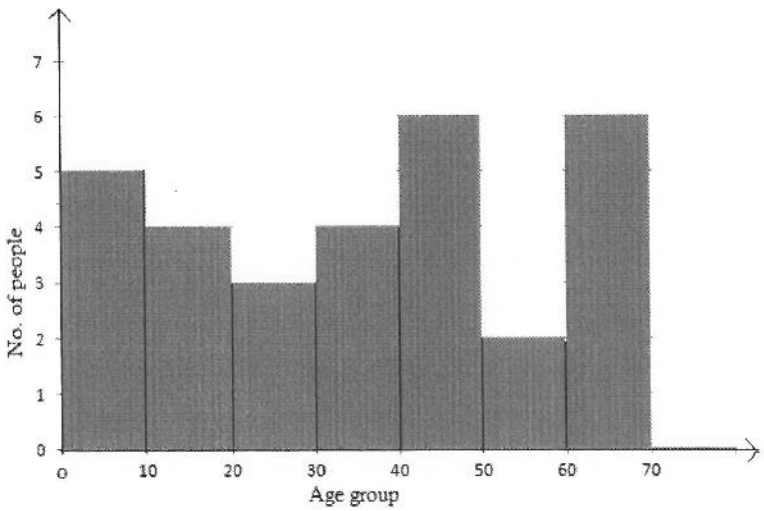
FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2024

PART III

SUBJECT: STATISTICS

CODE NO: **FY 432** ANSWER KEY VERSION:

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

Qn, No.	Sub Qns	Answer Key/Value points	Score	Total Score
1		(b) Continuous	1	1
2		(d) Geographical Classification	1	1
3		(b) 0	1	1
4		(c) 4	1	1
5		(a) Mean	1	1
6		(b) 20	1	1
7		(a) Quartile Deviation	1	1
8		(d) 0	1	1
9		(b) 0.6	1	1
10		(a) 0	1	1
11		(b) 6	1	1
12		Minimum 3 points about NSSO	3×1	3
13		Appropriate questionnaire with any 6 relevant questions other than personal questions.	3	3
14		Comparison of Primary data and secondary data with 3 relevant points.	3×1	3
15		 *(Drawing histogram with space between bars give 2 scores)*	3	3

Qn, No.	Sub Qns	Answer Key/Value points	Score	Total Score
16			3	3

Gender	Mode of Transport								
	Bus			Own Vehicle			Auto rkshaw		
	Malayalam	Hindi	Total	Malayalam	Hindi	Total	Malayalam	Hindi	Total
Boy									
Girl									
Transgender									
Total									

(Give full score for similar correct table)

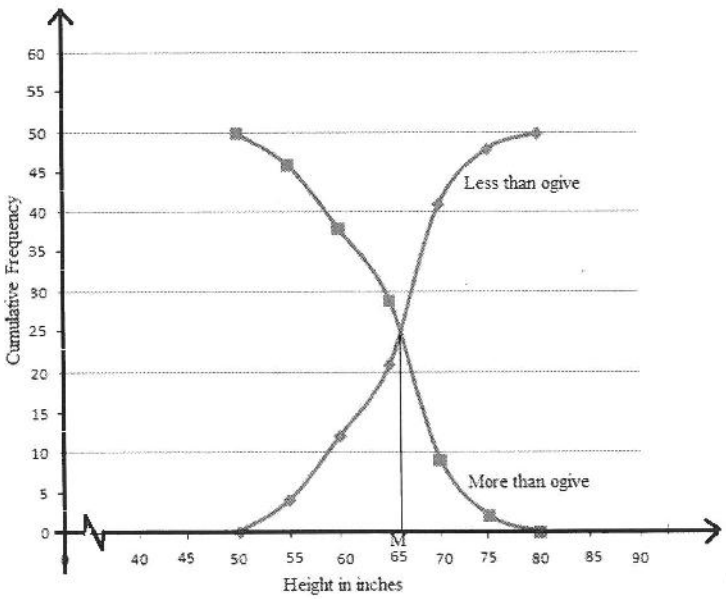
17			3	3

Score (Class)	Tally Marks	No. of students (Frequeny)
0 – 5	|	1
5 – 10	𝍸	5
10 – 15	𝍸 𝍸 ||	12
15 – 20	𝍸 |||	8
20 – 25	||||	4
Total		**30**

