

## ANSWER KEY

**FIRST YEAR HIGHER SECONDARY EXAMINATION JUNE 2022**

### PART III

**SUBJECT: STATISTICS**

CODE NO: **FY-32**

VERSION:

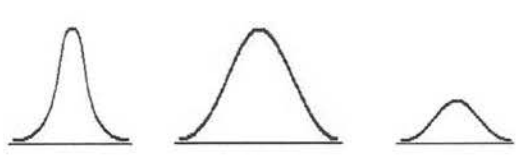
**60 SCORES**

**2 HOURS**

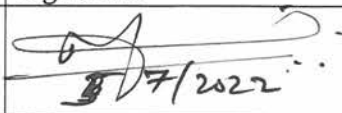
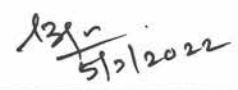
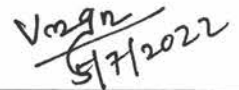
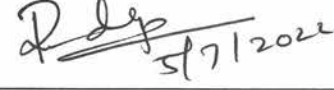
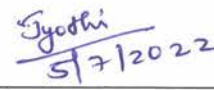
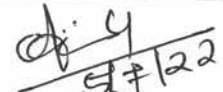


Qn, No.	Sub Qns	Answer Key / Value Points	Score	Total Score																																				
1		(b) June 29	1	1																																				
2		(b) Secondary data	1	1																																				
3		(d) Geographical	1	1																																				
4		(c) $360^\circ$	1	1																																				
5		(b) 12	1	1																																				
6		(c) 27	1	1																																				
7		(b) Mean = Median = Mode	1	1																																				
8		(d) B, C, D	1	1																																				
9		(a) Independent events	1	1																																				
10		(b) Stratified sampling	1	1																																				
11		Any 4 methods viz. Direct personal interview, Indirect oral investigation, Direct observation, Telephone interview, Mailed questionnaires and schedules, Focus group discussion. (Census/sampling can also be considered)	$4 \times \frac{1}{2}$	2																																				
12		Any two differences between questionnaire and schedule.	$2 \times 1$	2																																				
13		<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <thead> <tr> <th rowspan="2">Education status Employment status</th> <th colspan="2">Under graduate</th> <th rowspan="2">Sub Total</th> <th colspan="2">Graduate</th> <th rowspan="2">Sub Total</th> <th rowspan="2">Total</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>Employed</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Unemployed</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Or any suitable table.	Education status Employment status	Under graduate		Sub Total	Graduate		Sub Total	Total	Male	Female	Male	Female	Employed								Unemployed								Total								2	2
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14		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Height</th> <th>Frequency</th> <th>Relative Frequency</th> </tr> </thead> <tbody> <tr> <td>110 - 120</td> <td style="text-align: center;">8</td> <td style="text-align: center;"><math>8/100 = 0.08</math></td> </tr> <tr> <td>120 - 130</td> <td style="text-align: center;">18</td> <td style="text-align: center;">0.18</td> </tr> <tr> <td>130 - 140</td> <td style="text-align: center;">20</td> <td style="text-align: center;">0.2</td> </tr> <tr> <td>140 - 150</td> <td style="text-align: center;">28</td> <td style="text-align: center;">0.28</td> </tr> <tr> <td>150 - 160</td> <td style="text-align: center;">16</td> <td style="text-align: center;">0.16</td> </tr> <tr> <td>160 - 170</td> <td style="text-align: center;">10</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td><b>Total</b></td> <td style="text-align: center;"><b>100</b></td> <td style="text-align: center;"><b>1</b></td> </tr> </tbody> </table>	Height	Frequency	Relative Frequency	110 - 120	8	$8/100 = 0.08$	120 - 130	18	0.18	130 - 140	20	0.2	140 - 150	28	0.28	150 - 160	16	0.16	160 - 170	10	0.1	<b>Total</b>	<b>100</b>	<b>1</b>	2	2												
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<b>Total</b>	<b>100</b>	<b>1</b>																																						

