

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2018

SUBJECT: STATISTICS

CODE. NO: 120

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1.		(1) → 4 , (2) → (3) , (3) → (2) , (4) → 1	$4 \times \frac{1}{2}$	2.
2.	a) Discrete b) Continuous c) Continuous d) Discrete		$4 \times \frac{1}{2}$	2
3.	Draw Scatter diagram. [Give 1 score for drawing X & Y axis only]		2	2
4.	Given $\bar{x} = 2650$, $n = 40$ $\Sigma x = 2650 \times 40 = 106000$ Correct $\Sigma x = 106000 - 1500 + 1150$ $= 105650$. Correct Average = $\frac{105650}{40} = 2641.25$		$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2.
5.	a) More than 3. b) positively skewed		1 1	2.

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6.		<p>A - persons own a credit card B - Person is employed Find $P(A/B)$</p> $P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{18/109}{47/109} = \frac{18}{47}$ <p>Or [Gives full credit for calculation of probability from table.]</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	2.																
7.	a) Investigator b) $1 \rightarrow (3), 2 \rightarrow (4), 3 \rightarrow (2), 4 \rightarrow (1)$		$\frac{1}{2} \times 4$	$\begin{matrix} 12 \\ 2 \end{matrix} \Bigg\} 3$																
8.		<table border="1"> <thead> <tr> <th></th> <th>Married</th> <th>Unmarried</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Men</td> <td>240</td> <td>720</td> <td>960</td> </tr> <tr> <td>Women</td> <td>120</td> <td>360</td> <td>480</td> </tr> <tr> <td>Total</td> <td>360</td> <td>1080</td> <td>1440</td> </tr> </tbody> </table> <p>Or [Give 2 marks for table form.]</p>		Married	Unmarried	Total	Men	240	720	960	Women	120	360	480	Total	360	1080	1440		3
	Married	Unmarried	Total																	
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11		<p>Ascending order of values 45, 47, 47, 49, 50, 53, 58, 59, 60</p> <p>Median = 50</p> <table border="1"> <thead> <tr> <th>x</th> <th> x - Median </th> </tr> </thead> <tbody> <tr><td>45</td><td>5</td></tr> <tr><td>47</td><td>3</td></tr> <tr><td>47</td><td>3</td></tr> <tr><td>49</td><td>1</td></tr> <tr><td>50</td><td>0</td></tr> <tr><td>53</td><td>3</td></tr> <tr><td>58</td><td>8</td></tr> <tr><td>59</td><td>9</td></tr> <tr><td>60</td><td>10</td></tr> </tbody> </table> <p>$\sum x - \text{Median} = 42.$</p> <p>$\therefore \text{M.D about Median} = \frac{\sum x - \text{Median} }{n}$</p> <p>$= \frac{42}{9} = 4.67$</p>	x	x - Median	45	5	47	3	47	3	49	1	50	0	53	3	58	8	59	9	60	10	1 1 1	3
x	x - Median																							
45	5																							
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12.		<table border="1"> <thead> <tr> <th>x</th> <th>y</th> <th>x.y</th> </tr> </thead> <tbody> <tr> <td>19</td> <td>50</td> <td>950</td> </tr> <tr> <td>21</td> <td>52</td> <td>1092</td> </tr> <tr> <td>30</td> <td>40</td> <td>1200</td> </tr> <tr> <td>45</td> <td>22</td> <td>990</td> </tr> <tr> <td>50</td> <td>10</td> <td>500</td> </tr> <tr> <td>54</td> <td>14</td> <td>756</td> </tr> <tr> <td>25</td> <td>35</td> <td>875</td> </tr> <tr> <td colspan="2">Σx = 244</td> <td>Σy = 223</td> <td>Σxy = 6363</td> </tr> </tbody> </table>	x	y	x.y	19	50	950	21	52	1092	30	40	1200	45	22	990	50	10	500	54	14	756	25	35	875	Σx = 244		Σy = 223	Σxy = 6363	2	3
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Σx = 244		Σy = 223	Σxy = 6363																													
		$\text{COV}(x,y) = \frac{\sum xy}{n} - \frac{\sum x}{n} \cdot \frac{\sum y}{n}$ $= \frac{6363}{7} - \frac{244}{7} \times \frac{223}{7}$ $= 909 - 1110.64$ $= -201.64$	1/2																													
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13		$B_1 = \frac{M_3^2}{M_2^3} = 0$ $B_2 = \frac{M_4}{M_2^2} = \frac{27}{3^2} = 3$ <p> $B_1 = 0$, the distribution is symmetric $B_2 = 3$, the <u>dn</u> is mesokurtic </p>	1 1 1/2 1/2	3
14	(a)	Aggregate of items	1	4
	(b)	Any three points of N.S.S.O	3	
15	(a)	$P[\text{The person like rice}] = \frac{21}{50}$	1	4
	(b)	$P[\text{The person like Chappathi or veg. Salad}] = \frac{22}{50} + \frac{5}{50}$ $= \frac{27}{50}$	1	
	(c)	$P[\text{The person doesn't like Chappathi or rice}] = \frac{5}{50} + \frac{2}{50}$	1	
	d)	$P[\text{The person doesn't like Soup}] = 1 - \frac{2}{50}$ $= \frac{48}{50}$	1	
		[Give Full Score for any three]		

