FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2023

PART III

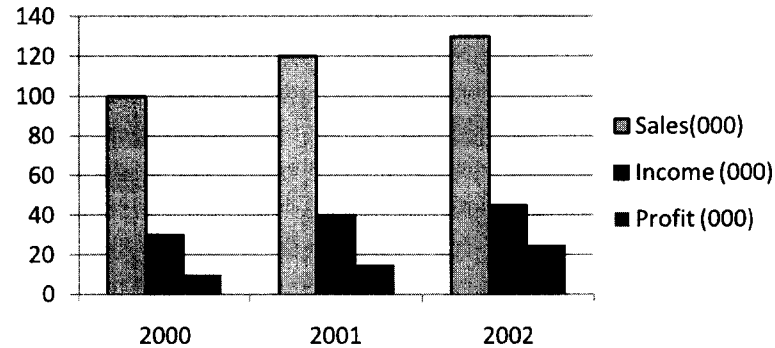
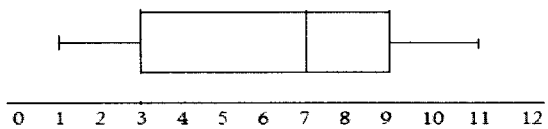
SUBJECT: STATISTICS

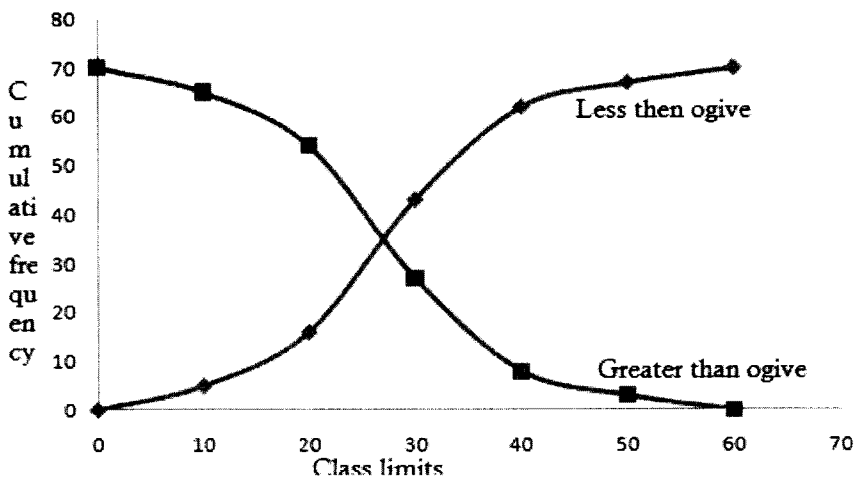
CODE NO: **FY- 432** VERSION:

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

Qn, No.	Sub Qns	Answer Key / Value Points	Score	Total Score
1		<table><tr><td>Age</td><td>5 – 10</td><td>10 – 15</td><td>15 – 20</td><td>20 – 25</td><td>25 – 30</td><td>30 – 35</td><td>Total</td></tr><tr><td>Freq</td><td>6</td><td>8</td><td>18</td><td>14</td><td>6</td><td>3</td><td>55</td></tr><tr><td>% freq</td><td>10.9</td><td>14.5</td><td>32.7</td><td>25.5</td><td>10.9</td><td>5.5</td><td>100</td></tr></table>	2	2
2	(a)	(iii) 0	1	2
	(b)	(ii) 26	1	
3		The data in ascending order: 54, 55, 57, 58, 60, 61, 67 $n = 7$ $Q_1 = \left(\frac{n+1}{4}\right)^{th}$ *value* $= 2^{nd}$ *value* $= 55$ (formula only ½ score) $Q_3 = 3 \times \left(\frac{n+1}{4}\right)^{th}$ *value* $= 6^{th}$ *value* $= 61$ (formula only ½ score) $QD = \frac{Q_3 - Q_1}{2} = \frac{61-55}{2} = \frac{6}{2} = 3$ (formula only ½ score)	½ ½ ½ + ½	2
4		$\beta_2 = \frac{\mu_4}{\mu_2^2}$ $= \frac{122}{(9.2)^2} = \frac{122}{84.64} = 1.44$ Since $\beta_2 < 3$, the distribution is platy kurtic.	1 ½ ½	2
5		$P(A \cup B) = P(A) + P(B) - P(A \text{ and } B)$ $= 1/4 + 1/2 - 1/8 = 5/8$	1 1	2
6		• If the population is infinite or large. • If the units under study are destroyed in the course of inspection. Or any two similar points /two examples)	2×1	2
7	(a)	(ii) P C Mahalanobis	1	3
	(b)	Minimum two points on any one of Biostatistics, Actuarial Science, Agricultural Statistics. *(Writing the name only give 1 score)*	2×1	

