1/6

ANSWER KEY

IMPVT

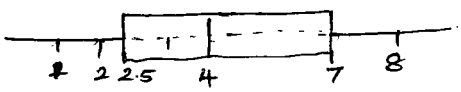
FIRST YEAR HIGHER SECONDARY EXAMINATION OCT 2022.

PART-I/II/III

SUBJECT: STATISTICS

CODE NO: EY 832 **VERSION:**

60 **SCORES** 2 **HOURS**

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1		(b) 24	1	
2		(d) literate	1	
3		(a) ISI	1	
4		(a) 180	1	
5		(a) Maximum [OR (b) മാത്രമല്ല]	1	
6		(b) Stratified Sampling	1	
7		(b) Meso kurtic	1	
8		(c) 1	1	
9		(a) Small	1	
10		(d) P(A and B) = P(A). P(B)	1	10
11		(i) → e , (ii) → a (iii) → d , (iv) → c	$4 \times \frac{1}{2}$	2
12		Explanation of FGD with any two points	2	2
13		Correct marking of points and figures	2	2
14		Explanation of Importance – four points	$4 \times \frac{1}{2}$	2
15		1, 2, 3, 3, 4, 5, 7, 7, 8 ; $n = 9$ $Q_1 = 2.5$ $Q_3 = 7$, $Q_2 = 4$  (Drawing box plot – 1 score)	½ 1 ½	2

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
16.		$S_k = \frac{\text{mean} - \text{mode}}{\text{Standard deviation}}$ $0.6 = \frac{35 - \text{mode}}{6}$ $\text{mode} = 31.4$	½ ½ 1	2
17.		Qualitative classification, Quantitative classification, Geographical classification, chronological classification	4 × ½	2
18.		class: 0-2 | 2-4 | 4-6 | 6-8 | 8-10 | Total frequency: 5 | 6 | 3 | 7 | 4 | 25 Relative frequency: $\frac{5}{25}$ | $\frac{6}{25}$ | $\frac{3}{25}$ | $\frac{7}{25}$ | $\frac{4}{25}$ | 1	2	2
19.		$P(A \cap B) = P(B) \cdot P(A\|B) = 0.28 \times 0.21$ $= 0.0588$ $P(B\|A) = \frac{P(A \cap B)}{P(A)}$ $= \frac{0.0588}{0.34} = 0.1729$	½ ½ ½ ½	2
20.		$COV(X,Y) = \frac{\Sigma XY}{n} - \bar{X} \cdot \bar{Y}$ $\bar{X} = \frac{\Sigma X}{n} = \frac{88}{8} = 11$ $\bar{Y} = \frac{\Sigma Y}{n} = \frac{152}{8} = 19$ $COV(X,Y) = \frac{1772}{8} - 11 \times 19 = 12.5$	½ ½ ½ ½	2
21.		Explanation of any applied branch of statistics	3	3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
22.			3	3
23.		Weighted average, $\bar{X}_w = \frac{\sum wx}{\sum w}$ $= \frac{80\times40 + 94\times60}{40+60}$ $= 88.4$	1 1 1	3
24		A.M $= \frac{18+8}{2} = 13$ G.M $= \sqrt{18\times8} = 12$ H.M $= \frac{2}{0.056+0.125} = 11.08$ A.M $\geq$ G.M $\geq$ H.M / $G^2 = A.M \times H.M$	½+½ 1 1	3
25.		Arranging in ascending order $Q_1 = 7$, $Q_3 = 24$ $Q.D = \frac{Q_3 - Q_1}{2}$ Q.D = 8.5	1 1 ½ ½	3
26.	a)	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cap B) = 0.25 + 0.4 - 0.5 = 0.15$	½ ½	
	b)	$P(A \text{ and not } B) = P(A \cap \bar{B}) = P(A) - P(A \cap B)$ $= 0.25 - 0.15 = 0.10$	½ ½	
	c)	$P(\text{none}) = 1 - P(A \cup B) = 1 - 0.5 = 0.5$	½+½	3

y \ x	0–10	10–20	20–30	30–40	40–50	50–60	Total
10–20	1	1					2
20–30		4	1				5
30–40			2	3			5
40–50				4	1	1	6
50–60					2		2
Total	1	5	3	7	3	1	20

