FIRST YEAR HIGHER SECONDARY EXAMINATION, MARCH 2016

Subject: STATISTICS **Code No: 320**

Qn. No	Sub Qns	Answer Key / Value points	Score	Total
1	a)	ii) SANKHYA	1	1
	b)	For any two points regarding NSSO	2	2
2		c) Chronological classification	1	1
3		For preparing an appropriate bivariate frequency table	4	4
4		c) Mean = Median = Mode	1	1
5		We have by empirical relation, Mean – Mode = 3(Mean – Median) $S_k = \frac{3(Mean-Median)}{SD}$ For distribution 1, $S_k = \frac{3(52.80-59.35)}{25.10} = -0.78$ For distribution 2 $S_k = \frac{3(23.20-30.10)}{4.50} = -4.6$ The second distribution is more skewed towards the left.	½ 1 1 1 ½	4
6		For drawing appropriate histogram	4	4
7	a)	Let x be the total votes polled. Then, $\frac{8500}{x} X\ 360 = 102$ $\therefore x = \frac{8500}{102} X\ 360 = 30000$ (For any alternate method give 1 score)	½ ½	2
	b)	Votes polled in favour of Miss S = $30000\ X\ \frac{162}{360}$ = 13500	½ ½	
8	a)	ii) Simple random sampling	1	1
	b)	1. Convenient sampling 2. Judgment sampling 3. Quota sampling	1 1 1	3
9	a)	iv) Ogives	1	1
	b)	n = 25, $\bar{x}$ =55 Total weight of all the boys = 25 X 55 = 1375 Corrected total weight = 1375 – 60 + 50 = 1365 Corrected average = $\frac{1365}{25} = 54.6$	½ ½ ½ ½	2

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10				
		Class | Frequency | Cumulative frequency 650 – 670 | 3 | 3 670 – 680 | 7 | 10 680 – 690 | 20 | 30 690 – 700 | 17 | 47 700 – 720 | 3 | 50 Total | N = 50	1 ½	
		Median $= l + \frac{\left(\frac{N}{2} - m\right)c}{f}$	1	
		Here $\frac{N}{2} = 25$. So median class is 680 – 690.	½	5
		$l = 680, f = 20, c = 10, m = 10$	1	
		Median $= 680 + \frac{(25-10)10}{20}$	½	
		$= 687.5$	½	
11	a)	iv) $\sqrt{ab}$	1	1
	b)	Here the speeds are 100 km/hr, 200 km/hr, 300km/hr and 400 km/hr. The average speed is the harmonic mean of these speeds.		
		$\frac{1}{H} = \frac{1}{n}\sum\frac{1}{x}$	1	
		$\frac{1}{H} = \frac{1}{4}\sum\left(\frac{1}{100} + \frac{1}{200} + \frac{1}{300} + \frac{1}{400}\right) = \frac{1}{192}$	1	3
		$\therefore H = 192$	½	
		The average speed of the aeroplane is 192 km/hr	½	
12	a)	ii) Coefficient of variation	1	1
	b)	$\sum x = 1234, \ \sum x^2 = 152784$	1	
		$\bar{x} = \frac{\sum x}{n} = \frac{1234}{10} = 123.4$	½	3
		$SD = \sqrt{\frac{1}{n}\sum x^2 - (\bar{x})^2}$	1	
		$= \sqrt{\frac{152784}{10} - (123.4)^2} = 7.13$	½	
13		c) 20	1	1

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14		Let X denotes the price and Y denotes the demand. $COV(X,Y) = \frac{1}{n}\sum XY - \bar{X}\,\bar{Y}$	1	
		<table><tr><th>X</th><th>Y</th><th>XY</th></tr><tr><td>20</td><td>5</td><td>100</td></tr><tr><td>22</td><td>4</td><td>88</td></tr><tr><td>23</td><td>3.5</td><td>80.5</td></tr><tr><td>25</td><td>2</td><td>50</td></tr><tr><td>26</td><td>1.5</td><td>39</td></tr><tr><td>27</td><td>0.5</td><td>13.5</td></tr><tr><td>143</td><td>16.5</td><td>371</td></tr></table>	2	5
		$\bar{X} = \frac{1}{n}\sum X = 23.83, \quad \bar{Y} = \frac{1}{n}\sum Y = 2.75$	1	
		$COV(X,Y) = \frac{1}{6}\sum 371 - 23.83X2.75$	½	
		$= -3.699$	½	
OR 15		**OR** Coefficient of Variation $= \frac{SD}{Mean} X\ 100$	1	
		CV for X $= \frac{23.88}{85.49} X\ 100$	1	
		$= 27.93$	½	5
		CV for Y $= \frac{26.22}{112} X\ 100$	1	
		$= 23.41$	½	
		CV for Y is less than CV for X. So the price of stock Y is consistent than the price of stock X.	1	
16	a)	iv) Office records	1	1
	b)	An appropriate questionnaire with atleast 4 questions other than questions related to personal details such as Name, Age, Sex etc.	4	4
17	a)	$\frac{13C2}{52C2} = \frac{78}{1326} = \frac{1}{17}$	1	
	b)	$\frac{13C1\ X\ 13C1}{52C2} = \frac{169}{1326} = \frac{13}{102}$	1	2
18		c) 3/8	1	1

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19	a)	$\frac{400}{1000} = 0.4$	1	
	b)	$\frac{225}{1000} = 0.225$	1	3
	c)	$\frac{275}{1000} = 0.275$	1	
OR		**OR**		
20	a)	Given that P(S) = 0.6, P(E) = 0.7 and P(S and E) = 0.5 P(S or E) = P(S) + P(E) – P(S and E) = 0.6 + 0.7 - 0.5 = 0.6	 ½ 1 ½	3
	b)	P(fail both the exams) = 1 – P(pass atleast one of the exam) = 1 – 0.6 = 4.4 (any alternate method can given full score)	½ ½	
21		Define the events A_1 – The transferred ball from first bag to second was white. A_2 – the transferred ball was black. A – A black ball is drawn from the second bag. $P(A_1) = \frac{4}{7}, P(A_2) = \frac{3}{7}, \ P(A/A_1) = \frac{5}{9}, \ P(A/A_2) = \frac{6}{9}$ By total probability theorem, $P(A) = P(A_1)P\left(A/_{A_1}\right) + P(A_2)P\left(A/_{A_2}\right)$ $= \frac{4}{7}X\frac{5}{9} + \frac{3}{7}X\frac{6}{9} = \frac{38}{63}$	 2 1 1	4
OR		**OR**		
22		Define the following events. A_1 – Select a question from Part A, A_2 – Select a question from Part B A_3 – Select a question from Part C and A – The selected question is wrong. $P(A_1) = 0.25, P(A_2) = 0.45, P(A_3) = 0.30$ $P\left(A/_{A_1}\right) = 0.05, P\left(A/_{A_2}\right) = 0.04 \text{ and } P\left(A/_{A_3}\right) = 0.02$ By Bayes theorem $P\left(A_2/_A\right) = \frac{P(A_2)P\left(A/_{A_2}\right)}{P(A_1)P\left(A/_{A_1}\right) + P(A_2)P\left(A/_{A_2}\right) + P(A_3)P\left(A/_{A_3}\right)}$ $= \frac{0.45\ X\ 0.04}{0.25\ X\ 0.05 + 0.45\ X\ 0.04 + 0.30\ X\ 0.02} = 0.493$	 2 1 1	4