Qn, No.	Sub Qns	Answer Key / Value Points	Score	Total Score
8	(a)	Pilot survey	1	3
	(b)	Comparison between primary and secondary data with any 4 relevant points.	$4 \times ½ = 2$	
9		Appropriate questionnaire with any 4 relevant questions other than personal questions.	3	3
10		Average speed is the HM of the given speeds. $\frac{1}{HM} = \frac{1}{n}\sum\frac{1}{x}$ $= \frac{1}{5}\left(\frac{1}{12}+\frac{1}{15}+\frac{1}{16}+\frac{1}{18}+\frac{1}{19}\right)$ $= \frac{1}{5}(0.0833+0.0667+0.0625+0.0556+0.0526) = \frac{0.3207}{5}$ $\therefore HM = \frac{5}{0.3207} = 15.6$ km/hr *(Give 3 score if the HM is calculated using any other relevant formula or procedure) (Give 1 score for finding AM).*	1 ½ ½ 1	3
11		Mean = 50, Mode = 45 $Mean - Mode = 3(Mean - Median)$ $50 - 45 = 3(50 - Median)$ $3Median = 150 - 5 = 145$ $Median = 145/3 = 48.33$ OR Give full score if solved using the formula $Mode = 3Median - 2Mean$	1 1 ½ ½	3
12	(a)	1. Positive skewness – Explanation/Diagram 2. Negative Skewness - Explanation/Diagram	1 1	3
	(b)	(i) $\beta_1 = 0$	1	
13		1. Convenience sampling 2. Judgment sampling 3. Quota sampling	1 1 1	3

Qn, No.	Sub Qns	Answer Key / Value Points	Score	Total Score
14		(i) Proper sketch. (ii) Stream / SL: Science (B, G, T, Sub Total); Commerce (B, G, T, Sub Total); Humanities (B, G, T, Sub Total); Total Malayalam Hindi Sanskrit **Total** (OR correct table give 4 score.)	2 2	4
15		Multiple Bar Diagram  *(Drawing sub divided or percentage bar diagram give 3 score)*	4	4
16		1, 3, 4, 6, 7, 7, 8, 8, 9, 10, 11 $n = 11$ $Q_1 = \left(\frac{n+1}{4}\right)^{th} value = \left(\frac{11+1}{4}\right)^{th} value = 3^{rd} value = 4$ $Q_2 = \left(\frac{n+1}{2}\right)^{th} value = \left(\frac{11+1}{2}\right)^{th} value = 6^{th} \text{ value} = 7$ $Q_3 = \left(\frac{3(n+1)}{4}\right)^{th} value = \left(\frac{3(11+1)}{4}\right)^{th} value = 9^{th} \text{ value} = 9$ Minimum value = 1 Maximum value = 11 The box plot is  *(Rough diagram of box plot give 2 score)*	1 1 1 1	4

<table>
<tr><th>Qn, No.</th><th>Sub Qns</th><th>Answer Key / Value Points</th><th>Score</th><th>Total Score</th></tr>
<tr><td>17</td><td></td><td>Mean $= \frac{\sum x}{n} = \frac{8+10+6+7+5+4+2}{7} = 6$
$\sum \lvert x - Mean \rvert = 2+4+0+1+1+2+4 = 14$
MD about mean $= \frac{\sum \lvert x - Mean \rvert}{n} = \frac{14}{7} = 2$</td><td>1
1½
1+½</td><td>4</td></tr>
<tr><td>18</td><td></td><td>(i) $\frac{4}{52} = \frac{1}{13}$
(ii) $\frac{26}{52} = \frac{1}{2}$
(iii) $\frac{2}{52} = \frac{1}{26}$
(iv) $\frac{1}{52}$</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td>19</td><td></td><td>$P(A) = 0.25,\ P(B) = 0.35,\ P(C) = 0.40$
$P\left(\frac{D}{A}\right) = 0.03,\ P\left(\frac{D}{B}\right) = 0.02,\ P\left(\frac{D}{C}\right) = 0.05$
By total probability theorem
$P(D) = P(A) \times P\left(\frac{D}{A}\right) + P(B) \times P\left(\frac{D}{B}\right) + P(C) \times P\left(\frac{D}{C}\right)$
$= 0.25 \times 0.03 + 0.35 \times 0.02 + 0.40 \times 0.05 = 0.0345$</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td>20</td><td></td><td>Less than CFT
<table><tr><th>Upper limit</th><th>LCF</th></tr><tr><td>10</td><td>5</td></tr><tr><td>20</td><td>16</td></tr><tr><td>30</td><td>43</td></tr><tr><td>40</td><td>62</td></tr><tr><td>50</td><td>67</td></tr><tr><td>60</td><td>70</td></tr></table>Greater then CFT
<table><tr><th>Lower limit</th><th>GCF</th></tr><tr><td>0</td><td>70</td></tr><tr><td>10</td><td>65</td></tr><tr><td>20</td><td>54</td></tr><tr><td>30</td><td>27</td></tr><tr><td>40</td><td>8</td></tr><tr><td>50</td><td>3</td></tr></table> 
</td><td>2
4</td><td>6</td></tr>
</table>

