## [13,14,16]

No. of Printed Pages: 9

Sardar Patel University M.Sc. (Bioscience) – 1<sup>st</sup>/2<sup>nd</sup> Semester Examinations Wednesday, 29<sup>th</sup> April, 2015

Time: 10.30 to 1.30 p.m.

M.Marks:70

SC

Biostatistics

## (PSO1EBBICO1/PSO1EMICO1/PSO1EBITO2)

Q.1	Multiple choice Q	uestio	ns					and the	ndias	in aci	videua	3	(8
(1)	Which of the follo	owing	can be	descr	ibed a	s a var	iable?						
	(a) Heart rate		(1	o) Body	y temp	peratu	re	(c) P	ulse ra	ate	(	d) All of t	hese
(2)	Consider the follo	owing	probal	oility d	istribu	tion:							
	$P(x) = \binom{10}{x} (0.5)$	3) <sup>x</sup> (0.	<sup>ر 10–</sup>	$x^{2}, x = 0$	0,1,	,10							
	The standard dev	viation	of X is	5									
	(a) 2.1		(b)	0.21			(c)	1.45			(d) N	lone of th	nese
(3)	Which of the follo	owing	is an ir	nexper	isive n	nethod	l to dra	w ran	dom sa	ample	from the	e populat	ion?
	(a) Lottery meth	od					(b)	Use o	f Ranc	lom nu	mbers t	able	
	(c) Both (a) and	(b)					(d)	None	of the	se			
(4)	The degrees of fr	eedon	n for 3	× 3 co	ntinge	ncy ta	ble is				n - Auto	on sind	
(=)	(a) 5		(b)	4			(c)	3			(d) 1	7	
(5)	In the regression	equat	ion Y	= 3X	+2,	what d	loes th	e 2 rej	presen	t?	and the second		
	(a) Slope of the	line		بر جم م ام	معاماما			( to d (	b) Y in	tercep	)t	a da de la composición de la c	
(c)	(c) Any value of	the in	aepen			that i	s selec	ted (	a) Nor form:	ie of tr	ie above	3	
(6)	(a) u =	ypoth	esis ioi	a one	talled	i lest c	an be i	or the	ionn:				
			(6)	11 +			(0)	11 /	11 20		(4)	All of the	ahovo
(7)	The main aim of	camp	(b)	$\mu \neq$	o got	roliahl	(c) e info	$\mu < \alpha$	$r \mu >$	it the	(d) /	All of the	above
(7)	The main aim of	samp	(b) le surv	µ≠ vey is t	o get	reliabl	(c) e infoi	$\mu < \alpha$ rmatio	or $\mu >$ on about	ut the	(d) /	All of the	above in less t
(7)	The main aim of and at a lower co	samp ost.	(b) le surv (b)	μ≠ vey is t Popul	o get	reliabl	(c) e infoi	$\mu < \alpha$ matio	or $\mu >$ on above (a) and	ut the	(d)	All of the	above in less t
(7)	The main aim of and at a lower co (a) Sample A group of 10 r	samp ost. men w	(b) Ie surv (b) vere gi	μ≠ vey is t Popul	o get ation	reliabl	(c) e infor (c)	$\mu < \infty$ rmatio Both	or $\mu >$ on above (a) and eeks to	ut the d (b)	(d) / (d)   weight	All of the Neither (a	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data wa	samp ost. men w as:	(b) Ie surv (b) vere gi	μ≠ vey is t Popul iven a	ation specie	reliabl al diet	(c) e infor (c) for ty	$\mu < \alpha$ rmatio ) Both wo we	or $\mu >$ on above (a) and eeks to	ut the d (b) o test	(d) / (d) ( weight	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w	samp ost. men w as: 1	(b) le surv (b) vere gi 2	$\mu \neq$ vey is t Popul iven a 3	ation specia	reliabl al diet	(c) e infor (c) for ty 6	$\mu < \alpha$ rmatio Both wo we	$pr \mu >$ n above (a) and eeks to 8	ut the d (b) o test 9	(d) / (d) / weight	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before	samp ost. men w as: 1 181	(b) le surv (b) vere gi 2 171	$\mu \neq$ vey is t Popul iven a 3 190	ation specie	reliabl al diet 5 210	(c) e infor (c) for tw 6 202	$\mu < \alpha$ rmatio Both wo we 7 166	$\begin{array}{l} \text{or } \mu > \\ \text{on above} \\ \text{(a) and each states} \\ \text{ecks to} \\ \hline 8 \\ 173 \end{array}$	ut the d (b) o test 9 183	(d) / (d) / weight 10 184	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after	samp ost. men w as: 1 181 178	(b) le surv (b) vere gi 2 171 172	$\mu \neq$ vey is t Popul iven a $\frac{3}{190}$ 185	ation species 4 187 184	reliabl al diet 5 210 201	(c) e infor (c) for tw 6 202 201	$\mu < \alpha$ rmatio Both wo we $7$ 166 160	$\begin{array}{l} \text{pr } \mu > \\ \text{n above} \\ \text{(a) and} \\ \text{eeks to} \\ \hline \\ 8 \\ 173 \\ 168 \end{array}$	ut the d (b) o test 9 183 180	(d) / (d) / weight 10 184 179	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t	samp ost. men w