## FIRST YEAR HIGHER SECONDARY EXAMINATION, MARCH 2016

## Subject: STATISTICS

Code No: 320

Qn. Sub No Qns				Tota
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) $S_k = \frac{3(Mean - Median)}{SD}$	1/2	
		For distribution 1, $S_k = \frac{3(52.80 - 59.35)}{25.10} = -0.78$	1	4
		For distribution 2 $S_k = \frac{3(23.20 - 30.10)}{4.50} = -4.6$	1	
		The second distribution is more skewed towards the left.	1/2	
6		For drawing appropriate histogram	4	4
7	a)	Let x be the total votes polled. Then,		
		$\frac{\frac{8500}{x} X 360 = 102}{\therefore x = \frac{\frac{8500}{102} X 360 = 30000}{102}$	1/2	
		$\therefore x = \frac{8500}{102} X 360 = 30000$ (For any alternate method give 1 score)	1/2	2
		1/2	1/2	
	b)	Votes polled in favour of Miss S = $30000 X \frac{162}{360}$ = 13500	1/2	
8	a)	ii) Simple random sampling	1	1
	b)	<ol> <li>Convenient sampling</li> <li>Judgment sampling</li> <li>Quota sampling</li> </ol>	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	1/2 1/2 1/2 1/2 1/2	2

Sub Qns		An	swer Key / Value points	Score	Tota
Qus					
	8				
	Class	Frequency	Cumulative		100
		•	frequency		
	650 - 670	37	3		
	670 - 680		10	1.0.0	
	1.2550.0 55 5.				
	Charles and the second s	augeo -		1 1/2	
			50	1. S.	
	Total	N = 30	1		
	Madian - 1 1	$\left(\frac{N}{2}-m\right)c$		1	
			1	1/2	5
				1	
	Median = 68	$30 + \frac{(25-10)10}{20}$		1/2	19
	= 68	37.5		1/2	
a)	iv) √ <i>ab</i>			1	1
b)					
			$\frac{1}{H} = \frac{1}{n} \sum_{r} \frac{1}{r}$	1	
		$\frac{1}{n} = \frac{1}{4} \sum ($	$\frac{1}{100} + \frac{1}{200} + \frac{1}{200} + \frac{1}{400} = \frac{1}{100}$	1	3
		H 441	100 200 300 4007 192		
	: <i>H</i>	<i>l</i> = 192		1/2	1. C
	The average	speed of the ac	eroplane is 192 km/hr	1/2	
a)	ii) Coefficier	nt of variation		1	1
b)	$\sum x = 123$	4, $\sum x^2 = 1$	52784		
	and the second sec			1	
	$-\sum x$	1234 _ 122 4		1/2	
	$x = \frac{1}{n} = \frac{1}{n}$	10 = 123.4			3
	$SD = \sqrt{\frac{1}{2}\sum x}$	$(x^2 - (\bar{x})^2)$		1	
			= 7.13	1/2	
	y ==	(120.1)			1
	b) a)	Here $\frac{N}{2} = 2$ l = 680, f = 2 Median = 68 = 68 a) iv) $\sqrt{ab}$ b) Here the spenthe average $\therefore H$ The average a) ii) Coefficient b) $\sum x = 123$ $\bar{x} = \frac{\sum x}{n} =$ $SD = \sqrt{\frac{1}{n}\sum x}$	$\begin{vmatrix} 690 - 700 & 17\\ 700 - 720 & 3\\ Total & N = 50 \end{vmatrix}$ Median = $l + \frac{\left(\frac{N}{2} - m\right)c}{f}$ Here $\frac{N}{2} = 25$ . So median of $l = 680, f = 20, c = 10, m = 1680, f = 20, c = 10, m = 1680, f = 20, c = 10, m = 1687.5$ a) iv) $\sqrt{ab}$ b) Here the speeds are 100 km The average speed is the had $\frac{1}{H} = \frac{1}{4} \sum \left(\frac{1}{4} + \frac{1}{4} + 1$	$\begin{cases} 690 - 700 & 17 & 47 \\ 700 - 720 & 3 & 50 \\ \hline Total & N = 50 \\ \hline \hline Total & N = 50 \\ \hline \hline Total & N = 50 \\ \end{cases}$ Median = $l + \frac{\left(\frac{N}{2} - m\right)c}{f}$ Here $\frac{N}{2} = 25$ . So median class is $680 - 690$ . l = 680, f = 20, c = 10, m = 10 Median = $680 + \frac{(25 - 10)10}{20}$ = 687.5 a) iv) $\sqrt{ab}$ b) Here the speeds are 100 km/hr, 200 km/hr, 300 km/hr and 400 km/hr The average speed is the harmonic mean of these speeds. $\frac{1}{H} = \frac{1}{4} \sum \left(\frac{1}{100} + \frac{1}{200} + \frac{1}{300} + \frac{1}{400}\right) = \frac{1}{192}$ $\therefore H = 192$ The average speed of the aeroplane is $192 \text{ km/hr}$ a) ii) Coefficient of variation b) $\sum x = 1234,  \sum x^2 = 152784$ $\bar{x} = \frac{\sum x}{n} = \frac{1234}{10} = 123.4$ $SD = \sqrt{\frac{1}{n} \sum x^2 - (\bar{x})^2}{\sqrt{\frac{152784}{10}} - (123.4)^2} = 7.13$	$\begin{vmatrix} 690 - 700 & 17 & 47 \\ 700 - 720 & 3 & 50 \\ \hline Total & N = 50 \end{vmatrix}$ Median = $l + \frac{\binom{N}{2}m}{l}c$ Here $\frac{N}{2} = 25$ . So median class is 680 - 690. $l = 680, f = 20, c = 10, m = 10$ Median = $680 + \frac{(25 - 10)10}{20}$ $= 687.5$ a) iv) $\sqrt{ab}$ Here the speeds are 100 km/hr, 200 km/hr, 300 km/hr and 400 km/hr. The average speed is the harmonic mean of these speeds. $\frac{1}{H} = \frac{1}{4}\sum_{n} \frac{1}{100} + \frac{1}{200} + \frac{1}{300} + \frac{1}{400} = \frac{1}{192}$ 1 $\therefore H = 192$ The average speed of the aeroplane is 192 km/hr a) ii) Coefficient of variation 1 b) $\sum_{n} x = 1234, \sum_{n} x^{2} = 152784$ $x = \frac{\sum_{n} x}{n} = \frac{1234}{10} = 123.4$ $\sum_{n} \frac{1}{20} = \frac{1}{210} = 7.13$ b)

