QP CODE: 23104422

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Reg No : .....

Name : .....

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

Third Semester

B.Sc Psychology Model I

COMPLEMENTARY COURSE - ST3CMT23 - PROBABILITY AND PROBABILITY DISTRIBUTIONS

2017 Admission Onwards

8E23CB8B

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. What is the frequency definition of probability?
2. A and B are two events such that P(A)=.3,P(B)=0.25,P(A|B)=0.5 then find P(B|A)
3. If P(A)=0.6, P(B)=0.3,P(A∩B)=0.1, find the probability of neither A nor B will occur.
4. State the multiplication theorem for 3 independent events.
5. Give an example of a random variable.
6. What is the difference between pmf and pdf?
7. What do you mean by expectation of a random variable?
8. If E(X)= 3 and E(Y)=4, then E(X+Y) is
9. If X ~ B(10,0.5) the P (X=10) =
10. If X ~ N(10,4) , explain the standardisation of X
11. If X~ N(0,1) then P(X>0) =
12. If X is distributed as standard normal then P(X>0) =

(10×2=20)

Part B

*Answer any **six** questions.*

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

13. Explain the terms random experiment, sample space and events with suitable example.

14. Differentiate between classical and frequency definitions of probability.

15. If A and B are independent events then Show that A and B^c are also independent.

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. The discrete random variable X can take values 1,2 and 3 for these values the cumulative distribution function is given by $F(x) = \frac{x^3+k}{40}$, show that k=13

18. Explain the variance of a random variable and state its properties.

19. Write a real life situation where binomial distibution can apply, and explain its application.

20. If X~ B(5,0.5) draw the probability mass function of X.

21. Explain normal distribution and state any four properties of it.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. State and prove addition theorem in probability.

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. In a city, it is estimated that the maximum temperature in June is normally distributed with a mean of 23º and a standard deviation of 5°. Calculate the number of days in this month in which it is expected to reach a maximum of between 21° and 27°.

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)