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F.Y. B.B.A./B.C.A. (CA) (Second Semester) EXAMINATION, 2018

204 : COMPUTER APPLICATION IN STATISTICS

(2013 PATTERN)

Time : Three Hours

Maximum Marks : 80

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Figures to the right indicate full marks.

(iv) Use of calculator is allowed.

1. Attempt any *four* of the following : [4×4=16]

(a) Explain Addition and Multiplication Principle of counting.

(b) How many three digit numbers can be formed from the digits 2, 4, 5, 8, 9 if each digit is to be used only once ? How many of these are divisible by 5 ?

(c) Define mutually exclusive events and exhaustive events.

(d) There are 10 professors and 20 students. Out of these a committee of 2 professors and 3 students is to be formed. In how many ways can it be done ?

P.T.O.

- (e) Determine which of the following are deterministic and non deterministic experiments :
- (i) The no. of customers entering a post office in a day.
 - (ii) Cooling water below 0 degrees Celsius.
 - (iii) Rolling of a die.
 - (iv) Gender of a new born baby is recorded in a hospital.
- (f) Find n if ${}^n P_4 = 10 * {}^n P_3$.

2. Attempt any *four* of the following : [4×4=16]

- (a) Explain the following terms.
- (i) Sample space
 - (ii) Elementary event
- (b) The letters of the word 'ARTICLE' are arranged at random. Find the probability that the vowels occupy the even places.
- (c) If $P(A) = 0.6$, $P(B) = 0.5$, $P(A \cap B) = 0.3$ Compute
- (i) $P(A \cup B)$
 - (ii) $P(A' \cap B)$
 - (iii) $P(A' \cup B')$
 - (iv) $P(A' \cap B')$.
- (d) Define Discrete Uniform distribution. State its mean and variance.
- (e) Write sample space for the following experiments.
- (i) No. of tossing of a dice is recorded, when it is tossed until 6 occurs.

- (ii) T.V. viewers were asked to give ratings to 3 programs
- (iii) A two digit number is formed from the digits 4, 5, 6 using each digit only once.
- (iv) Answers to an objective question which has 4 multiple choices A, B, C, D. Student ticks a single answer.
- (f) In a basket there are 5 mangoes and 4 oranges. If any 3 fruits are to be selected from these, find number of possibilities which :
 - (i) At least one mango is selected.
 - (ii) Exactly two mangoes are selected.

3. Attempt any *four* of the following : [4×4=16]

- (a) Explain classical definition of probability. Also state addition theorem of probability.
- (b) If X follows Binomial distribution with parameters $n = 6$ and $p = 1/3$. Find :
 - (i) $P(X \leq 5)$
 - (ii) $P(X > 4)$.
- (c) Suppose A and B are mutually exclusive events for which $P(A) = 0.3$, $P(B) = 0.5$. What is probability that ?
 - (i) Either A or B occurs
 - (ii) A occurs but B does not occur
 - (iii) Both A and B occur
 - (iv) Neither A nor B occurs

- (d) Let x follows Binominal distribution with parameters n & p :
 - (i) Find n & p if $E(x) = 6$ and $\text{Var}(x) = 4.2$
 - (ii) If $P = 0.6$ and $E(x) = 6$, find n and $\text{Var}(x)$
- (e) Define :
 - (i) Independence of events
 - (ii) Impossible event.
- (f) Define Binominal Distribution. State its mean and variance

4. Attempt any *four* of the following : [4×4=16]

- (a) Suppose a card is drawn at random from a pack of 52 playing cards. Let event A = getting a spade card, B = getting a king. Are A and B independent ?
- (b) Explain merits and demerits of simulation.
- (c) Compute 4 random numbers using linear congruential generator $X_{i+1} = (5X_i + 3) \text{ mod } 8$ with $X_0 = 8$.
- (d) Write a note on Pseudo random number generator.
- (e) A box contains 20 light bulbs of which 6 are defective. 4 light bulbs are chosen at random from the box. Find probability that :
 - (i) None is defective
 - (ii) Exactly 1 is defective.
- (f) Define Bernoulli distribution. State its mean and variance.

5. Attempt any *two* of the following : [8×2=16]

- (a) At a garage number of cars arrived for repairs (X) is a random variable having Binomial distribution with parameters $n = 10$ and $p = 0.6$. Simulate number of cars coming for repairs on 5 days. (Use calculator to generate random numbers.)
- (b) The daily demands for the items with associated probabilities are given below :

Daily demand	Probability
0	0.01
15	0.15
25	0.20
35	0.50
45	0.12
50	0.02

Simulate demand for next 8 days using random numbers 21, 27, 47, 54, 60, 39, 43, 25.

- (c) A Certain company encourages its employees to participate in Cricket and Hockey. A survey indicates that 40% play Cricket, 50% play Hockey and 25% play Cricket and Hockey both. Find probabilities of the following events :
 - (i) An employee plays only Hockey
 - (ii) An employee plays only Cricket
 - (iii) An employee takes part in at least one of the games, cricket and hockey
 - (iv) An employee does not play either game.