	1	TATISTICS	Code N Score	o: 320 Tota
Qn. No	Sub Qns	Answer Key / Value points		
14		Let X denotes the price and Y denotes the demand.		
		$COV(X,Y) = \frac{1}{n} \sum XY - \bar{X}\bar{Y}$		
		n L	1	
		X Y XY		
		20 5 100	1.1	
		22         4         88           23         3.5         80.5           25         2         50	2	
			1.1.1	
	1.1.2	26 1.5 39		5
	1.1	27         0.5         13.5           143         16.5         371		5
		145 10.5 371		
		$\bar{y} = \frac{1}{2} \sum y = 22.02$ $\bar{y} = \frac{1}{2} \sum y = 2.75$		
		$\bar{X} = \frac{1}{n} \sum X = 23.83,  \bar{Y} = \frac{1}{n} \sum Y = 2.75$	1	1
		$COV(X,Y) = \frac{1}{6} \sum 371 - 23.83X2.75$	1/2	
		<b>6</b>		
		= -3.699	1/2	
OR		OR		
15		Coefficient of Variation = $\frac{SD}{Mean} X$ 100		
		Mean Mean	1	
		CV for X = $\frac{23.88}{85.49}X$ 100		
	1.1	$C V I01 X = \frac{1}{85.49} X 100$	1	
		= 27.93	1/2	
	17.1			5
		CV for $Y = \frac{26.22}{112} X \ 100$	1	
			1/	
	2.51	= 23.41	1/2	-
		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	4	4
17	a)	related to personal details such as Name, Age, Sex etc. 13C2 78 1	-	
1/	(4)	$\frac{1302}{52C2} = \frac{70}{1326} = \frac{1}{17}$	1	
	b)	$13C1 \times 13C1 - 169 - 13$		2
		52C2 - 1326 - 102	1	
18		c) 3/8	1	1

	Subject: STATISTICS Code No: 3				
Qn. No	Sub Qns	Answer Key / Value points	Score	Tota	
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		. 6	
20	a)	Given that P(S) = 0.6, $P(E) = 0.7$ and $P(S  and  E) = 0.5P(S  or  E) = P(S) + P(E) - P(S  and  E)= 0.6 + 0.7 - 0.5 = 0.6$	1/2 1 1/2	3	
	b)	P(fail both the exams) = $1 - P($ pass at least one of the exam) = $1 - 0.6 = 4.4$	<sup>1</sup> /2 1/2		
1		( any alternate method can given full score)			
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, $P(A) = P(A_1)P(A/A_1) + P(A_2)P(A/A_2)$ 4 = 5, 3 = 6, 38	2	4	
		$=\frac{4}{7}X\frac{5}{9}+\frac{3}{7}X\frac{6}{9}=\frac{38}{63}$	1		
OR 22		OR Define the following events. $A_1 - \text{Select a question from Part A}, A_2 - \text{Select a question from Part B}$ $A_3 - \text{Select a question from Part C and A} - \text{The selected question is wrong.}$ $P(A_1) = 0.25, P(A_2) = 0.45, P(A_3) = 0.30$ $P(A_{A_1}) = 0.05, P(A_{A_2}) = 0.04 \text{ and } P(A_{A_3}) = 0.02$ By Bayes theorem $P(A_2/A) = \frac{P(A_2)P(A_{A_2})}{P(A_1)P(A_{A_1}) + P(A_2)P(A_{A_2}) + P(A_3)P(A_{A_3})}$ $0.45 \times 0.04$	2	4	
		$=\frac{0.45 \times 0.04}{0.25 \times 0.05 + 0.45 \times 0.04 + 0.30 \times 0.02} = 0.493$	1		