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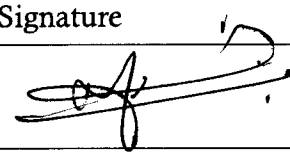
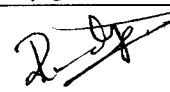
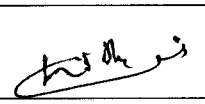
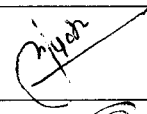
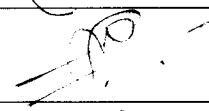
21	(a)	Modal class = 20 – 30		
		$\text{Mode} = l + \frac{(f_1 - f_0)c}{2f_1 - f_0 - f_2}$	1	
		Here, $l = 20,\ f_0 = 10, f_1 = 20,\ f_2 = 11, c = 10$	1	
		$\text{Mode} = 20 + \frac{(20-10)\times 10}{2\times 20 - 10 - 11}$	1	
		$= 20 + \frac{100}{19} = 25.26$	1	6
	(b)	$n_1 = 253,\ n_2 = 312,\ \bar{x}_1 = 11.8,\ \bar{x}_2 = 12.3$		
		$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$	1	
		$= \frac{253\times 11.8 + 312\times 12.3}{565} = \frac{6823}{565} = 12.08$	1	
22		For Karnataka		
		$\sum x = 114,\ \sum x^2 = 2614$		
		$\bar{x} = \frac{\sum x}{n} = \frac{114}{5} = 22.8$	½	
		$\sigma = \sqrt{\frac{\sum x^2}{n} - (\bar{x})^2} = \sqrt{\frac{2614}{5} - (22.8)^2} = \sqrt{2.96} = 1.72$	½ + ½	
		$\text{CV} = \frac{SD}{Mean}\times 100$	1	
		$= \frac{1.72}{22.8}\times 100 = 7.54$	½	
		For Kerala		6
		$\sum x = 126,\ \sum x^2 = 3214$		
		$\bar{x} = \frac{\sum x}{n} = \frac{126}{5} = 25.2$	½	
		$\sigma = \sqrt{\frac{\sum x^2}{n} - (\bar{x})^2} = \sqrt{\frac{3214}{5} - (25.2)^2} = \sqrt{7.76} = 2.79$	½ + ½	
		$\text{CV} = \frac{2.79}{25.2}\times 100 = 11.07$	½	
		Here CV is less for Karnataka. So the price in Karnataka is stable than the price in Kerala.	1	
		(Comparison using standard deviation only give full score)		

Sl No	Name & School	Signature
1	Dr. Manoj K HSS Panangad, Mathilakam, Thissur	
2	Dr. Biju G V Govt V&HSS Vatiyoorkavu, Thiruvananthapuram	
3	Dr. Sajish Kumar M MNKM HSS Chittilencherry, Palakkad	
4	Vidya Ramachandran TD HSS Thuravoor, Alappuzha	
5	Smitha MS SN HSS Sreekandeswaram, Poochackal, Alappuzha	
6	Seby Jose P MSM HSS Kallingalparamba, Malappuram	
7	Jyothi B Govt HSS Korom, Payyannoor, Kannur	
8	Shanthi K Govt HSS Chayoth, Hosdurg, Kasargod	
9	Unnikrishnan E Shree Durga Parameswary AHSS, Dharmathadka Kasargod