PART-A

Answer ALL of the following questions: **(10 x 2=20)**

1. Obtain Binomial distribution for which mean is 20 and variance 15.
2. The following table gives probability distribution for the random variable X, compute E(X).

X	3	6	9
P(x)	0.25	0.50	0.25

3. Consider a Poisson distribution with parameter 3. Compute P(X>0)
4. State the probability mass function of negative binomial distribution.
5. If X and Y be two independent geometric random variables , what is the distribution of X+Y.
6. What are the mean and variance of uniform distribution U(a, b)?
7. Define hypergeometric distribution.
8. Define probability generating function of a discrete distribution.
9. What is the standard deviation and β_1 coefficient of Poisson distribution with mean 4?
10. Write down the expression for covariance between two variables if the joint PMF of two variables is given, with usual notations.

PART-B

Answer any FIVE of the following questions: **(5 x8 =40)**

11. Show that Poisson distribution is a limiting form of Binomial distribution.
12. Derive mean and variance of Negative Binomial distribution.
13. State and prove memory less property of geometric distribution.
14. Derive measure of skewness of Poisson distribution.
15. Average percentage of failure in a certain examination is 40%. What is the probability that out of a group of 6 candidates, at least 4 passed in the examination.
16. A lot of 12 television sets includes 2 with white cards. If 3 of the sets are chosen at random for shipment to a hostel, how many sets with white cards can be expected to be sent to the hostel.
17. According to data obtained from the international data base, the infant mortality rate in Sweden is 3.5 per 1000 live births. Find the probability that of 500 randomly selected live births, there are (a) no deaths (b) at most 3 deaths.
18. Find the covariance between X and Y if the joint PMF is given as follows.

X	Y	
	0	1
-1	0	1/4
0	1/2	0
1	0	1/4

PART-C

Answer any TWO of the following questions: (2 x 20 =40)

19. A transmitter can send a data pack over one of the two possible channels. Let X and Y each takes value 0 or 1 according to the availability of channel 1 and channel 2 respectively. Joint pmf of (X,Y) is given as follows. Find the marginal and conditional probabilities. Also find mean and variances of X and Y.

X (Channel -1)

		0	1
Y (Channel-2)	0	0.3	0.15
	1	0.15	0.4

20. Show that for a trinomial distribution, marginal and conditional distributions are binomial.

21. The screws produced by a certain machine were checked by examining samples of size 7. The following table shows the distribution of 128 samples according to the number of defective items they contained. Fit a Binomial distribution and find the expected frequencies. Find the mean and variance of the fitted distribution.

Number of defectives in a sample of 12	0	1	2	3	4	5	6	7
Number of samples	7	6	19	35	30	23	7	1

22. Using the following table of joint PMF, find
    (a) $P(Y \geq 100)$
    (b) Marginal p.m.f.' s of X and Y
    (c) Conditional pmf of X given Y=100
    (d) Coefficient of Correlation between X and Y

	Y		
X	0	100	200
100	0.2	0.1	0.2
250	0.05	0.15	0.30

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