Rayat Shikshan Sanstha's

D.P.Bhosale College, Koregaon

Department of Statistics

B.Sc. (Part I) (Semester-I) Statistics Paper I

DSC-7A (Discreptive Statistics I)

QUESTION BANK 2022-23

Question I: Choose the correct alternative:

1) Where is Indian Statistical Institute?
   (a) Mumbai (b) Delhi (c) Kolkata (d) Chennai
2) Prof. Sukhatme was born in
   (a) Kolhapur (b) Sangli (c) Satara (d) Ratnagiri
3) In the contest of Statistical Organizations in India full form of C.S.O. is……
   (a) Common Statistical Organization (b) Central Statistical Organization
   (c) Central Sampling Organization (d) Central Survey Organization
4) Among the following who was an Indian Statisticians?
   (a) C. R. Rao (b) P.V. Sukhatme (c) P.C. Mahalanobis (d) All of these
5) The second stage in statistical investigation is……
   (a) Collection (b) Presentation (c) Analysis (d) Interpretation
6) Sampling is……
   (a)Not always useful (b) Not always possible
   (c) Has no. of advantages over census (d) The census
7) Sample is……
   (a) Part of population (b) 5% of population
   (c) 50% of population (d) Unit of population
8) Samples selected by……. Method are non-overlapping.
   (a) SRSWOR (b) SRSWR (c) Stratified (d) Systematic
9) If population is homogeneous, then….. is better method of sampling.
   (a) SRS (b) Stratified (c) Systematic d) Two stage

10) The most accurate scale of measurement is:
   (a) Nominal scale (b) ordinal scale (c) interval scale (d) ratio scale.
11) The concept of 'absolute zero' is used in…..
   (a) Nominal scale (b) Ordinal scale
   (c) Interval scale (d) Ratio scale
12) The data of marks 35, 455, 40, 47, 50, 56 of six students in statistics will be called as…….
   (a) An increasing series (b) An individual series
   (c) A decreasing series (d) A continuous series

13) Which of the following is not an example of continuous variable?
(a) No. of members in family (b) Length of screw produced by machine
(c) Speed of a vehicle (d) temperature at a certain place

14) Mode is located from:
(a) Histogram (b) Frequency polygon (c) Ogive curve (d) Frequency curve.

15) Average applicable to find average rate of interest is:
(a)Geometric mean (b) Harmonic mean (c) Mode (d) Arithmetic mean.

16) If the grouped data has open end classes, one cannot calculate:
(a) Median (b) Mode (c) Mean (d) Quartiles.

17) Shoe size of most of the people in India is No.8. Which measure does it represent?
(a) Mean (b) Median (c) Mode (d) Second quartile.

18)The average of the marks obtained in an examination by 8 students was 51 and by another 9 students were 68. The average marks of these total 17 students was ......
(a) 59 (b) 59.5 (c) 60 (d) 60.5

20) Second Quartile is equal to
(a) A.M. (b) median (c) mode (d) none of these

21) Third Quartile is equal to ......
(a) A.M (b) median (c) mode (d) 75th percentile

22) If any observation is zero, we cannot compute:
(a) Arithmetic mean (b) Weighted mean (c) G.M. (d) H.M.

23) All the 5 observations are equal to 25. Then their Arithmetic Mean would be:
(a) 0 (b) 25 (c) 50 (d) 1.

24) If we know mean, median then we can empirically determine…..
(a) S.D (b) G.M (c) H.M (d) Mode

25) Algebric sum of the deviations of xi from the arithmetic mean is----
(a) Positive (b) Negative (c) Zero (d) None of these

Que.2. Solve the following long answer question.

1) Explain scope of statistics in brief.

2) Write a short note on:
i) Stages of statistical investigation ii) Statistical organizations in India

3) Define:
i) Population ii) Sample iii) Sampling iv) Sampling unit iv)sampling frame

4) Explain census method also state its limitations.

5) Write brief note on:

i) Simple random sampling ii) Stratified sampling

iii) Systematic sampling

6) Explain randomness and its need. What are the methods of achieving randomness.

7) Define:

i)Arithmetic mean ii) Median iii) Mode iv) Geometric mean v) Harmonic mean

8) Distinguish between:

i) Qualitative data and Quantitative data

ii) Primary data and Secondary data

iii) Discrete variable and Continuous variable

9) Explain four scales of measurement with suitable example.

10) Explain any two Indian Statisticians and their Contribution in brief .

Que.3. Short answer questions:

1) Explain Systematic sampling with examples.

2) State limitations of sampling.

3) Define sampling. What are the advantages of sampling over census.

4) State importance of statistics.

5) Define median. Derive its formula in case of continuous grouped frequency distribution.

6) Define mode. Derive its formula in case of continuous grouped frequency distribution

7) Define arithmetic mean, geometric mean and harmonic mean. State relation amongst them and prove it for two values a & b.

8) Define arithmetic mean. Prove that sum of deviations of observations from their mean is always zero.

9) Define arithmetic mean .State and prove any two properties of it.

10) Define geometric mean. State and prove G.M. for pooled data.

11) Write a short note on Partition Values.

12) Write a short note on Graphical representation of mode.

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B.Sc. (Part I) (Semester-I) Statistics Paper II

DSC-8A (Elementary Probability Theory)

QUESTION BANK 2022-23

Question I: Choose the correct alternative:

1. Experiment is:
   (a) an action (b) a process
   (c) a phenomenon (d) all of a, b c under observation.
2. If A and B are mutually exclusive events with P(A)= 0.45 and P(B)=0.25, then P(AUB) is …
   (a) 0.75 (b) 0.70 (c) 0.20 (d) 0.1125
3. If a sample space contains n sample points, its power set consists of:
   (a) 2^n (b) 3^n (c) 2n (d) 2n+1 events
4. Interpretation of P(A)=0 is …
   (a) A is an impossible event (b) A is sure event
   (c) A is certain event (d) All the above are true
5. A box contains 6 black and 4 white balls. Two balls are drawn one after other without replacement. The probability that both are black is ...
   (a) 2/3 (b) 2/15 (c) 1/3 (d) 6/25
6. Probability of the event lies between …
   (a) $-\infty$ and ∞ (b) 0 and 1 (c) -1 and +1 (d) 0 to ∞
7. If A and B are two mutually exclusive events then $P(A \cap B)$ is always …
   (a)Zero (b) one (c) infinity (d) positive
8. If A and B are mutually exclusive events then P(A|B) is …
   (a) 0 (b) 1 (c) P(A) (d) P(B)
9. If one card is drawn at random from pack of cards then probability that the card is diamond will be …
   (a)13/52 (b) 3/4 (c) 1/13 (d) 1/2
10. If A and B are complimentary events their intersection is:
    (a) sure event (b) impossible event (c) certain event (d) none of these
11. Two boys and a girl are sitting in a row, then the probability that the girl is sitting between the two boys is:
    (a) 1/4 (b) 1 (c) 1/2 (d) 1/3
12. For any two events which of the relations is not always true:
    (a) $P(A) \leq 1$ (b) $P(AUB) \leq 1$ (c) $P(A) + P(B) \leq 1$ (d) $0 \leq P(A)$
13. Sample space Ω and impossible event $\emptyset$ are …
    (a) mutually exclusive event (b) complimentary event
    (c) independent event (d) all a, b c events.
14. If A and B are mutually exclusive and exhaustive events then:
    (a) P(A)=1- P(B) (b) $P(A) \leq P(B)$ (c) $P(B) \leq P(A)$ (d) none of these.