15		Any four diagrams viz. Simple BD, Multiple BD, Component (Sub divided) BD, Percentage BD, Pie diagram.	$4 \times \frac{1}{2}$	2																
16		Any two differences between bar diagram and histogram (For drawing diagrams give 2 scores)	$2 \times 1$	2																
17		<p>Given that <math>\bar{x} = 55, n = 30</math></p> <p>Total weight = <math>n\bar{x} = 30 \times 55 = 1650</math></p> <p>Corrected total = <math>1650 - 15 + 45 = 1680</math></p> <p>Corrected average = <math>\frac{1680}{30} = 56</math></p> <p><b>For Malayalam Version</b></p> <p>Corrected total = <math>1650 - 45 + 15 = 1620</math></p> <p>Corrected average = <math>\frac{1620}{30} = 54</math></p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2																
18		<p>Given that, <math>Q_1 = 25, Q_3 = 47</math></p> $QD = \frac{Q_3 - Q_1}{2}$ $= \frac{47 - 25}{2} = 11$	$\frac{1}{2}$ 1 $\frac{1}{2}$	2																
19		<p>Given, Mean = 58, Mode = 62, SD = 8.1</p> $S_k = \frac{\text{Mean} - \text{Mode}}{SD}$ $= \frac{58 - 62}{8.1} = -0.49$	$\frac{1}{2}$ 1 $\frac{1}{2}$	2																
20		<p>Given, <math>P(A) = \frac{2}{5}, P(B) = \frac{3}{5}, P(A \text{ and } B) = \frac{1}{5}</math></p> $P\left(\frac{A}{B}\right) = \frac{P(A \text{ and } B)}{P(B)}$ $= \frac{\frac{1}{5}}{\frac{3}{5}} = \frac{1}{3}$	$\frac{1}{2}$ 1 $\frac{1}{2}$	2																
21	(a)	R A Fisher	1	3																
	(b)	Notes on ISI with any 2 points.	$2 \times 1$																	
22		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Class</th> <th>0 - 5</th> <th>5 - 10</th> <th>10 - 15</th> <th>15 - 20</th> <th>20 - 25</th> <th>25 - 30</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Freq</td> <td>1</td> <td>8</td> <td>5</td> <td>10</td> <td>2</td> <td>4</td> <td>30</td> </tr> </tbody> </table> <p>(For any other class interval with correct table give 2 score)</p>	Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	Total	Freq	1	8	5	10	2	4	30	3	3
Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	Total													
Freq	1	8	5	10	2	4	30													