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
27.		$P(A\|B) = \frac{P(A \cap B)}{P(B)}$	1	
		$P(A \cap B) = 17/20$ $\quad P(B) = \frac{15}{16}$	½+½	
		$P(A\|B) = \frac{17/20}{15/16} = 0.907$	½+½	3
28.		8 relevant questions	8×½	4
29.		less than c.f table: upper limit / l.c.f: 10/8, 20/20, 30/40, 40/50, 50/54 ; Greater than c.f table: lower limit / g.c.f: 0/54, 10/46, 20/34, 30/14, 40/4	1+1	
		Drawing graph	2	4
30.	i)	Company A, Total wage $= n_1\bar{x}_1 = 5000 \times 550 = 27,50,000$	1½	
		Company B, Total wage $= n_2\bar{x}_2 = 650 \times 4500 = 29,25,000$	1½	
		Company B pays larger amount	1	
	ii)	Combined mean, $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1+n_2}$	½	
		$= \frac{550 \times 5000 + 650 \times 4500}{1200}$	1	
		$= 4729.166$	½	4
31.		Mode = 10	1	
		|x-mode| : 0 2 2 1 6 0 1 2 0 3 / 17	2	
		$M.D = \frac{\Sigma \|x-mode\|}{n} = \frac{17}{10} = 1.7$	1	4

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
32.		x: 4, 6, 2, 1, 7 — Total 20 $(x-\bar{x})^2$: 0, 4, 4, 9, 9 — 26 $(x-\bar{x})^4$: 0, 16, 16, 81, 81 — 194	2	
		$\mu_2 = \frac{\Sigma (x-\bar{x})^2}{n} = \frac{26}{5} = 5.2$	½	
		$\mu_4 = \frac{\Sigma (x-\bar{x})^4}{n} = \frac{194}{5} = 38.8$	½	
		$\beta_2 = \frac{\mu_4}{\mu_2^2} = \frac{38.8}{(5.2)^2} = 1.43$	½	
		$\therefore \beta_2 < 3$, so it is platy kurtic	½	4
33.		B_1 – choose bag 1, B_2 – choose bag 2 A – select black ball		
		$P(B_1) = ½$ $P(B_2) = ½$	½+½	
		$P(A/B_1) = \frac{6}{10}$ $P(A/B_2) = \frac{3}{7}$	½+½	
		$P(B_1/A) = \frac{P(B_1) \cdot P(A/B_1)}{P(B_1) \cdot P(A/B_1) + P(B_2) \cdot P(A/B_2)}$	1	
		$= \frac{½ \times \frac{6}{10}}{½ \times \frac{6}{10} + \frac{1}{2} \times \frac{3}{7}} = 0.5834$	1	4
34.		class: 30-40, 40-50, 50-60, 60-70, 70-80, 80-90 f: 6, 12, 18, 13, 9, 4 c.f: 6, 18, 36, 49, 58, 62 class: 90-100 f: 1 c.f: 63	2	
		Median class → 50-60	½	
		Median $= l + \frac{(\frac{N}{2} - cf)c.}{f.} = 50 + \frac{(31.5-18)10}{18}$	1+1	
		$= 57.5$	½	5

Qn No.	Sub Qns	Answer key / Value Points	Score	Total Score
35.				

class	f	x	fx	fx^2
1–3	40	2	80	160
3–5	30	4	120	480
5–7	20	6	120	720
7–9	10	8	80	640
	100		400	2000

3

$\bar{x} = \frac{\Sigma fx}{N} = \frac{400}{100} = 4$ — ½

$S.D = \sqrt{\frac{\Sigma fx^2}{N} - (\bar{x})^2}$ — ½

$= \sqrt{\frac{2000}{100} - (4)^2} = 2$ — 1 — 5

36.	i)	P(a spade) $= \frac{13}{52}$	1	
	ii)	P(not an ace) $= 48/52$	1	
	iii)	P(a red card) $= 26/52$	1	
	iv)	P(not a diamond) $= 39/52$	1	
	v)	P(spade or an ace) $= \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52}$	1	5

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