as: 1 181 178 the dat	(b) le surv (b) vere gi 2 171 172 ta prov	$\mu \neq$ vey is t Popul iven a 3 190 185 vide su	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide	(c) e infor (c) for to 6 202 201 ence to	$\mu < \alpha$ rmatio ) Both wo we 7 166 160 ) indica	$\begin{array}{l} \text{or } \mu > \\ \text{n abov} \\ \text{(a) and} \\ \text{eeks to} \\ \hline 8 \\ 173 \\ 168 \\ \text{ate the} \end{array}$	ut the d (b) o test 9 183 180 e speci	(d) / (d) l weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less ti a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate	samp ost. men w as: 1 181 178 the dat test p	(b) le surv (b) vere gi 2 171 172 ta prov rocedu	$\mu \neq$ vey is t Popul ven a 3 190 185 vide su re is :	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide	(c) e infor (c) for tw 6 202 201 ence to	$\mu < \alpha$ matio Both wo we 7 166 160 indica	or $\mu >$ n about (a) and (a) and (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	ut the d (b) o test <u>9</u> <u>183</u> <u>180</u> e speci	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less t a) nor (b ounds. weight l
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate (a) two sample	samp ost. men w as: 1 181 178 .he dat test pr unpair	(b) (b) vere gi 2 171 172 ta prov rocedu ed t - t	$\mu \neq$ yey is t Popul iven a <u>3</u> <u>190</u> <u>185</u> yide su re is :	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide	(c) e infor (c) for tw 6 202 201 ence tc (b)	$\mu < \alpha$ rmatio Both wo we 7 166 160 indica ) paire	$pr \mu > pr above(a) andeaches to8173168ate thed t - te$	ut the d (b) o test 9 183 180 e speci st	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and	samp ost. men w as: 1 181 178 the dat test pr unpair (b)	(b) (b) vere gi 2 171 172 ta prov rocedu ed t - t	$\mu \neq$ rey is t Popul ven a 3 190 185 ride su re is : sest	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide	(c) e infor (c) for tv 6 202 201 ence tc (b) (d)	$\mu < \alpha$ matio Both wo we 7 166 160 indica ) paire ) None	$\begin{array}{l} \text{pr } \mu > \\ \text{n above} \\ \text{(a) and} \\ \text{eeks to} \\ \hline \\ 8 \\ 173 \\ 168 \\ \text{ate the} \\ \text{dt - tee} \\ \text{of the} \end{array}$	ut the d (b) o test 9 183 180 e speci st ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less t a) nor (b ounds.
(7) (8) Q.2	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ	samp ost. men w as: 1 181 178 the dat test pr unpair (b) pe Que	(b) (b) vere gives 2 171 172 ta proves rocedu ed t - to stions	$\mu \neq$ yey is t Popul iven a 3 190 185 vide su re is : cest (Atten	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide	(c) e infor (c) for tw 6 202 201 ence tc (b) (d) en)	$\mu < 0$ rmatio Both wo we 7 166 160 indica ) paire ) None	$pr \mu > n about (a) and (b) (a) and (c) (c) (c) (c) (c) (c) (c) (c) (c) (c)$	ut the d (b) o test 9 183 180 e speci st ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less ti a) nor (b ounds. weight l
(7) (8) Q.2 (1)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p	samp ost. men w as: 1 181 178 the dat test pr unpair (b) pe Que olot (di	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram	$\mu \neq$ rey is t Popul iven a 3 190 185 ride su re is : cest (Atten )? Writ	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide ny Seve (n its li	(c) e infor (c) for tw 6 202 201 ence tc (b (d) en) mitatio	$\mu < \alpha$ rmatio Both wo we 7 166 160 indica ) paire ) None cons.	$\begin{array}{l} \text{(a) and} \\ \text{(b) and} \\ \text{(c) and} $	ut the d (b) o test 9 183 180 e speci ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less ti a) nor (b ounds. weight l