15. If a perfect coin is tossed twice then probability of getting both the heads is…
(a) 0 (b) 1/4 (c) 1/8 (d) 1

16. The probability that leap year will have 53 Sundays is…
(a) 52/53 (b) 2/53 (c) 2/7 (d) 1/7

17. One card is drawn at random from a well shuffled pack of 52 cards, then probability that the card is a heart or a queen card will be…
(a) 1/52 (b) 13/52 (c) 4/13 (d) 4/52

18. The probability that a certain question can be solved by A is ¼ and by B is 1/6. Then the probability that the question will be solved by any one of them is…
(a) 1/4 (b) 1/12 (c) 5/12 (d) 1/24

19. If the odds in favour of an event A are in the ratio a:b, then P(A) is…
(a) $\frac{b}{a}$ (b) $\frac{a}{b}$ (c) $\frac{a}{a+b}$ (d) $\frac{b}{a+b}$

20. One card is drawn at random from a well shuffled pack of 52 cards, then probability that the card is a diamond card will be…
(a) 13/52 (b) 3/4 (c) 1/13 (d) 1/2

21. If the odds against of an event A are in the ratio 4:5, then P(A) is…
(a) 4/5 (b) 5/4 (c) 4/9 (d) 5/9

22. If A and B are two events then the probability of occurrence of either A or B is given by…
(a) P(A)*P(B) (b) P(A∪ B)
(c) P(A ∩ B) (d) P(A)+P(B)-2 P(A ∩ B)

23. A coin is tossed until a head observed, The sample space of this experiment is …
(a) Infinite (b) Countably Infinite
(c) Finite (d) Uncountably Infinite

24. If A and B are independents events, then P(A' ∩ B)is equal to…
(a) P(A).P(B') (b) P(B)-P(A∪ B) (c) P(A')[1-P(B')] (d) 1-(A∪ B)'

25. The odds in favour of an event A are 10:5 then $P(A^c)$ is …
(a) 1/3 (b) 9/15 (c) 1/2 (d) 2/3

26. If P(A)=9/10, P(B)=3/4,P(A|B) =4/5, the P(B|A)=
(a) 1/3 (b) 1/4 (c) 1/8 (d) 2/3

27. If B⊂ A then P(A|B) is …
(a) 0 (b) 1 (c) $\frac{P(A)}{P(B)}$ (d) $\frac{P(B)}{P(A)}$

28. For any event A defined on sample space Ω , then P(A|A') = …
(a) 0 (b) 1 (c) P(A) (d) P(A')

29. If P(A)=9/10, P(B)=3/4,P(A|B) =4/5, the P(B|A)=
(a) 1/3 (b) 1/4 (c) 1/8 (d) 2/3

30. The originator of the definition of a priori probability was:
(a) Feller (b) Von-Mises (c) De-Moivre (d) Laplace

31. If P(A|B) > P(A) then P(B|A) is:
(a) = P(B) (b) < P(B) (c) > P(B) (d) none of these.

32. If A ⊂ B then P(A|B) is …
(a) 0 (b) 1 (c) $\frac{P(A)}{P(B)}$ (d) $\frac{P(B)}{P(A)}$

33. For any event A defined on sample space Ω , then $P(\Omega|A)$ = …
(a) 0 (b) 1 (c) P(A) (d) 1/P(A)
34. If A and B are mutually exclusive events then P(A|B) is
(a) 0 (b) 1 (c) P(A) (d) P(B).
35. If A and B are independent events then:
(a) P(A)= 1- P(B) (b) P(A) = P(A|B)
(c) P(B) =1- P(A) (d) None of these
36. If A and B are independent events then:
(a) P(A)= 1- P(B) (b) $P(A) \leq P(B)$
(c) $P(B) \leq P(A)$ (d) none of these
37. If A and B are independent events then:
(a) $P(B^c)= P(B^c|A)$ (b) $P(A^c) = P(A^c|B)$
(c) $P(A^c \cap B^c) = P(A^c)*P(B^c)$ (d) all of these
38. If A and B are independent events then:
(a) P(B)= P(B|A) (b) P(A) = P(A|B)
(c) $P(A \cap B) = P(B)*P(A)$ (d) all of these.
39. Let F(x) be the distribution function of a r.v. X, if a<b and P(X=a) and P(X=b) are not zero, then P(a<x<b) is equal to…
(a) F(b) – F(a) - P(X=b) (b) F(b) – F(a) + P(X=b)
(c) F(b) – F(a) + P(X=a) (d) F(b) – F(a)
40. Let F(x) be the distribution function of a r.v. X, if a<b and P(X=a) and P(X=b) are not zero, then $P(a \leq x \leq b)$ is equal to…
(a) F(b) – F(a) + P(X=b) (b) F(b) – F(a) + P(X=b) + P(X=a)
(c) F(b) – F(a) + P(X=a) (d) F(b) – F(a)
41. For discrete random variable X and Y = aX+b where a and b are constants, then E(Y) = E(X) if…
(a) a = 0, b = 1 (b) a = 1, b = 1 (c) a = 1, b = 0 (d) b = 0
42. The expectation of a number on a throw of a single die is …
(a) 3 (b) 7/2 (c) 1/6 (d) does not exist
43. If X and Y are two independent integer values r.v.s then p.g.f. of sum of two r.v.s $P_{x+y}(s)$ = …
(a) $E(X^s) + E(Y^s)$ (b) $P_x(s) + P_y(s)$ (c) $P_x(s) * P_y(s)$ (d) $P_x(s) / P_y(s)$
44. If X is a r.v.s having probability generating function $P_x(s)$ then value of s must be…
(a) less than or equal to 1 (b) less than 1
(c) less than ∞ (d) between -1 and +1
45. Possible values for a random variable which is defined on a finite sample space are…
(a) Infinite (b) Countably Infinite
(c) Finite (d) All the above
46. Name of the function which is a non-decreasing step function?
(a) Probability mass function (b) Probability generating function
(c) Cumulative distribution function (d) all the above
47. If E(X) = 10 then E(10X+10) = …
(a) 10 (b) 100 (c) 20 (d) 110
48. If V(X) = 10 then V(10X-10) = …
(a) 0 (b) 1000 (c) 990 (d) 110

