

Q.1) Q.P. : 59174

Set B

Q.17 a) F : Prob = 0

2) T :  $P(A \cap B) = P(A) \cdot P(B)$

3) T :  $\mu_0 = E[(X - E(X))^0] = E(1) = 1$

4) F :  $V(100) = 0$

6) F : For poisson dist<sup>n</sup>, mean = variance one variable two outcom

Q.17 b) 1) Definition = 01, Example = 01

2) Def = 01, Example = 01

3) Def = 01, range = 01,  $-1 < S < 1$

4)  $P(X) = \sum_y P(X, Y)$        $P(Y) = \sum_x P(X, Y)$       01 + 01

5) (i) Poisson      (ii) Binomial.

Q.2) 1) I) statement + Proof + independent events = 01 + 04 + 01  $\Rightarrow$  (06)

II)  $P(\text{Accident}) = 0.0195$ ,  $P(\text{Heavy} | \text{Accident}) = 9/13$   $\Rightarrow$  (04)

2) I) statement + Proof = 02 + 05 = (07)

II) Req. prob =  $P(A) \cdot P(\bar{B}) + P(\bar{A}) \cdot P(B) = 22/45$       (03)

3) definition + Example = 01 + 01 = 2 marks each.

4) I) 2 marks each

II) 4 marks.

Q.3) 1) I) statement + Proof + n events = 01 + 04 + 01  $\Rightarrow$  (06)

II) each 02 marks  $\Rightarrow$  (04)

2) I) Def = (02)

II) Def = (02) ; 5 properties = (05)

III) Def = (01)

3)  $\text{cov}(X, Y) = 0$ ,  $S = 0$ ,  $X$  &  $Y$  are <sup>Not</sup> independent } (10)  
comment :  $\text{cov}(X, Y) = 0 \not\Rightarrow X$  &  $Y$  are independent

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4) I) Def: (01)

II) each  $v(a) \Rightarrow (02)$ ,  $v(ax+b) \Rightarrow (02)$ ,  $v(ax+by) \Rightarrow (05)$

Q.4)

1) Def + Ex ~~am~~  $\Rightarrow 01$

2 Examples  $\Rightarrow 02$

Mean  $\Rightarrow 03$       Variance  $\Rightarrow 04$

2) I) Def + 2 Ex =  $01 + 02 = (03)$

II) (02)

III)  $n=100$  (large)       $p=0.01$  (small)

$$X \sim \text{Bin}(n, p)$$

$$X \sim \text{Poi}(np)$$

$$\lambda = np = 1$$

$$P(X=1) = e^{-1}$$

(05)

3) Def + Mean + Variance =  $01 + 04 + 05$

4) I)  $05 + 02$

II)  $p = \frac{2}{5}$ ,  $n = 3$        $X \sim \text{Bin}(n=3, p=\frac{2}{5})$

$$P(X=1) = \binom{3}{1} \left(\frac{2}{5}\right) \left(\frac{3}{5}\right)^2$$

Q.5) 1) statement + Proof + n events =  $01 + 02 + 01$

mutually exclusive & exhaustive = 01

2) each carry (01) mark.

3) each definition 01 mark, proof = 02

4)  $02 + 01 + 01 + 01$

5) 05

6) Def + mean + variance =  $01 + 03 + 01$

7) Mean = 03,  $P(X=0) = e^{-3} = (03 + 02)$