Qn. No	Sub Qns	Answer Key/Value Points		Score	Total
16		class	frequency		
		0.5-9.5	4		
		9.5-19.5	10	1	
		19.5-29.5	20		
		29.5-39.5	11		
		39.5-49.5	3		
		49.5-59.5	2		
		Modal class 19.5-29.5		1/2	
		Mode = $l + \frac{c \cdot (f_1 - f_0)}{2f_1 - f_0 - f_2}$		1/2	4
		$l = 19.5$ $f_1 = 20, f_0 = 10, f_2 = 11, c = 10$ $M = \frac{19.5 + 10(20 - 10)}{2 \times 20 - 10 - 11}$ $= 24.76$ [Consider the inclusive classes also for full score]		1/2	
17	(a)	37		1	
	(b)	x	f	Cum. f	
		160	8	8	
		200	3	11	
		208	6	17	
		210	7	24	
		220	4	28	
250	2	30			

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
		$N = 30$ $\frac{N+1}{4} = 7.75$ $Q_1 = 160$ $3 \cdot \frac{(N+1)}{4} = 23.25$ $\therefore Q_3 = 210$ $Q.D = \frac{Q_3 - Q_1}{2}$ $= \frac{210 - 160}{2} = \frac{50}{2} = 25$ Or [Give 2 marks for correct formula.]	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	4
18	a) Systematic Sampling b) Number of samples = $5 \times 4 = 20$	The Pairs are $(B_1 B_2), (B_1 B_3), (B_1 G_1), (B_1 G_2), (B_2 B_1), (B_2 B_3)$ $(B_2 G_1), (B_2 G_2), (B_3 B_1), (B_3 B_2), (B_3 G_1), (B_3 G_2)$ $(G_1 B_1), (G_1 B_2), (G_1 B_3), (G_1 G_2), (G_2 B_1), (G_2 B_2), (G_2 B_3)$ $(G_2 G_1)$.	1 1 2	4
19	a)	A - student joined guitar class B - student joined tabla class. $P(A) = 0.30$, $P(B) = 0.20$ $P(A \cap B) = 0.10$	1	:

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total																		
	(1)	$P[\text{Student enrolled in any of the class}]$ $= P(A \cup B)$ $= P(A) + P(B) - P(A \cap B)$ $= 0.30 + 0.20 - 0.10$ $= 0.40$	$\frac{1}{2}$ $\frac{1}{2}$																			
	2)	$P[\text{Student not enrolled in any of the classes}] = 1 - P(A \cup B)$ $= 1 - 0.40$ $= 0.60$	$\frac{1}{2}$ $\frac{1}{2}$	4.																		
	(b)	Complementary Event	1																			
20	a)	$G.M = \sqrt[4]{108 \times 106 \times 104 \times 105} = 105.74$ <p>\therefore Average increase = 5.74%</p> <p>Or [Identifying G.M - 2 marks]</p>	$\frac{1}{2} + 1$ $\frac{1}{2}$	2.																		
	b)	<table border="1"> <thead> <tr> <th>class</th> <th>frequency</th> <th>C-f</th> </tr> </thead> <tbody> <tr> <td>19.5 - 29.5</td> <td>10</td> <td>10</td> </tr> <tr> <td>29.5 - 39.5</td> <td>8</td> <td>18</td> </tr> <tr> <td>39.5 - 49.5</td> <td>f_1</td> <td>$18 + f_1$</td> </tr> <tr> <td>49.5 - 59.5</td> <td>4</td> <td>$22 + f_1$</td> </tr> <tr> <td>59.5 - 69.5</td> <td>f_2</td> <td>$22 + f_1 + f_2$</td> </tr> </tbody> </table>	class	frequency	C-f	19.5 - 29.5	10	10	29.5 - 39.5	8	18	39.5 - 49.5	f_1	$18 + f_1$	49.5 - 59.5	4	$22 + f_1$	59.5 - 69.5	f_2	$22 + f_1 + f_2$	1	
class	frequency	C-f																				
19.5 - 29.5	10	10																				
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		$N = 40$ Median = 42 Median = $l + \left(\frac{N}{2} - m\right) \frac{c}{f}$ $42 = 39.5 + \frac{(20 - 18)10}{f_1}$ $\therefore f_1 = 8, f_2 = 10$	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	4																
21	a)	Company A <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>1</td> <td>2</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>$\Sigma X = 13$</td> </tr> <tr> <td>X^2</td> <td>1</td> <td>4</td> <td>9</td> <td>9</td> <td>4</td> <td>4</td> <td>$\Sigma X^2 = 31$</td> </tr> </table> $\bar{x} = \frac{\Sigma x}{n} = \frac{13}{6} = 2.16$ Standard deviation $\sigma_x = \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$ $= \sqrt{\frac{31}{6} - 2.16^2}$ $= 0.7$ C.V of Company A = $\frac{S.D}{\bar{x}} \times 100$ $= \frac{0.7}{2.16} \times 100$ $= 32.40\%$	X	1	2	3	3	2	2	$\Sigma X = 13$	X^2	1	4	9	9	4	4	$\Sigma X^2 = 31$	$\frac{1}{2}$ $\frac{1}{2}$ 1	
X	1	2	3	3	2	2	$\Sigma X = 13$													
X^2	1	4	9	9	4	4	$\Sigma X^2 = 31$													

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
		Company B.		
		X 35 45 30 35 40 25 $\Sigma X = 210$	$\frac{1}{2}$	
		X ² 1225 2025 900 1225 1600 625 $\Sigma X^2 = 7600$		
		$\bar{X} = \frac{210}{6} = 35$	$\frac{1}{2}$	
		$\sigma_x = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2}$		
		$= \sqrt{\frac{7600}{6} - 35^2}$	$\frac{1}{2}$	
		$= \underline{\underline{6.45}}$		6
		C.V of Company B = $\frac{S.D}{\bar{X}} \times 100$		
		$= \frac{6.45}{35} \times 100$	1	
		$= 18.42\%$		
	b)	C.V is less for Company B, \therefore Company B is more reliable in Service.	1	
22	(a)	P[one boy and one girl is being selected] = $\frac{1}{6} \times \frac{1}{4} + \frac{2}{6} \times \frac{3}{4}$	1+1	
		$= \frac{1}{6} + \frac{1}{4} = \underline{\underline{\frac{5}{12}}}$		

1. Beena Abraham . 9495930533

Beena

2. Sakkeer. M 9400677669

Sakkeer

3. Susan David 9495983264

Susan

4. Lekshmi Parvithran 8281553503

Lekshmi

5 Rami. L 9846404485 Rami

6 Rejani Sathesh - 9497793534

Rejani

7 Shija Philip - 9744957099

Shija

8. Preertha. P - 9447782626

Preertha

9. Hasim M.C 9446270566

Hasim