(7) (8) Q.2 (1) (2)	The main aim of and at a lower co (a) Sample A group of 10 r observed data wa Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa	samp ost. men w as: 1 181 178 the dat test pi unpair (b) ve Que olot (di ance o	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram f diagr	$\mu \neq$ yey is t Popul iven a 3 190 185 yide su re is : cest (Atten )? Writ ams.	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide ny Seve	(c) e infor (c) for tw 6 202 201 ence to (d) en) mitatio	$\mu < \alpha$ rmatio Both wo we 7 166 160 indica ) paire ) None ons.	or $\mu >$ n about (a) and eeks to $\frac{8}{173}$ 168 ate the d t - te e of the	ut the d (b) o test 9 183 180 e speci ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p	above in less t a) nor (b ounds. weight l
(7) (8) Q.2 (1) (2) (3)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w <u>Man</u> Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario	samp ost. men w as: 1 181 178 the dat test pr unpair (b) pe Que olot (di ance o pus me	(b) le surv (b) vere gi 2 171 172 a prov rocedu ed t - t stions agram f diagr thods	$\mu \neq$ vey is t Popul iven a 3 190 185 vide sur- re is : cest (Atten )? Writh rams. of dram	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide y Seve (n its li	(c) e infor (c) for tw 6 202 201 ence to (b) (d) en) mitation	$\mu < \alpha$ rmatio Both wo we 7 166 160 indica ) paire ) None ons.	$pr \mu > n above(a) andeeks to(a) andeeks to(a) and(a) (a) (a) (a) (a) (a) (a) (a) (a) (a) $	ut the d (b) o test 9 183 180 speci st ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p eads to a	above in less ti a) nor (b ounds. weight l (7 a methoo
(7) (8) (2) (2) (3)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w <u>Man</u> <u>Weight before</u> <u>Weight after</u> To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario you adopt? Why	samp ost. men w as: 1 181 178 the dat test pr unpair (b) ve Que olot (di ance o ous me ?	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram f diagr thods	$\mu \neq$ rey is t Popul iven a 3 190 185 ride su re is : cest (Atten )? Writ ams. of drav	ation specia 4 187 184 fficien	reliabl al diet 5 210 201 t evide ny Seve n its li	(c) e infor (c) for tw 6 202 201 ence to (d) en) mitation	$\mu < \alpha$ rmatio ) Both wo we 7 166 160 0 indica ) paire ) None ons.	$pr \mu >$ n about (a) and eeks to eeks to $\frac{8}{173}$ $\frac{173}{168}$ ate the of the of the point	ut the d (b) o test 9 183 180 e speci st ese	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p eads to a	above in less ti a) nor (b ounds. weight l (7 a method
(7) (8) (2) (2) (3) (4)	The main aim of and at a lower co (a) Sample A group of 10 r observed data w <u>Man</u> Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario you adopt? Why Let $X \sim b (6, \frac{1}{3})$ . F	samp ost. men w as: 1 181 178 the dat test pr unpair (b) be Que olot (di ance o bus me ? ind its	(b) le surv (b) vere gi 2 171 172 ta prover rocedu ed t - t stions agram f diagr thods (i) m	$\mu \neq$ rey is t Popul iven a 3 190 185 ride sur- re is : cest (Atten )? Writh rams. of drame	o get ation specia 4 187 184 fficien mpt An te dow wing a d stan	reliabl al diet 5 210 201 t evide y Seve (n its li n rando dard d	(c) e infor (c) for tw 6 202 201 ence to (b) (d) en) mitation pm sam	$\mu < \alpha$ rmatio Both wo we 7 166 160 indica indica ) paire ) None ons.	$pr \mu >$ n above (a) and eeks to (a) and eeks to 173 168 ate the of the of the $P(X \leq$	ut the (b) (b) (b) (b) (c)	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p eads to a	above in less ti a) nor (b ounds. weight l (7 method
