BLOCK 26 C-05 S.Y.B.A. Stats. II

IJ12ABG

TIME : 2 hrs. **MARKS : 50**

NOTE : 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Graph papers, log tables, statistical tables will be provided on request.

Q.1 **A)** State and prove multiplication rule of probability. State the rule when the two events are independent. (6)

B) An urn contains 8 white and 6 black balls. Another urn contains 4 white and 2 black balls. A ball is drawn at random from the first urn and is placed into the second urn without noting its colour. Then a ball is drawn from the second urn. If this ball drawn is white, what is the probability that the first ball was also white? (6)

OR

A) Define the following terms with suitable examples. (6)
i) Random experiment and sample space.
ii) Probability of an event.
iii) Conditional probability of an event

B) Two cards are drawn at random from a pack of 52 well- shuffled playing cards one after another. Find the probability that both the cards are diamond if the cards drawn are (6)
i) With replacement
ii) Without replacement

Q.2 **A)** Define (i) Joint probability mass function. (6)
(ii) Marginal Probability mass function of X and Y
(iii) Covariance between two random variables X and Y.

B) A random variable X has the following probability mass function. (6)

X	:	-2	-1	0	1	2	3
P(X)	:	0.1	K	0.2	2K	0.3	K

Find the value of K. Hence find Expected value of X and variance of K.

OR

A) State and prove the properties of expectation and variance of a (6)

B) Following is the joint probability distribution of (X, Y) (6)

X \ Y	1	2	3	4
0	$1/24$	$1/12$	$1/12$	$1/24$
1	$1/12$	$1/6$	$1/6$	$1/12$
2	$1/24$	$1/12$	$1/12$	$1/24$

Obtain i) Marginal probability distribution of X and Y.
Obtain ii) The conditional probability distribution of X given Y = 2
iii) Conditional probability distribution of Y given $X \geq 2$.

Q.3 **A)** Write the probability mass function of a poison distribution. (6)
State the properties of a poisson distribution.

B) It is observed that 40% of the students of a certain class wear (6)
glasses. If 5 students of this class are selected at random. What is the probability that among them.
i) only 2 of them wear glasses.
ii) no one wear glasses
iii) atleast one of them wear glasses.

OR

A) Write the probability mass function of a discrete random (6)
variable X following Binomial distribution. Find its mean and variance.

B) It is known that on an average 5 accidents takes place on a (6)
high way during a month. Find the probability that in a certain month number of accidents on the highway will be
I) less than 3
ii) between 3 and 5
iii) more than or equal to 3
(Given $e^{-5.0} = 0.00674$)

Q.4 **A)** One lottery ticket is drawn at random from a set of 40 tickets (7)
numbered from 1 to 40. What is the probability that the number

B) A newspaper editor rejects on an average 4 out of every 5 stories coming for their Sunday edition. What is the chance that out of four stories received (7)

i) not even one is accepted

ii) none of the articles are rejected.

iii) atleast one of the article is rejected.

OR

A) i) state and prove addition theorem. (5)

ii) If A, B, and C are three events defined on a sample space S. What is probability of AUBUC ? (2)

B) If X and Y are two stochastically independent random variables with means 7 and 4 and variance 9 and 16 respectively. Find. (7)

(i) E(X + Y) (ii) E (2X + 3Y) (iii) V(X + Y) (iv) V (2X - 3Y)

(v) E(XY) (vi) E (Y + 2) (vii) Cov (X, Y)

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