49. If F(x) is distribution function of r. v. X, then …
(a) $0 \leq .F(x) \leq 1$ (b) $0 \leq .F(x) \leq \infty$
(c) $-1 \leq .F(x) \leq 1$ (d) $-\infty \leq .F(x) \leq \infty$

50. If p. g. f. of discrete r. v. X is $0.5 + 0.3s + 0.2s^2$ …
(a) 0.9 (b) 1 (c) 1.5 (d) 0.5

51. If mean = 5, 0 = 3 then mean & S.D. of Z = 3 -7x respectively are …
(a) 38 and -21 (b) 32 and 21 (c) -32 and 21 (d) -38 and -21

52. If discrete random variable X having p.m.f.
P(X) = (1 /n +1) , X = 0,1,2,….,7 then value of mean is equal to …
(a) (n+1) / 2 (b) n / 2 (c) (n/2) +1 (d) (n/2) -1

53. The mean & variance of a r. v. X are given by 2 &3 respectively. Then the value of $E(3X^2 + 2X)$ is …
(a) 25 (b) 29 (c) 27 (d) 30

54. An important property of distribution function F(X) = P(X≤y) of discrete random variable X is that it is…
(a) An increasing function
(b) A decreasing function
(c) A monotonically decreasing function
(d) A non-decreasing function with its minimum and maximum values are 0 and 1 respectively.

55.Let X takes values -1, 0, and 2 with probabilities 0.2, 0.5, 0.2 and 0.1 respectively. Then |X| takes values 0, 1 and 2 with respectively probabilities:
(a) (0.5, 0.4, 0.1) (b) (0.4, 0.4,0.2) (c) (0.25, 0.5, 0.25) (d) none of these

56. If X be a discrete random variable which takes only one value say C with probability 1. Then…
(a) E (X) = 0, Var (X) =0 (b) E (X) = C, Var (X) =C
(c) E (X) = c, V (X) =0 (d) E (X) = X , Var (X) =C^2

57.The first order raw moment about origin is …
(a) Variance (b) Mode (c) Mean (d) Median

58.Probability generating function is affected by change of …
(a)Origin only (b) Scale only
(c) Origin and scale (d) none of these

59. In a throw of single die, the outcomes of a variable of the type …
(a) discrete r.v. (b) continuous r.v.
(c) neither (a) nor (b) (d) both (a) and (b)

60. The weight of person, temperature, time, ect. Are examples of:
(a) discrete r.v. (b) continuous r.v.
(c) neither (a) nor (b) (d) both (a) and (b)

Question 2. (Long answer)

1. Define: (i) Sample space (ii) Simple event (iii) Compound event
(iv) Sure event (v) Impossible event
2. Define: (i) Experiment (ii) Event (iii) Mutually exclusive event
(iv) Exhaustive event (v) Complementary event

3. With usual notations prove that P(AUB) = P(A) + P(B) - P (A ∩ B). State the law of addition for three events.
4. An urn contains 7 white, 5 red and 6 blue balls. Two balls are drawn at random from this urn without replacement. Find the probability that:
   (i) Both are red (ii)one is white and another is blue
   (iii) both are of the same colour (iv) Both are of different colours
5. Define conditional probability and show that it is a probability measure.
6. Define partition of sample space. State and prove Bayes' theorem.
7. Let Ω = {1, 2, 3, 4, 5, 6, 7, 8}, A= {1, 2, 3, 8}, B = {2, 4, 7, 8} , B = {3, 4, 5, 8. Discuss the pairwise and mutual independence of the events A, B and C.
8. Define probability generating function of a r.v. X. Explain how will you obtain the mean and variance of a a r.v. X. from p.g.f.?
9. Define mean and variance of a random variable X.
   Obtain : (i) E(aX + b) (ii) V(aX + b)
10. Let X be a discrete random variable with following as the p.m.f.

X	-5	-4	0	1	2
P(x)	0.2	0.3	0.2	k	0.35

   Find value of k, E(X), V(X), E(2X-3), V(2X-3).

Question 3. (Short answer)

1. Define probability and state its axioms.
2. Define power set of sample space. Write power set of the sample space associated with an experiment of tossing an ordinary two-faced coin and observing top face.
3. With usual notations, Show that:
   (i) P(A') = 1 - P(A) (ii) P(ϕ) = 0
4. With usual notations, Show that:
   (i) P(A|A') = 0 (ii) P(A'|B) = 1- P(A|B) , P(B)>0
   (iii) If A and B are mutually exclusive events, then P(A|B) = 0
5. If the letters of the word 'REGULATIONS' are arranged at random, what is the probability that there will be exactly 4 letters between R and E.
6. Which of the following functions define probability on sample space
   $\Omega = \{w_1, w_2, w_3\}$?
   (i) $P(w_1) = 1/4$, $P(w_2) = 1/5$, $P(w_3) = 1/2$
   (ii) $P(w_1) = 0$, $P(w_2) = 1/3$, $P(w_3) = 2/3$
   (iii) $P(w_1) = 1$, $P(w_2) = -1/2$, $P(w_3) = 1/2$
7. A and B are two events defined on sample space. Such that P(A)=0.30, P(B)=0.78, P(A ∩ B) = 0.16 . Find i) $P(A \cap B')$ ii) $P(A' \cap B)$ iii) $P(A' \cup B')$
8. Define conditional probabilities P(A|B) and P(B|A).
9. Define and explain independence of events A and B.