OR ***Give full score for correct table with class interval 2or 3 or 4.***
OR ***Full score for correct table with inclusive type classes.***

18		The average speed is the harmonic mean of the given speeds 40 and 50 Km/hr.		
		$HM = \frac{n}{\sum\left(\frac{1}{x}\right)}$	1	
		$= \frac{2}{1/40 + 1/50}$	1	3
		$= \frac{2}{0.025 + 0.02} = \frac{2}{0.045} = 44.44$	1	
		The average speed of the entire journey is 44.44 km/hr.		
		(Give 3 score for calculating HM using any other formula or procedure). (Give 1 score for finding AM)		
19		Given $\mu_1 = 0$ $\mu_2 = 9$, $\mu_3 = -3$ and $\mu_4 = 22$	$\frac{1}{2}$	
		The coefficient of kurtosis is,		
		$\beta_2 = \frac{\mu_4}{\mu_2^2} = \frac{22}{9^2} = \frac{22}{81} = 0.27$	1+1	3
		Since $\beta_2 < 3$ distribution is platy kurtic.	$\frac{1}{2}$	

Qn, No.	Sub Qns	Answer Key/Value points	Score	Total Score
20		Let $n_1 = 200$ and $\bar{x}_1 = 12000$, $n_2 = 100$ and $\bar{x}_2 = 9000$	1	4
		The mean wage of all the employees is the combined arithmetic mean is, given by		
		$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$	1	
		$= \frac{200\times12000 + 100\times9000}{200+100}$	1	
		$= \frac{3300000}{300} = 11000$	1	
		The average wage of all the employees together = ₹ 11000.		
21		CV of city A $= \frac{\sigma}{\bar{x}}\times100$	1	4
		For city A: Mean ($\bar{x}$) = 22, SD (σ) = 2.8		
		CV of city A $= \frac{2.8}{22}\times100 = 12.73$	1	
		For City B: Mean ($\bar{x}$) = 18, SD (σ) = 2.4		
		CV of city B $= \frac{2.4}{18}\times100 = 13.33$	1	
		CV of City A is less than the CV of City B. So the temperature level in City A is more consistent.	1	
22		The coefficient of skewness, $S_K = \frac{Mean - Mode}{SD}$	1	4
		For Class I, Mean = 42, Mode = 40, SD = 5		
		$S_K = \frac{Mean - Mode}{SD} = \frac{42-40}{5} = \frac{2}{5} = 0.4$	1	
		For Class II, Mean = 35, Mode = 30, SD = 4		
		$S_K = \frac{Mean - Mode}{SD} = \frac{35-30}{4} = \frac{5}{4} = 1.25$	1	
		The coefficient of skewness of Class II is more than that of Class I. So class II is more skewed than Class I.	1	
23	(i)	Given that $P(A) = 0.3$, $P(B) = 0.2$, $P(A \cap B) = 0.1$		4
		$P(A \text{ or } B) = P(A \cup B) = P(A) + P(B) - P(A \cap B)$	1	
		$= 0.3 + 0.2 - 0.1 = \underline{\underline{0.4}}$	1	
	(ii)	Total No. of students = 250 No of commerce students = 60	1	
		P(the selected student is from commerce stream) = $\frac{60}{250}$	1	