23		<table border="1"> <thead> <tr> <th><math>x</math></th> <th><math>f</math></th> <th><math>fx</math></th> </tr> </thead> <tbody> <tr> <td>5000</td> <td>3</td> <td>15000</td> </tr> <tr> <td>6000</td> <td>4</td> <td>24000</td> </tr> <tr> <td>6500</td> <td>2</td> <td>13000</td> </tr> <tr> <td>7000</td> <td>3</td> <td>21000</td> </tr> <tr> <td>Total</td> <td><math>N = 12</math></td> <td><math>\sum fx = 73000</math></td> </tr> </tbody> </table> $\bar{x} = \frac{\sum fx}{N}$ $= \frac{73000}{12} = 6083.33$	$x$	$f$	$fx$	5000	3	15000	6000	4	24000	6500	2	13000	7000	3	21000	Total	$N = 12$	$\sum fx = 73000$	$1\frac{1}{2}$  1  $\frac{1}{2}$	3			
$x$	$f$	$fx$																							
5000	3	15000																							
6000	4	24000																							
6500	2	13000																							
7000	3	21000																							
Total	$N = 12$	$\sum fx = 73000$																							
24		$n_1 = 450, n_2 = 550, \bar{x}_1 = 5500, \bar{x}_2 = 5000$ $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$ $= \frac{450 \times 5500 + 550 \times 5000}{450 + 550} = 5225$	1  1  $\frac{1}{2} + \frac{1}{2}$	3																					
25		<table border="1"> <tbody> <tr> <td>X</td> <td>10</td> <td>12</td> <td>20</td> <td>18</td> <td>25</td> <td><math>\sum X = 85</math></td> </tr> <tr> <td>Y</td> <td>15</td> <td>18</td> <td>27</td> <td>21</td> <td>30</td> <td><math>\sum Y = 111</math></td> </tr> <tr> <td>XY</td> <td>150</td> <td>216</td> <td>540</td> <td>378</td> <td>750</td> <td><math>\sum XY = 2034</math></td> </tr> </tbody> </table> $\bar{X} = \frac{85}{5} = 17, \bar{Y} = \frac{111}{5} = 22.2$ $\text{Cov}(X, Y) = \frac{\sum XY}{n} - \bar{X} \times \bar{Y}$ $= \frac{2034}{5} - 17 \times 22.2 = 29.4$	X	10	12	20	18	25	$\sum X = 85$	Y	15	18	27	21	30	$\sum Y = 111$	XY	150	216	540	378	750	$\sum XY = 2034$	1  $\frac{1}{2}$  1  $\frac{1}{2}$	3
X	10	12	20	18	25	$\sum X = 85$																			
Y	15	18	27	21	30	$\sum Y = 111$																			
XY	150	216	540	378	750	$\sum XY = 2034$																			
26	(a)	(iii) 1	1	3																					
	(b)	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B).$ $[P(A \text{ or } B) = P(A) + P(B) \text{ give 1 score}]$	2																						
27		$A_1$ - The event of selecting first bag, $A_2$ - The event of selecting second bag $A$ - The event of drawing a Red ball $P(A_1) = \frac{1}{2}, P(A_2) = \frac{1}{2}, P\left(\frac{A}{A_1}\right) = \frac{7}{10}, P\left(\frac{A}{A_2}\right) = \frac{4}{10}$ $P\left(\frac{A_1}{A}\right) = \frac{P(A_1) \times P\left(\frac{A}{A_1}\right)}{P(A_1) \times P\left(\frac{A}{A_1}\right) + P(A_2) \times P\left(\frac{A}{A_2}\right)}$ $= \frac{\frac{1}{2} \times \frac{7}{10}}{\frac{1}{2} \times \frac{7}{10} + \frac{1}{2} \times \frac{4}{10}} = \frac{7}{11}$	1  1  $\frac{1}{2} + \frac{1}{2}$	3																					

28		Comparison of primary data with secondary data using any 4 relevant points.	4 × 1	4																							
29		Drawing histogram.	4	4																							
30	(a)	(iii) $\sqrt{4 \times 5}$	1	4																							
	(b)	Average speed of the journey is the HM of 60 KM/Hr and 40 KM/Hr $\frac{1}{HM} = \frac{1}{n} \sum \frac{1}{x}$ $= \frac{1}{2} \left( \frac{1}{60} + \frac{1}{40} \right) = \frac{1}{48}$ $\therefore HM = 48$ (Give 3 score if the HM is calculated using any other relevant formula or procedure) (Give 1 score for finding AM).	1 1 1																								
31		$CV = \frac{SD}{Mean} \times 100$ $CV \text{ of } X = \frac{20.5}{95} \times 100 = 21.58$ $CV \text{ of } Y = \frac{52.3}{121.5} \times 100 = 43.05$ $CV \text{ of } X \text{ is less than } CV \text{ of } Y. \text{ So stock } X \text{ is more consistent.}$	1 1 1 1	4																							
32	(a)	(ii) $\mu_3 < 0$	1	4																							
	(b)	 <p style="text-align: center;">Lepto kurtic      Meso kurtic      Platy kurtic</p> (Explanation without diagram – 2 scores)	$\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$																								
33	(a)	(ii) $NC_n$	1	4																							
	(b)	Notes on systematic sampling with 3 relevant points.	3 × 1																								
34	(a)	(iii) Ogives	1	5																							
	(b)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Score</th> <th>0-10</th> <th>10-20</th> <th>20-30</th> <th>30-40</th> <th>40-50</th> <th>50-60</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Freq.</td> <td>3</td> <td>12</td> <td>18</td> <td>15</td> <td>8</td> <td>4</td> <td><b>60</b></td> </tr> <tr> <td>CF</td> <td>3</td> <td>15</td> <td>33</td> <td>48</td> <td>56</td> <td>60</td> <td></td> </tr> </tbody> </table> $\frac{N}{2} = 30. \therefore \text{Median class is } 20 - 30.$ $\therefore l = 20, c = 10, f = 18, m = 15$ $\text{Median} = l + \frac{\left(\frac{N}{2} - m\right)c}{f}$ $= 20 + \frac{(30 - 15) \times 10}{18} = 28.33$	Score		0-10	10-20	20-30	30-40	40-50	50-60	Total	Freq.	3	12	18	15	8	4	<b>60</b>	CF	3	15	33	48	56	60	
Score	0-10	10-20	20-30	30-40	40-50	50-60	Total																				
Freq.	3	12	18	15	8	4	<b>60</b>																				
CF	3	15	33	48	56	60																					