10. Two cards are drawn from a well shuffled pack of 52 card. Find the probability that:
   (i) two kings are drawn   (ii) a king and queen are drawn
   (iii) two diamond are drawn   (iv) same colour card are drawn
11. Two events are such that P(A)=1/4, P(A|B) =1/3 and P(B|A) =1/2, find P(A|B^c).
12. If A and B are mutually exclusive events then find P[A|(AUB)].
13. For any two events A and B of Ω. find P ($A^c \cap B$).
14. Define partition of a sample space and provide its one example.
15. If events A and B are independent prove that A^c and B are independent and A^c and B^c are independent.
16. Define pair-wise and mutual independence of events A, B and C.
17. A box contains four tickets with numbers 112, 121, 211 and 222 and one ticket is drawn. Let A_i (i=1, 2, 3) be the event that i^{th} digit of the number on the ticket drawn is one. Examine the independence of the events A_1, A_2, A_3
18. For any two events A and B, prove that $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq [P(A)+P(B)]$
19. Definition of probability in terms of odds ratio.
20. Two honest dice are tossed and top faces are observed. Find the probability that
    (i) the sum of number of points on the top faces is an even number
    (ii) the sum of number of points on the top faces is not less than 6
21. Define cumulative distribution function and state its properties.
22. A coin is tossed 3 times. Obtain the probability distribution of the number of head observed.
23. Define expectation of a univariate discrete random variable. State and prove effect of change of origin and scale on variance.
24. Define the raw and central moments. State relation between the first four central moments and moments about origin.
25. Show that the p.g.f. of the sum of two independent r.v.s. is equal to the product of their p.g.f.s.
26. Let X be a random variable with p.m.f.

$$P(X=x) = \begin{cases} 1/5, & x = 0, 1, 2, 3, 4 \\ 0, & \text{otherwise} \end{cases}$$

    Find the distribution function of X and P(1< X < 4).
27. Describe measure of skewness and kurtosis based on moments.
28. The function is given by, $P(x,y)=\frac{x+2y}{27}$; x=0,1,2 y=0,1,2
    Is it probability mass function ?
29. If a random variable X has a following probability mass function :

$$P(x) = \begin{cases} 1/5 & if\ x = -3, -2, 2, 3 \\ 0 & otherwise \end{cases}$$

    Obtain variance of X.

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Department of Statistics

B.Sc. (Part I) (Semester-II) Statistics Paper III

DSC-7B (Descriptive Statistics II)

QUESTION BANK 2022-23

Q. Choose the most correct alternative out of four alternatives given below for each question.

1) The range of Karl Pearson's correlation coefficient...............

a) $-\infty$ to ∞ b) -1 to 1 c) 0 to 1 d) 0 to ∞

2) If X and Y are any two random variables then the covariance between ax + b and cy +d is given by......

a) Cov (x, y) b) abcd cov (x, y) c) ac cov(x, y) d) bd cov(x, y)

3) The correlation coefficient between college entrance exam grades and the final grades was computed to be -1. 08. On the basis of this you would recommend

a) The entrance exam is good predictor of success

b) Students who do worst in this exam will do best in final

c) Students at this school are not scholars

d) Recomputed the correlation coefficient

4) The correlation coefficient between X and Y is known to be zero. We then conclude

a) X and Y have standard distributions

b) The variances of X and Y are equal

c) There exists no relationship between X and Y

d) There exists no linear relationship between X and Y.

5) In the context of two variables X and Y which of the following statement is false.........

a) If the covariance between two variables X and Y is equal to zero, the correlation coefficient between these variables equal to zero.

b) If the covariance between two variables X and Y is equal to zero, then they are independently distributed.

c) For independent variables X and Y, correlation and covariance are both equal to zero

d) Correlation coefficient between X and Y is same as that of Y and X.

6) If X and Y are any two random variables Covariance between them is equal to 50, then covariance between U and V, where U-10X+10 and V-5Y+5 is given by...............

a) 50 b) 65 c) 500 d) 2500

7) Suppose correlation coefficient between rainfall as measured in inches and production of rice measured in metric ton is 0.65. What is the correlation coefficient of rainfall measured in cm and production measured in Kg?

a) 0.4 b) 0.65 c) 0.65x2.2/1000 d) Cannot be computed from given information

8) Let the correlation coefficient between X and Y be denoted by r_{xy}. If r_{xy}= 0.02 then $r_{(-x,y+1)}$ is………

a) 0.02 b) 0.57 c) -0.48 d) -0.02

9) If the correlation coefficient between (X, Y) is 0.02 then the correlation coefficient between (-2X, Y) is.............

a) 0.02 b) 0.04 c) -0.04 d) -0.02

10) If the correlation coefficient between X and Y is 0.8 then the correlation coefficient between -X and Y is............

a) -0.8 b) 0.8 c) 0.64 d) 0.4.

11) If the correlation coefficient between X and Y is 0.4, then the correlation coefficient between 3X+2 and 6-4Y is............

a) 0.4 b) -0.4 c) 0.48 d) none of these

12) Spearman's rank correlation coefficient lies between.......

a) -1 and 1 b) 0 and 1 c) 0 to∞ d) - ∞ to ∞

13) If X and Y are independent variables then...

a) r = 0 b) Cov (X,Y) = 0 c) both a and b d) either a or b

14) If the variables X and Y are changes in the same direction then correlation between X and Y is..............

a) zero b) one c) positive d) negative

15) If the correlation coefficient between X and Y is -0.02 then correlation coefficient between (X, 2Y +3) is...........

a) 0.02 b) 0.04 c) -0.02 d) -0.04

16) If X and Y are independent variables then correlation coefficient between X and Y is….

a) 1 b) 0 c)-1 d) cannot be determined

17) If X and Y are independent r. vs. with V(X)= V(Y) = 0, then r (X, X+Y) is......

a) 1 b) 1/v 2 c) 0 d) none of these.

18) The height of fathers and their sons form bivariate variables which are.....

a) continuous variables b) discrete variables c) pseudo variables d) none of these

19) Cov (X-a, Y-b) is….

a) ab cov(X, Y) b) –ab cov(x, Y) c) cov (X, Y) d) cov (X, Y) /ab

20) If X and Y are uncorrelated variables, then Var (X-Y) is equal to

a) V(x) – V(y) b) V(x)- V(y) +2 cov(X,Y)

c) V(x) + V(y) d) V(x)- V(y) -2 cov(X,Y)

21) If V(X+Y) = V(X) + V(Y) then correlation coefficient between X and Y is

a) 0 b) +1 c) -1 d) 0.5

22) If one of the regression coefficient is greater than one , the other must be
a) greater than 1 b) less than 1 c) equal to 1 d) zero

23) If X and Y are any two r.v; cov(ax+b, cy+d) is ..
a) cov (x, y) b) ac cov (x, y) c) abcd cov(x,y) d) ac cov(x,y)+bd

24) In a simple linear regression model y=a + bx, the constant b measures
a) The change in y which the model predict for a unit change in x
b) The change in x which the model predict for a unit change in y
c) The ratio y / x
d) The value of y for any given value of x

25) The Karl Pearson's coefficient of correlation lies between
a) (- ∞ ,+∞) b) (-1 , +1) c) (0, 1) d) N.O.T.