<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>24</td><td>(i)</td><td>A – the event that the surveyed student read Malayalam news paper
B – the event that the surveyed student read English news paper
$P(A)=\frac{60}{100}=0.6,\ P(B)=\frac{40}{100}=0.4,\ P(A\cap B)=\frac{20}{100}=0.2$
$P\left(\begin{array}{l}\text{the selected student reads English}\\ \text{news paper if we knew that the}\\ \text{student reads Malayalam news paper}\end{array}\right)=P\left(B/A\right)=\frac{P(A\cap B)}{P(A)}$
$=\frac{0.2}{0.6}=\underline{\underline{0.33}}$</td><td>$1\frac{1}{2}$
1
$\frac{1}{2}$</td><td rowspan="2">4</td></tr>
<tr><td></td><td>(ii)</td><td>(a) $P(A\cap B)=P(A)\times P(B)$</td><td>1</td></tr>
<tr><td>25</td><td></td><td>Explanation of simple random sampling
Explanation of stratified random sampling</td><td>2
2</td><td>4</td></tr>
<tr><td>26</td><td></td><td>
<table>
<tr><th>Upper Bound</th><th>Less than cumulative frequency</th></tr>
<tr><td>55</td><td>4</td></tr>
<tr><td>60</td><td>12</td></tr>
<tr><td>65</td><td>21</td></tr>
<tr><td>70</td><td>41</td></tr>
<tr><td>75</td><td>48</td></tr>
<tr><td>80</td><td>50</td></tr>
</table>
<table>
<tr><th>Lower Bound</th><th>Grater than cumulative frequency</th></tr>
<tr><td>50</td><td>50</td></tr>
<tr><td>55</td><td>46</td></tr>
<tr><td>60</td><td>38</td></tr>
<tr><td>65</td><td>29</td></tr>
<tr><td>70</td><td>9</td></tr>
<tr><td>75</td><td>2</td></tr>
</table>


From the graph, Median = 65 inches
</td><td>1+1
3
1</td><td>6</td></tr>
</table>

<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>27</td><td>(i)</td><td>Mean $= \dfrac{\sum x}{n}$
$= \dfrac{1.8+5+4.8+1+5.8+2.6+3.6+8.3+2.4+8.1}{10} = \dfrac{43.4}{10} = \underline{\underline{4.34}}$</td><td>1
1</td><td rowspan="2">6</td></tr>
<tr><td></td><td>(ii)</td><td>Modal Class = 30 – 35
Mode $= l + \dfrac{(f_1 - f_0)c}{2f_1 - f_0 - f_2}$,
where $l = 30,\ f_0 = 24,\ f_1 = 32,\ f_2 = 28,\ c = 5$
$\therefore$ Mode $= 30 + \dfrac{(32-24)\times 5}{2\times 32 - 24 - 28}$
$= 30 + \dfrac{40}{12} = 30 + 3.33 = \underline{\underline{33.33}}$</td><td>1
1
1
1</td></tr>
<tr><td>28</td><td></td><td>
<table>
<tr><th>x</th><th>f</th><th>fx</th><th>fx^2</th></tr>
<tr><td>15</td><td>1</td><td>15</td><td>225</td></tr>
<tr><td>25</td><td>10</td><td>250</td><td>6250</td></tr>
<tr><td>35</td><td>30</td><td>1050</td><td>36750</td></tr>
<tr><td>45</td><td>50</td><td>2250</td><td>101250</td></tr>
<tr><td>55</td><td>42</td><td>2310</td><td>127050</td></tr>
<tr><td>65</td><td>30</td><td>1950</td><td>126750</td></tr>
<tr><td>75</td><td>7</td><td>525</td><td>39375</td></tr>
<tr><td>Total</td><td>170</td><td>8350</td><td>437650</td></tr>
</table>
$SD(\sigma) = \sqrt{\dfrac{\sum fx^2}{N} - \left(\dfrac{\sum fx}{N}\right)^2}$
$= \sqrt{\dfrac{437650}{170} - \left(\dfrac{8350}{170}\right)^2}$
$= \sqrt{2574.4118 - 2412.5433} = \sqrt{161.8685} = \underline{\underline{12.7228}}$
$V(X) = (SD)^2 = \underline{\underline{161.8685}}$
Calculation of SD with alternate formula may also consider.</td><td>2
1
1
1
1</td><td>6</td></tr>
</table>

Sl No	Name	Signature
1	Dr. Biju G V 9447584301 Govt VHSS Vattiyoorkavu, Thiruvananthapuram	
2	Smitha M S SN HSS Poochackal, Alappuzha	9446418886
3	Vidya Ramachandran TD HSS Thuravoor, Alappuzha	9744243430
4	Sreesan M B Karimpuzha HSS, Thottara, Palakkad	9447326445
5	Dr. Vidhya G Nair Govt VHSS, Nadakkavu, Kozhikkode	9495412390
6	Seby Jose P MSM HSS Kallingalparamba. Malappuram	9497626298
7	Jyothi B Korom GHSS, Payyannoor, Kannur	9446732149
8	Sunil Kumar P V Kambil Mopla HSS, Kannur	9946701532