Name of Paper : Statistics for IT

Course and year : HNDIT I

CONFIDENTIAL

Name of the Examination : First year, second semester **SCHEME OF ASSESSMENT**

Title of Paper : ..... **Month :** ..... **Year:** .....

(Please write legibly or type on one side of the Paper)

(1) (i) (a) - colour of a production } similar answers
taste of a production }

(b) Number of students in a class } similar answers
Number of pages in the books }

(ii) Select two schools — C.R.D
Within the selected schools apply C.R.D and select students like the following

School	Girls	Boys
I	21	14
II	21	14

Selection of girls and boys corresponding to stratified sampling.

(iii)

x	f
20	3
25	4
30	3

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SCHEME OF ASSESSMENT

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(iv)

Class	Tally marks	frequency
(a) 40-44	||| ||||	9
50-54	||| |||| |||	13
60-64	||| |||| ||	12
70-74	||| ||||	8
80-84	||| ||||	6

(b) using table expected sum = $44.5 \times 9 = 400.5$

exact sum = $41+47+48+46+44+42+43+41+49$

$= 401$

∴ error $= 401 - 400.5 = 0.5$

(v) $\sum_{i=1}^{4}(2x_i+4) = 2x_1+4+2x_2+4+2x_3+4+2x_4+4$

$= 10+15+13+20+20$

$= 78$

(b) $\sum_{i=1}^{4}(2x_i^2-3) = 2x_1^2-3+2x_2^2-3+2x_3^2-3+2x_4^2-3$

$= 2(10^2+15^2+13^2+20^2)-12$

$= 1776.$

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Part III

Course and year : HNDIT I

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SCHEME OF ASSESSMENT

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class	f	F	x	fx
1 - 1.2	12	12	1.1	13.2
1.2 - 1.4	18	30	1.3	23.4
1.4 - 1.6	6	36	1.5	9
1.6 - 1.8	24	60	1.7	40.8
1.8 - 2.0	30	90	1.9	57
2.0 - 2.2	5	95	2.1	10.5
2.2 - 2.4	17	112	2.3	39.1
2.4 - 2.6	28	140	2.5	70
	140			263

(i) $\text{Mode} = L + \left[\frac{d_1}{d_1+d_2}\right] \times C = 1.8 + \left[\frac{6}{6+25}\right] \times 0.2 = 1.83$

(ii) $\text{Median} = L + \left[\frac{\frac{N}{2} - F}{f}\right] \times C = 1.8 + \left[\frac{70 - 60}{30}\right] \times 0.2 = 1.8667$

minimum study time of a good student = 1.8667 hrs.

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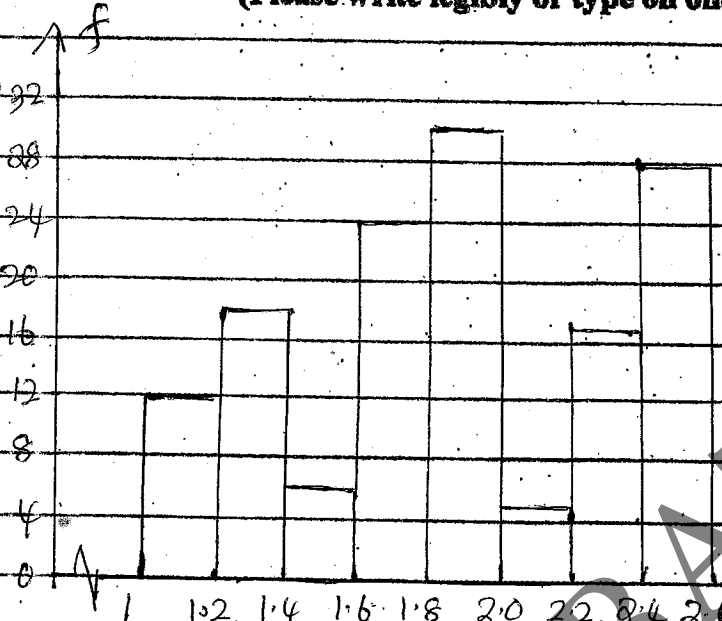
(iii)



→ class boundaries

(iv) average $(\bar{x}) = \frac{\sum f_i x_i}{\sum f_i} = \frac{263}{140} = 1.8788$

(v) new $(\bar{x}) = \frac{263 + 1.7 \times 6 - 1.9 \times 6}{140}$

$= \frac{261.8}{140}$

$= 1.87$

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Part V

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SCHEME OF ASSESSMENT

Name of the Examination : .....

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(3) (i)

x	x^2
10	100
12	144
18	324
20	400
25	625
85	1593
$\sum_{i=1}^{n} x_i$	$\sum_{i=1}^{n} x_i^2$

(a) $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{85}{5} = 17$

Variance (s^2) $= \frac{\sum_{i=1}^{n} x_i^2}{n} - \bar{x}^2$

$= \frac{1593}{5} - 17^2 = 89.6$

(b) $SD(s) = \sqrt{89.6} = 9.4406$.