35	$SD = \sqrt{\sum \frac{fx^2}{N} - (\bar{x})^2}$ <table border="1"> <thead> <tr> <th><math>x</math></th> <th><math>f</math></th> <th><math>fx</math></th> <th><math>fx^2</math></th> </tr> </thead> <tbody> <tr> <td>2</td> <td>4</td> <td>8</td> <td>16</td> </tr> <tr> <td>6</td> <td>8</td> <td>48</td> <td>288</td> </tr> <tr> <td>10</td> <td>10</td> <td>100</td> <td>1000</td> </tr> <tr> <td>14</td> <td>6</td> <td>84</td> <td>1176</td> </tr> <tr> <td>18</td> <td>2</td> <td>36</td> <td>648</td> </tr> <tr> <td><math>\sum x = 50</math></td> <td><math>N = 30</math></td> <td><math>\sum fx = 276</math></td> <td><math>\sum fx^2 = 3128</math></td> </tr> </tbody> </table> $\bar{x} = \frac{\sum fx}{N} = \frac{276}{30} = 9.2$ $SD = \sqrt{\frac{3128}{30} - (9.2)^2} = \sqrt{104.267 - 84.64}$ $= \sqrt{19.627} = 4.43$	$x$	$f$	$fx$	$fx^2$	2	4	8	16	6	8	48	288	10	10	100	1000	14	6	84	1176	18	2	36	648	$\sum x = 50$	$N = 30$	$\sum fx = 276$	$\sum fx^2 = 3128$	1  2  $\frac{1}{2}$ 1 $\frac{1}{2}$	5
$x$	$f$	$fx$	$fx^2$																												
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$\sum x = 50$	$N = 30$	$\sum fx = 276$	$\sum fx^2 = 3128$																												
36	<p>(a) <math>P(A) = 0.35, P(B) = 0.57, P(A \text{ or } B) = 0.89</math></p> <p>We have, <math>P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)</math></p> $0.89 = 0.35 + 0.57 - P(A \text{ and } B)$ $\therefore P(A \text{ and } B) = 0.92 - 0.89 = 0.03$ <p>(b)</p> <p>(i) <math>P(3 \text{ green balls}) = \frac{15C_3}{30C_3} \text{ or } \frac{455}{4060} \text{ or } \frac{13}{116} \text{ or } 0.112</math></p> <p>(ii) <math>P(2 \text{ blue and 1 red balls}) = \frac{10C_2 \times 5C_1}{30C_3} \text{ or } \frac{225}{4060} \text{ or } \frac{45}{812} \text{ or } 0.055</math></p> <p>(iii) <math>P(\text{No green balls}) = \frac{15C_3}{30C_3} \text{ or } \frac{455}{4060} \text{ or } \frac{13}{116} \text{ or } 0.112</math></p>	1  $\frac{1}{2}$ $\frac{1}{2}$  1 1 1	5																												

Sl No	Name	Signature
1	Dr. Manoj K HSS Panangad, Thrissur	 5/7/2022
2	Dr. Biju G V Govt VHSS Vattiyoorkavu, Thiruvananthapuram	 5/7/2022
3	Dr. Vidya G Nair Govt Girls HSS Nadakkavu, Kozhikkode	 5/7/2022
4	Vidya Ramachandran TD HSS Thuravoor, Alappuzha	 5/7/2022
5	Jyothi T J SMV HSS Poonjar, Kottayam	 5/7/2022
6	Ambily A St. Peters HSS Kolenchery, Ernakulam	 5/7/22
7	Rekha Radhakrishnan HSS Kuthanur, Palakkadu	 5/7/22
8	Seby Jose P MSM HSS Kallingalparamba. Malappuram	 5-7-22