Y.B.Sc. (Gen)Minor
Paper: III**

**Credits: 2
Time: 2 Hours
Max. Marks: 30
SET: A**

Instructions to the candidate:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw a well labelled diagram wherever necessary.
- 4) Use of Statistical table and calculator is allowed.

SECTION: A

Q1) Answer the following:

[5 X 1= 5]

1. If $X \sim B(n=20, P=0.04)$ find mean of X .
2. For certain Normal distribution $Q_1=3, Q_2 = 5$ then find Q_3 .
3. If $X \sim t_9$ distribution, $P(X \leq -4) = 0.36$ then find $P(X \geq 4)$
4. Represent the following probability graphically using standard normal probability curve:
 $P(-1 < Z < 2)$
5. State mean and variance of Poisson distribution.

SECTION: B

Q2) Answer the following (any 5)

[5 X 2 =10]

1. Define 'Geometric distribution'.
2. Give any two real life situations of 'Negative Binomial distribution'.
3. Given that, mean of Poisson distribution is 5 find $P(X > 1)$.
4. If $X \sim U(a=0, b=10)$, find mean and variance of X .
5. If $X \sim \text{Exp}(\text{mean} = 5)$, find variance of X .
6. If Z has a standard normal variable, compute the following probabilities using normal probability table: i) $P(Z \geq 1.30)$ ii) $P(0.50 \leq Z \leq 1.30)$
7. The p.d.f. of continuous random variable X is

$$f(x) = \frac{1}{2\sqrt{2\pi}} \cdot e^{\frac{1}{4}(x-8)^2}; \quad -\infty < x < \infty$$

Identify the distribution and hence find the parameters.

SECTION: C

Q3) Answer the following/Write short notes on following: (any 2)

[2 X 5 = 10]

1. State the properties of Normal distribution.
2. If X follows discrete uniform distribution with $n = 10$ then find $E(X)$ and $\text{Var}(X)$
3. If $X \sim B(n=40, P=0.02)$ Compute i) $P(X < 4)$ ii) $P(X > 20)$
4. State additive property of Chi-square distribution.

SECTION: D

Q4) Answer the following: (any 1)

[5 X 1 = 5]

1. X is a random variable having p.m.f. as
$$P(X=x) = pq^{x-1} \quad ; x = 1, 2, \dots \quad 0 < p < 1$$
$$= 0 \quad ; \text{Otherwise}$$

Given that $P(X = 4) = 0.2889$ and $P(X = 3) = 0.428$ find

- i) $P(X \leq 2)$ ii) $E(X)$ iii) $\text{Var}(X)$
2. State the lack of memory property of “Exponential distribution”. The time (in hours) required to repair a machine is exponentially distributed with mean 5. What is probability that a repair takes at least 10 hours, given that its duration exceeds 8 hours?