26) The coefficient of correlation is ;
a) the product of regression coefficient c) geometric mean of regression coefficient
b) mean of regression coefficient d) has nothing to do with regression coefficient

27) Both the regression lines of Y on X and X on Y :
a) intersect at origin b) do not intersect at all
c) intersect at right angle d) intersect at X and Y

28) The coefficient of correlation is positive:
a) as X increase , Y increase b) as X increase , Y decrease
c) both changes with same directions d) N.O.T

29) If the values of X and Y are uncorrelated then V (ax + by) is equal to :
a) V (x) + V(y) + 2ab cov (x, y)
b) a^2 V (x) + b^2 V(y) + 2ab cov (x, y)
c) a^2 V (x) + b^2 V(y)
d) N.O.T.

30) Correlation coefficient is –
a) independent of change of origin but depend on scale.
b) dependent on change of origin and independent on scale
c) independent on change of origin and scale
d) N.O.T.

31) Let X and Y are two variables such that ax + by + c = 0, then the correlation coeff. between X and Y is precisely.
a) zero b) between 0 and 1 c) between -1 and +1 d) +/- 1

32) The sign of two regression coefficients b_{yx} and b_{xy} have
a) opposite b) same c) opposite or same d) N.O.T

33) The coefficient of correlation is ;
a) the product of regression coefficient
b) mean of regression coefficient
c) geometric mean of regression coefficient
d) has nothing to do with regression coefficient.

34) Cov (X-a, Y-b) is…

a) ab cov(X, Y) b) –ab cov(x, Y)

c) cov (X, Y) d) cov (X, Y) /ab

35) If X and Y are uncorrelated variables, then Var (X-Y) is equal to

a) V(x) – V(y) b) V(x) + V(y)

c) V(x)- V(y) +2 cov(X,Y) d) V(x)- V(y) -2 cov(X,Y)

36) If one of the regression coefficient is greater than one , the other must be

a) greater than 1 b) less than 1 c) equal to 1 d) zero

37) In a simple linear regression model y=a + bx, the constant b measures

a) The change in y which the model predict for a unit change in x

b) The change in x which the model predict for a unit change in y

c) The ratio y / x

d) The value of y for any given value of x

38) Both the regression lines of Y on X and X on Y :

a) intersect at origin b) do not intersect at all

c) intersect at right angle d) intersect at X and Y

39) The coefficient of correlation is positive:

a) as X increase , Y increase b) as X increase , Y decrease

c) both changes with same directions d) N.O.T.

40) The term ‘regression’ first introduced by…….

a)Sir Francis Galton b) R.A.Fisher c) .Karl Pearson d) Spearman

41) IN are called ----

a) economic thermometer b) economic barometer c) social barometer d)NOT

42) fr(XY) =1then we say that X & Y are ------

a) -ve correlated b) +ve correlated C. perfect positive correlated D. NOT

43) If r=0 the angle between two lines of regression is

a) 90^0 b) 45^0 c) 0^0 d) 180^0

44) The best Average in the construction of IN is-----

a) AM b) GM c) HM d) NOT

45) Cost of living IN can be obtained

a) Using of family budget method b)using of aggregate expenditure method

c) Both A and d)NOT

46) Spearman’s rank corr coeff is equal to one if ……..

a) $\sum di^2 = 0$ b) $\sum di^2 > 0$ c) $\sum di^2 < 0$ d) NOT

47) The two lines of regression intersects at

a) median(n/2) b) $(-\bar{X}, \bar{Y})$ c) $\overline{(X, Y)}$ d) $(-\bar{X},-\bar{Y})$

48) In the case of n attributes, the total number of ultimate class frequencies Is---

a) 2^n b) 3^n c) 3n d) 2n

49) The coefficient of association always lies between-----

a) 0 and 1 b) 0 and ∞ c) -1 and 1 d) -1 and 0

50) In the case on n dichotomous attributes total number of ultimate classes is -----

a) 3^n b) 2^n c) n^2 d) n^3

51) In case of n attributes total number of class frequencies is:

a) n^2 b) n^3 c) 2^n d) 3^n

52) In case of n attributes number of ultimate class frequencies is:

a) n^2 b) n^3 c) 2^n , d) 3^n

53) In case of n attributes fundamental set of class frequencies must consist:

(a) n^2, (b) n^3 , (c) 2^n , (d) 3^n class frequencies.

54) Specific death rate may be calculated according to......

a) age b) sex c) region or locality d) all a), b), c)

55) If NRR < 1, then we say that the population is

a) increases b) decreases c) no increase or decrease d) none of these

56) S.T.D.R. of standard population is ---

a) CBR b) IMR c) CDR d) none of these

57) The weighted average of SDR's is ---

a) SDTR b) IMR c) CDR d) none of these

58) If NRR >1, then we say that the population is

a) increases b) decreases c) no increase or decrease d) none of these

59) If NRR = 1, then we say that the population is

a) increases b) decreases c) no increase or decrease d) none of these

60) ----- overestimates the growth rate.

a) GRR b) NRR c) TFR d) CBR

61) The survival factor is used in the computation of NRR lies between-----

a) 0 and 1 b) -1 and 1 c) -1 and 0 d) 0 and -1

62) Mortality or health conditions of persons in two cities are efficiently compared by using------

a) CDR b) SDR c) STDR d) None of these

2) Short Answered Questions:

1. State and prove effect of change of origin and scale on Karl Pearson's coefficient.
2. Write a short note on scatter diagram method of studying the correlation.
3. Derive the expression of Spearman's rank correlation coefficient for untied case.
4. State and prove effect of change of origin and scale on Covariance.
5. Derive the expression of Spearman's rank correlation coefficient for tied case.
6. Define Covariance. State its properties.
7. Prove that Karl Pearson's correlation coefficient always lies between -1 and 1
8. Find coefficient of correlation from the following
   n=10 , Σx=Σy=35, σ2x=2500, σ2y=2209, and $\sum(xy)$=13590
9. Derive the Expression for acute angle between the regression lines.
10. State any two properties of regressoion coefficient and prove one of them.
11. Derive the expression for acute angle between the regression lines.