(ii) $\bar{x} = 100 \quad s = 3 \quad BS = 6$

Range of good items = between 94 and 106.

(iii) $\frac{(n+1)!}{n!} - \frac{n!}{(n-1)!} = \frac{(n+1)n!}{n!} - \frac{n \times (n-1)!}{(n-1)!}$

$= n+1 - n$

$= 1$

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(iv) (a) $4P_4 = 24$

(b) $3P_3 = 6$

(c) $24 - 6 = 18$

(v) $5C_2 \times 6C_2 = 10 \times 15 = 150$

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Name of the Examination : .....

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(1) $E_1 = \{TH, HT\}$, $E_2 = \{HT, HH\}$

$E_1 \cap E_2 = \{HT\}$, $E_1 \cup E_2 = \{TH, HT, HH\}$

$P(E_1) = \frac{2}{4}$, $P(E_2) = \frac{2}{4}$ $P(E_1 \cap E_2) = \frac{1}{4}$

$\therefore P(E_1) + P(E_2) - P(E_1 \cap E_2) = \frac{2}{4} + \frac{2}{4} - \frac{1}{4} = \frac{3}{4}$ — (1)

$P(E_1 \cup E_2) = \frac{3}{4}$ — (2)

By (1) and (2) $\Rightarrow P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

(11) (a) $S = \{1H, 2H, 3H, 4H, 5H, 6H, 1T, 2T, 3T, 4T, 5T, 6T\}$

* Here instead of 1H can write H1, (1,H) or (H,1)

(b) $E_1 = \{1H, 2H, 3H, 4H, 5H, 6H\}$

$E_2 = \{3H, 5H, 3T, 5T\}$

(c) $E_1 \cap E_2 = \{3H, 5H\} \Rightarrow P(E_1 \cap E_2) = \frac{2}{12} = \frac{1}{6}$

(d) $E_1 \cup E_2 = \{1H, 2H, 3H, 4H, 5H, 6H, 3T, 5T\}$

$P(E_1 \cup E_2) = \frac{8}{12} = \frac{2}{3}$

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Part III

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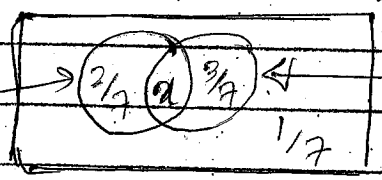
(iii)



$a = \frac{1}{7}$

(a) $P(A) = \frac{2}{7} + \frac{1}{7} = \frac{3}{7}$

(b) $P(B) = \frac{3}{7} + \frac{1}{7} = \frac{4}{7}$

(c) $P(A \cap B) = \frac{1}{7}$

(d) $P(A \cup B) = \frac{2}{7} + \frac{1}{7} + \frac{3}{7} = \frac{6}{7}$

(e) $P[(A \cap B)'] = 1 - P(A \cap B) = 1 - \frac{1}{7} = \frac{6}{7}$

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Name of the Examination : .....

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(5) (i) Binomial, Poisson — Discrete
Normal, Negative exponent — continuous

(ii) $P(X=m) = \frac{1}{14} \times m$

(a)

a	2	3	4	5
$P(X=m)$	$\frac{2}{14}$	$\frac{3}{14}$	$\frac{4}{14}$	$\frac{5}{14}$

(b) $P(X \leq 2) = P(X=2) = \frac{2}{14} = \frac{1}{7}$

(c) $E(X) = \sum x P(x) = 2\times\frac{2}{14} + 3\times\frac{3}{14} + 4\times\frac{4}{14} + 5\times\frac{5}{14}$

$= \frac{4+9+16+25}{14} = \frac{54}{14} = \frac{27}{7}$

(d) $E(X^2) = \sum x^2 P(x) = 2^2\times\frac{2}{14} + 3^2\times\frac{3}{14} + 4^2\times\frac{4}{14} + 5^2\times\frac{5}{14}$

$= \frac{224}{14} = 16$

Variance $= E(X^2) - [E(X)]^2 = 16 - (27/7)^2 = \frac{55}{49}$

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(iii) $p = 0.4$, $q = 0.6$ $n = 15$

$P(X = x) = {}^{n}C_{x}\, p^{x} q^{n-x} = {}^{15}C_{x} (0.4)^{x} (0.6)^{15-x}$

(a) P{exactly two days} $= {}^{15}C_{2} (0.4)^{2} (0.6)^{13} = 0.0219$

(b) P{less than or equal 3 days}

$= P(X \leq 3)$

$= P(X=0) + P(X=1) + P(X=2) + P(X=3)$

$= {}^{15}C_{0} (0.4)^{0} (0.6)^{15} + {}^{15}C_{1} (0.4)^{1} (0.6)^{14} + {}^{15}C_{2} (0.4)^{2} \times (0.6)^{13} + {}^{15}C_{3} (0.4)^{3} (0.6)^{12}$

$= 0.0905$

(c) P{more than 3 days} $= P(X > 3)$

$= 1 - P(X \leq 3)$

$= 1 - 0.0905$

$= 0.9095$

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