Anna Adarsh College for Women

Statistics - II Answer Key.

Section - B.

13) (i) $P(A) = 1/6$

(ii) $P(A) = 5/36$

14) $P(H) = 1/2 \quad P(T) = 1/2$

$P(x) = 10Cx\left(\frac{1}{2}\right)^{x}\left(\frac{1}{2}\right)^{10-x} = 10Cx\left(\frac{1}{2}\right)^{10}$.

$P(x \geq 7) = P(x=7) + P(x=8) + P(x=9) + P(x=10)$

$= \left(\frac{1}{2}\right)^{10}\left[10C_7 + 10C_8 + 10C_9 + 10C_{10}\right]$.

$P(x \geq 7) = \frac{176}{1024}$.

15) $P(x \geq 20)$ when $x = 20 \quad Z = \frac{20-12}{4} = 2$.

$\therefore P(x \geq 20) = P(z \geq 2) = 0.5 - P(0 \leq Z \leq 2)$

$= 0.5 - 0.4772$

$= 0.0228$.

(16) $n = 22, \quad \bar{x} = 153.7, \quad S = 17.2$

$H_0 : \mu > 146.3 \quad t = \frac{\bar{x} - \mu}{\sqrt{s^2/(n-1)}} = 9.03 \quad T.V = 1.72$

Reject H_0; Advertising campaign was successful

17) $E_1 = 1440$ $E_2 = 5760$

$E_3 = 160$ $E_4 = 640$

$\chi^2 = 13.89$

T.V = 3.84

Distinction is made in appointment on the basis of Gender.

18) Chi-Square Distribution — Explanation..

19) $n = 1000$ $x = 540$

$$p = \frac{540}{1000} = 0.540$$

$P = 0.5$ $Q = 0.5$

$H_1 : P \neq 0.5$

$$Z = \frac{p - P}{\sqrt{PQ/n}} = 2.532.$$

T.V = 2.58.

Rice and wheat eaters are equally Population

Section - C.

20) (i) $\frac{{}^6C_2 \times {}^{13}C_1}{{}^{19}C_3}$

(ii) $\frac{{}^6C_1 + {}^4C_1 + {}^9C_1}{{}^9C_3}$

(iii) $\frac{15C_3}{19C_3}$

(iv) $1 - \frac{13C_3}{19C_3}$

21) $N = 100 \quad n = 500 \quad p = 0.01 \quad \lambda = np = 0.5$

$$f(x) = N \cdot P(x) = \frac{100 \times 0.6065 \times (0.5)^x}{x!}$$

(i) No Defective $= 100 \times P(x=0) = 100 \times 0.6065$

$\approx$ 61 Bottles.

(ii) atleast two Defective.

$$= 100\,[P(x \geq 2)] = 100\,[1 - P(x=0) - P(x=1)].$$

$$= 100[1 - 0.6065 - 0.6065 \times 0.5)$$

$$= 9.$$

22) $P(X<25) = 0.1003$ and $P(X<70) = 0.8997$

when $x = 25 \quad z = \frac{25-\mu}{\sigma} = -z_1$

when $x = 70 \quad z = \frac{70-\mu}{\sigma} = z_2.$

$P(z < -z_1) = 0.1003$

$P(z < z_2) = 0.8997$

$25 - \mu = -1.286$

$70 \mu = 1.286$

$\sigma = 17.578$

$\mu = 47.5$

23) $\bar{x} = 50.875$ $\bar{y} = 52.875$

$\Sigma (x-\bar{x})^2 = 30.875$

$\Sigma (y-\bar{y})^2 = 16.875$

$S^2 = 3.41$

$G = 2.17$

Food A and Food B Differ significantly.

24) $E(620) = 585$

$E(380) = 417$

$E(550) = 585$

$E(450) = 415$.

$H^2 = 10.089$

T.V $= 3.841$

The nature of area is related to voting preference in the election.