12. With usual notation show that $\frac{bxy+byx}{2} \geq$ r
13. Show that regression coefficients are independent of change of origin but not of change of scale.
14. Interpretation of reg. coefficients.
15. With usual notations prove that $|Q| \geq |Y|$.
16. Show that -1≤ Q≤1
17. Explain the terms CDR and SDR,
18. Define the net reproduction rate (NRR). Interpret the cases i) NRR = 1 ii) NRR > 1 and iii) NRR < 1
19. Explain the terms GFR and TFR.
20. Write a note on Specific Death Rate (SDR)
21. Write a note on standardized death rate (STDR).
22. Define SDR and SDTR. State their utility.
23. What is life tables ? Explain the construction of life tables.
24. State uses of life tables.
25. Explain applications of life tables in insurance.

3) Long Answer Questions:

1. Define Karl Pearson correlation coefficient Show that it lies between -1 and 1.
2. State properties of regression coefficient And prove any two of them.
3. Explain the term Regression. Derive the equation of the line of regression of Y on X by the least square method.
4. Define Karl Pearson's coefficient of correlation and Spearman's rank correlation coefficient. Derive an expression for rank correlation coefficient in case of without ties.
5. Define Product moment correlation coefficient. Show that it lies between -1 and 1
6. Derive the Expression for acute angle between the two lines of regression Y on X and X on Y.
7. With usual notations, obtain the acute angle between the two lines of regression .Discuss the cases r=0 and r=+-1
8. Define Yules coefficient of association (Q) and coefficient of colligation (Y). Obtain the relation between the two coefficients.
9. Define independence of attributes. If the attributes A and B are independent prove that $\propto$ and β are also independent.
10. Define GRR and NRR. How they are computed? Give their interpretations.
11. Define i) CBR ii) CDR iii) SDR iv) GRR v) NRR.
12. Explain the direct and indirect methods of obtaining standardized death rates (STDR). 17) Define the t reproduction rates (GRR and NRR). Interpret the cases i) NRR = 1 ii) NRR > 1 and iii) NRR < 1

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Department of Statistics

B.Sc. (Part I) (Semester-II) Statistics Paper IV

DSC-8B (Discrete Probability Distribution)

QUESTION BANK 2022-23

Question I: Choose the correct alternative:

1. The first order raw moment about origin is …
   (a) Variance (b) Mode (c) Mean (d) Median
2. The second order central moment of random variable (r. v.) is …
   (a) Mode (b) Variance (c) Median (d) Arithmetic mean
3. Probability generating function is affected by change of …
   (a)Origin only (b) Scale only (c) Origin and scale (d) none of these
4. If (X,Y) is a bivariate random variable then E[Y|X] is called…
   (a) Correlation (b) Regression (c) Both a and b (d) none of these
5. In Case of bivariate distribution of (X,Y) , $(1,1)^{th}$ central moment μ_{11} is …
   (a) V(X) (b) V(X) V(Y) (c) Cov(X,Y) (d) Corr(X,Y)
6. In Case of bivariate distribution of (X,Y) V(X) is …
   (a) μ_{11} (b) μ_{20} (c) μ_{02} (d) μ_{00}
7. For bivariate continuous r.v. (X,Y) which of the following is not true ?
   (a) Cov(X,Y) = Cov(Y, X) (b) Cov(–X, –X) = Cov(X, X)
   (c) Cov(X,3) = Cov(3, Y) (d) Cov(–X, –Y) = – Cov(X, Y)
8. If Var(X) = 1, Var(Y) = 9 and Cov(X, Y) = 1 then r(X, Y) is …
   (a) 1/3 (b) 0 (c) -1 (d) -1/3
9. If E[E(X | Y)] = 5 then …
   (a) E(X) = 5 (b) E(Y) = 5 (c) V(Y) = 5 (d) V(X) = 5
10. A random variable X takes values -1,0,1 and 2 with probabilities 0.2, 0.4, 0.1 and 0.3 then X^2 values 0, 1 and 4 with respective probabilities ...
    (a) 0.4, 0.2, 0.5 (b) 0.4, 0.3, 0.3 (c) 0.16, 0.02, 0.82 (d) none of these
11. The expectation of a number on a throw of a single fair die is …
    (a) 3 (b) 1/6 (c) 7/2 (d) 4
12. Covariance is affected by the change of …
    (a) origin (b) scale (c) origin and scale (d) none of these
13. First order central moment is --------
    (a) 1 (b) 0 (c) mean (d) Variance
14. If X takes values 1, 2, 3 with P(X=1)=0.2 and E(X) = 2.2 then P(X=2) is :
    (a) 0.5 (b) 0.1 (c) 0.3 (d) 0.4
15. Let X takes values -1, 0,1 and 2 with probabilities 0.2, 0.5, 0.2 and 0.1 respectively. Then P(|X|) is :
    (a) 0.9 (b) 0.8 (c) 0.4 (d) none of these
16. If F(x) is distribution function of r. v. X, then
    (a) $0 \le F(x,y) \le 1$ (b) $0 \le F(x,y) \le \infty$
    (c) $-1 \le F(x,y) \le 1$ (d) $-\infty \le F(x,y) \le \infty$

17. If a random variable X possesses the following function

x :	3	2	1	0	-1	-2	-3
P(x) :	K	0.2	3k	k	2k	0	0.1

Then the value of k is :
(a) 0 (b) 0.1 (c) - 0.1 (d) none of these

18. The expected no. of heads in 100 tosses of unbiased coin is ….
(a) 100 (b) 50 (c) 25 (d) none of these

19. Suppose X takes values -1 and 1 where P(X=1)=p, then p. g. f. of X is equal to
(a) (sp+(1-p))/s (b) ((1-p)s +p)/s
(c) $(ps^2 + (1-p))/s$ (d) p + (1-p)s

20. The mathematical expectation of a random variable is its --------.
(a) Median (b) Mode (c) Geometric mean (d) Arithmetic mean

21. A random variable X is said to have probability mass function $P_X(.)$ If …
(a) $P_X(y) \geq 0$, for all y (b) $P_X(y) \geq 0$, for all y and $\sum_y P_x(y)=1$
(c) $\sum_y P_x(y)=1$ (d) $|P_X(y)| \leq 1$, for all y and $\sum_y P_x(y)=1$

