

QP CODE: 23127934



Reg No :

Name :

**B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE
EXAMINATIONS, OCTOBER 2023**

Third Semester

B.Sc Psychology Model I

**COMPLEMENTARY COURSE - ST3CMT23 - PROBABILITY AND PROBABILITY
DISTRIBUTIONS**

2017 Admission Onwards

262F00C6

Time: 3 Hours

Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Consider the random experiment of tossing 3 coin at a time, what is the probability of exactly 2 heads.
2. If $P(A)=0.5$, $P(B)=0.4$, $P(A \cup B)=0.8$, find $P(A \cap B)$
3. if A and B are independent then $P(A|B)=$
4. Give any one example of independent events.
5. Consider the random experiment of tossing a coin, let X denote the wheather it is head or tail, is it random variable? Why?
6. If F(x) is distribution function $F(\infty)=?$
7. If $E(X)=8$, then $E(k+X)=$
8. If $V(x)=2$ find $V(2x+5)?$
9. What is the mean and variance of binomial random variable?
10. For what value 'p' the binomial distribution will be negatively skewed?
11. Normal distribution is symetric about _ _ _
12. If $X \sim N(0,1)$ then $P(X>2) = ?$

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*





13. Give the empirical definition of probability, what are its drawbacks?
14. What do you mean by conditional probability ? and give the multiplication theorem in probability.
15. The probability that a student passes a maths test is 0.75 and the probability that he passes both maths and english test is 0.25, the probability that he passes at least one test is 0.9. What is the probability that he passes the english test?
16. The pdf of discrete random variable is given by $f(x) = kx^2$, $x = 1, 2, 3$ find the value of k. also find its mean.
17. Consider an experiment of tossing 3 fair coins, X is the number of heads obtain its probability mass function.
18. What is the relationship between mean and variance of a discrete random variable? Explain with an example.
19. If the mean and variance of a binomial variate are respectively 5 and $\frac{10}{3}$, find its parameters, also draw its p.m.f
20. what do you mean by standardisation ? What is its importance
21. If mean of a given data for a random value is 81.1 and standard deviation is 4.7, then find the probability of getting a value more than 83, assuming normality.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. If A and B are independent show that A and B', A' and B, and A' and B' are independent.
23. If a random variable X possesses the following function.

X	3	2	1	0	-1	-2	-3
P(X)	0.1	0.2	3k	k	2k	0	0.1

- i) Find the value of k ii) E(X) iii) V(X)
24. If X is a normal variate with mean 20 and variance 25 then find the probability that 1) $16 < X < 22$ 2) $X \geq 23$ 3) $X < 10$
25. The length of human pregnancies from conception to birth approximates a normal distribution with a mean of 266 days and a standard deviation of 16 days.
 - i) What proportion of all pregnancies will last between 240 and 270 days?
 - ii) What length of time marks the shortest 70% of all pregnancies?
 - iii) What length of time marks the shortest 10% of all pregnancies?

(2×15=30)