22. If $P^{(k)}(1)(<\infty)$denotes the k^{th} derivative of probability generating function of random variable X evaluated at s=1 then mean and variance of X are respectively given by …
(a) $E(X)= P^{(1)}(1)$ and $Var(X) = P^{(2)}(1) + P^{(1)}(1) - \{P^{(1)}(1)\}^2$
(b) $E(X)= P^{(2)}(1)$ and $Var(X) = P^{(2)}(1) - \{P^{(2)}(1)\}^2$
(c) $E(X)= P^{(2)}(1)$ and $Var(X) = P^{(2)}(1) + P^{(1)}(1) - \{P^{(1)}(1)\}^2$
(d) $E(X)= P^{(1)}(1)$ and $Var(X) =P^{(2)}(1) - \{P^{(2)}(1)\}^2$

23. An important property of distribution function F(X) = P(X≤y) of discrete random variable X is that it is …
(a) An increasing function
(b) A decreasing function
(c) A monotonically decreasing function
(d) A non-decreasing function with its minimum and maximum values are 0 and 1 respectively

24. The mean & variance of a r. v. X are given by 1 &2 respectively. Then the value of $E(3X^2 +2X)$ is …
(a)11 (b) 9 (c) 8 (d) none of these

25. The p. m. f. of a r. v. X is given by …

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

Then the p.m. of $Y = X^2$ is
(a) Y : 0 1 4
p(y) : 0.3 0.5 0.3
(b) Y : 0 1 2
p(y) : 0.3 0.5 0.3
(c) Y : 0 1 2
p(y) : 0.2 0.5 0.3
(d) Y : 0 1 4
p(y) : 0.2 0.5 0.3

26. If mean = 5, 0 = 3 then mean & S.D. of Z = 3 -7x respectively are …
(a) 38 and -21 (b) 32 and 21 (c) -32 and 21 (d) -38 and -21

27. If V(X) = V(Y) = Cov(X, Y) then r(X, Y) is -------
(a) 1 (b) V(X) (c) -1 (d) 1/V(X)

28. A discrete random variable can take ----- number of values within its range
(a) Finite (b) Countably infinite (c) Infinite (d) None.

29. If X be a discrete random variable which takes only one value say C with probability 1, Then …
(a) E (X) = 0, Var (X) =0 (b) E (X) = C, Var (X) =C
(c) E (X) = c, V (X) =0 (d) E (X) = X , Var (X) =C^2

30. If X follows one point distribution with P(X=10) = 1 then V(X) is …
(a) 1 (b) 10 (c) 2 (d) 0

31. If p.g.f. of discrete r.v. X is S^k then X follows:
(a) Poisson distribution (b) One-Point distribution
(c) Two-Point distribution (d) none of these

32. If r.v. X takes only two values x_1 and x_2 with probabilities p and q then r.v. X follows …
(a) Poisson distribution (b) One-Point distribution
(c) Two-Point distribution (d) none of these

33. Mean of two point distribution is ….
(a) $px_1 + (1-p)x_2$ (b) $px_1 + px_2$ (c) px_1x_2 (d) $px_1 - (1-p)x_2$

34. Let X be a discrete uniform distribution over 5,6,7,….,14 then P(X>9) is…
(a) 0.5 (b) 0.6 (c) 0.4 (d) 0.7

35. Variance of discrete uniform distribution is …
(a) $\frac{n^2+1}{12}$ (b) $\frac{n^2-1}{12}$ (c) $\frac{(n-1)^2}{12}$ (d) $\frac{(n+1)^2}{12}$

36. If discrete random variable X having p.m.f.
P(X) = (1 /n +1) , X = 0,1,2,---------,7 then value of mean is equal to …
(a) (n+1) / 2 (b) n / 2 (c) (n/2) +1 (d) (n/2) -1

37. For Bernoulli distribution the p.g.f. of X is …
(a) (q+ps) (b) $(q+ps)^{-1}$ (c) (p+qs) (d) none of these

38. The p.g.f. of Binomial distribution with parameters n and p is…
(a) (q+ps) (b) $(q+ps)^n$ (c) $(p+qs)^n$ (d) none of these

39. The variance of Bernoulli distribution with parameter p is …
(a) p (b) p(1-p) (c) np(1-p) (d) none of these

40. Given mean =4 and variance =2 for Binomial random variable X. Then value of P(X=2) is…
(a) 5/64 (b) 7/64 (c) 15/64 (d) 17/64

41. If X follows Binomial distribution with parameters n and p then :
(a) mean > variance (b) mean < variance
(c) mean = variance (d) none of these

42. The distribution of sum of two independent and identical Bernoulli random variables is …
(a) Bernoulli (b) Binomial (c) Geometric (d) Poisson

43. The number of parameters for Hyper geometric distribution is …
(a) One (b) Two (c) Three (d) n - k

44. Hyper geometric distribution with parameters N, M, and n tends to Binomial distribution if …
(a) $N \to 0$, $P = \frac{M}{N}$ (b) $N \to \infty$, M= P (c) $N \to \infty$, N= P (d) none of these

45. In which of the following distribution the probability of success varies at each successive draws?
(a) Discrete Uniform distribution (b) Hypergeometric distribution
(c) Binomial distribution (d) none of these

46. If X follows hypergeometric distribution with parameters N= 20 M=10 and n=5, then mean of X is …
(a) 5.2 (b) 2.5 (c) 40 (d) none of these

47. If X and Y are two independent Poisson random variables with parameters 1 and 1 respectively then distribution of X+Y is…
(a) Poisson with parameter 2 (b) Poisson with parameter 3
(c) Poisson with parameter 1 (d) none of these

48. The second central moment of Poisson distribution with mean m is …
(a) m (b) m^2 (c) m^2 (d) 3m

49. If X ~ Poisson (5) then ratio of mean to the variance is?
(a) 5 (b) 1 (c) 100 (d) 25

50. If X ~ Poisson distribution then …
(a) mean > variance (b) mean < variance
(c) mean = variance (d) none of these

51. If X ~ Poisson distribution with parameter 1 then P(X=0) is…
(a) e (b) 1/e (c) 1 (d) none of these

52. If X is a Poisson variate with P[X =1] = P[X=2] then mean of X is…
(a) 1 (b) 4 (c) 3 (d) 2

53. The Poisson distribution is limiting case of binomial distribution when $p\rightarrow 0$ and…
(a) $n \rightarrow 0$ (b) $n \rightarrow \infty$ (c) $n \rightarrow p$ (d) $n \rightarrow 1/2$

54. The sum of independent Geometric variables is --------.
(a) Negative Binomial (b) Poisson (c) Binomial (d) Hypergeometric

55. Which of the following distribution has lack of memory property?
(a) Poisson distribution (b) Geometric distribution
(c) Binomial distribution (d) none of these

56. If X ~ Geometric distribution with parameter p and P(X > 8 / X >3) = 0.7 then P(X > 5) is…
(a) 0.7 (b) 0.3 (c) 0.1 (d) 0

57. If X ~ G(p) then mean of geometric distribution is…
(a) p/q (b) p (c) q (d) q/p

58. If X ~G(p) and Y ~G(p) are independent variables then X + Y ~…
(a) G(p) (b) G(q) (c) NBD(2, p) (d) NBD(4, q)

59. If X ~ NBD(k, p) then mean of X is …
(a) kp/q (b) kp (c) pq (d) kq/p

60. If X ~ NBD(k, p) it reduces to geometric distribution if …
(a) k =1 (b) k =0 (c) p =1 (d) p = 0

61. If X is number of failures before k^{th} success then X follows…….distribution.
(a) Poisson distribution (b) Geometric distribution
(c) Binomial distribution (d) none of these

62. If X is a random variable with $P(X= k) = pq^{k-1}$, k = 1,2,3,… then P(X = 6) is …
(a) pq^6 (b) pq^5 (c) pq^2 (d) p^6q

63. If X follows one point distribution with P(X=5) = 1 then E(X) is …
(a) 1 (b) 5 (c) 0 (d) 2

64. The mean of Negative Binomial distribution with parameters k, p is …
(a) kq/p (b) kp/q (c) kq/p^2 (d) kp/q^2

65. The sum of independent Geometric variates is …
(a) Negative Binomial (b) Poisson (c) Binomial (d) Hypergeometric

Question II: Short Answered Questions:

1) With usual notation show that E(X+Y)=E(X)+E(Y).
2) If X and Y are independent then show that E(XY)=E(X)*E(Y)
3) Show that: $V(aX+bY)= a^2V(X) + b^2V(Y) + 2ab\ cov(X,Y)$.
4) Prove that: Cov[(ax+by) , (cx+dy)] = acV(X) + bdV(Y) + (ad+bc)Cov(X,Y)
5) Define distribution function of r.v. and state its properties.
6) Define raw and central moment of a discrete random variable.
7) Define Expectation of d.r.v. and Prove that: E(aX+bY)=aE(X)+bE(Y)
8) Define joint c.d.f. and state its properties.
9) Prove that: $P_{X+Y}(s) = P_X(s) . P_Y(s)$
10) Define Covariance and states its two properties.
11) State and prove Additive property of Bernoulli random variate.
12) Define discrete uniform distribution. Find its mean and variance.
13) Obtain the recurrence relation for probabilities of binomial distribution.
14) The mean and the variance of a binomial distribution are 16 and 8 respectively. Find: (i) P(x=0) (ii) P(x=1) (iii) P(x≥2)
15) For a binomial distribution n = 6 and 9* P(x=4) = P(x=2), then find p.
16) Let X and Y are two independent binomial variates with parameters (n_1 = 6, p = 1/2) and (n_2 = 4, p = 1/2) respectively. Then evaluate P[X+Y=3].
17) If mean and variance of binomial distribution are 4 and 3, then find all the constants.
18) Define Hypergeomatric distribution and find its mean.
19) Obtain the recurrence relation for probabilities of hypergeometric distribution
20) Define Poisson distribution and find its recurrence relation for probabilities.
21) State and prove additive property of Poisson distribution.
22) If X and Y are two independent Poisson variates with parameter 2 and 3 respectively, Find P(X+Y < 2).
23) If a random variable X has a Poisson distribution such that , P(x=2)=P(x=3) then find P(x=4)
24) Define Geometric distribution and find its recurrence relation for probabilities.
25) State and prove lack of memory property of geometric distribution.
26) Define Geometric distribution and find its p.g.f.
27) Define Geometric distribution and find its cumulative distribution function (c.d.f.)
28) Define Negative binomial distribution and find its recurrence relation for probabilities.
29) Find mean of Negative binomial distribution.
30) Define moment generating function (m.g.f.) and state their properties

Question III: Long Answer Questions:

1) Define:
   (i) Probability Distribution of (X,Y) (ii) Marginal Probability Distribution
   (iii) Conditional Probability Distribution (iv) Correlation Coefficient

(v) Independence of random variables

2) A joint probability distribution of r.v. (X,Y) is,

X \ Y	0	1	2	3
0	K	2k	3k	4k
1	4k	6k	8k	2k
2	9k	12k	3k	6k

Find: i) The value of k ii) Marginal distribution of X and Y

iii) Conditional distribution of X/Y=2 iv) Are X and Y independent r. v. ?

3) Define conditional expectation in case of bivariate discrete r.v (X,Y). The joint probability distribution of (X,Y) is given by,

X \ Y	-1	1
0	1/6	2/6
1	2/6	1/6

I) Show that: i)E(X)=0 ii)V(X)=1/4 iii)Cov(X,Y)= -1/6

II) Find E(X+Y)

4) The function is given by, $P(x,y)=\frac{x+2y}{27}$; x=0,1,2 y=0,1,2

(i) Is it probability mass function ? (ii) Marginal p.m.f. of X and Y

(iii) Conditional distribution of X given Y=2

5) A joint probability distribution of r.v. (X,Y) is given by,

$P(x,y) = c\,(2x+3y)$; x = 0,1,2 y = 1,2,3

= 0 ; otherwise

i) Find c

ii) Marginal distribution of X and Y

iii) corr (2x+5, 3y+2)

iv) Are X and Y independent random variable ?

6) State and prove law of addition of expectation and multiplication of expectation of two independent random variables.

7) Define One point distribution. Find its p.g.f. and hence, its mean and variance.

8) Define Two point distribution. Find its p.g.f. and hence, its mean and variance.

9) State and prove Additive property of Bernoulli random variate.

10) Stating assumption prove that binomial is limiting case of Hypergeometric distribution.

11) Define Discrete uniform distribution. Obtain mean and variance of a discrete random variate X taking values 1,2,3.

12) Define Bernoulli distribution. Obtain its mean and variance via p.g.f.

13) Define Poisson distribution and find its mean and variance.

14) Obtain probability generating function of Poisson distribution and hence find its mean and variance.

15) Show that under certain conditions to be stated, Poisson distribution is limiting case of Binomial distribution

16) Define Negative binomial distribution and find its mean and variance.
17) Define Negative binomial distribution Obtain p.g.f and hence find mean and variance.
18) Define Geometric distribution and find its mean and variance.