(7) (8) (2) (2) (3) (4) (5)	The main aim of and at a lower co (a) Sample A group of 10 r observed data wa Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario you adopt? Why Let $X \sim b \left(6, \frac{1}{3}\right)$ . F Write down the	samp ost. men w as: 1 181 178 the dat test pr unpair (b) re Que lot (di ance o pus me ? ind its regres	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram f diagr thods (i) m sion eq	$\mu \neq$ rey is t Popul iven a 3 190 185 ride su re is : cest (Atten )? Writh ams. of draw ean an quation	ation specia 4 187 184 fficien <b>npt An</b> te dow wing a d stan	reliabl al diet 5 210 201 t evide ny Seve n its li a rando dard d	(c) e infor (c) for tw 6 202 201 ence to (d) en) mitation pm sam eviation d be us	$\mu < \alpha$ rmatio Both wo we <u>7</u> <u>166</u> <u>160</u> indica ) paire ) None ons. on ( <i>ii</i> ) sed to	$pr \mu >$ n above (a) and eeks to (a) and eeks to 173 168 ate the of the predic	ut the $\frac{1}{2}$ (b) $\frac{9}{183}$ $\frac{183}{180}$ $\frac{180}{2}$ speci st ese opulat $\leq 4$ ) t the v	(d) / (d) l weight <u>10</u> <u>184</u> <u>179</u> al diet le	All of the Neither (a loss in p eads to a rge which Y for any	above in less ti a) nor (b ounds. weight l (7 methoo
<ul> <li>(7)</li> <li>(8)</li> <li>(8)</li> <li>(1)</li> <li>(2)</li> <li>(3)</li> <li>(4)</li> <li>(5)</li> <li>(6)</li> </ul>	The main aim of and at a lower co (a) Sample A group of 10 r observed data w Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario you adopt? Why Let $X \sim b(6, \frac{1}{3})$ . F Write down the of X. Write down Given that Z is a	samp ost. men w as: 1 181 178 he dat test pr unpair (b) ve Que ilot (di ance o pus me ? iind its regres n the fi	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram f diagr thods (i) m sion ec ormula ard no	$\mu \neq$ yey is t Popul iven a 3 190 185 yide su re is : cest (Atten )? Writ ams. of drav ean an quation a for ea rmal v	ation specia 4 187 184 fficien mpt An te dow wing a d stan n whice ach ter ariate	reliabl al diet 5 210 201 t evide y Seve (n its li a rando dard d ch coul- m in th Sketch	(c) e infor (c) for tw 6 202 201 ence to (d) ence to (d) ena mitation om sam eviation d be us he equin each	$\mu < \alpha$ rmatio ) Both wo we 7 166 160 o indica ) paire ) None ons. ope. If on ( <i>ii</i> ) sed to ation. ope at	$pr \mu > pr above(a) andeach state(a) andeach state(a) andeach state(b) and(c) and(c)$	ut the $\frac{1}{(b)}$ test $\frac{9}{183}$ $\frac{183}{180}$ e speci st ese opulat $\leq 4$ ) t the v	(d) / (d) weight 10 184 179 al diet le	All of the Neither (a loss in p eads to a rge which Y for any wing prob	above in less ti a) nor (b ounds. weight l (7 method given va pabilities
<ul> <li>(7)</li> <li>(8)</li> <li>(8)</li> <li>(1)</li> <li>(2)</li> <li>(3)</li> <li>(4)</li> <li>(5)</li> <li>(6)</li> </ul>	The main aim of and at a lower co (a) Sample A group of 10 r observed data wa Man Weight before Weight after To determine if t the appropriate (a) two sample (c) both (a) and Short Answer Typ What is Scatter p State the importa List out the vario you adopt? Why Let $X \sim b (6, \frac{1}{3})$ . F Write down the of X. Write down Given that Z is a	samp ost. men was: 1 181 178 the dat test pro- unpair (b) re Que lot (di ance o pus me ? find its regress n the finistanda	(b) le surv (b) vere gi 2 171 172 ta prov rocedu ed t - t stions agram f diagr thods (i) m sion ed ormula ard no	$\mu \neq$ vey is t Popul iven a 3 190 185 vide su re is : cest (Atten )? Writh ams. of drav ean an quation a for ear rmal var	ation specia 4 187 184 fficien mpt An te dow wing a d stan n whic ach ter ariate,	reliabl al diet 5 210 201 t evide ny Seve n its li a rando dard d ch coul m in th Sketcl	(c) e infor (c) for to 6 202 201 ence to (d) en) mitation om sam leviation d be us he equin each	$\mu < \alpha$ rmatio Both wo we <u>7</u> <u>166</u> <u>160</u> o indica ) paire ) None ons. one an one an	$pr \mu > n above(a) andeach s to(a) and(a) and(b) (a) (a) (a) (a) (a) (a) (a) (a) (a) (a$	ut the $\frac{1}{(b)}$ test $\frac{9}{183}$ $\frac{183}{180}$ e speci st ese opulat $\leq 4$ ) t the v luate t	(d) / (d) l weight 10 184 179 al diet le fon is lan ralue of he follo	All of the Neither (a loss in p eads to a rge which Y for any wing prob	above in less ti a) nor (b ounds. weight l (7 methoo given va pabilities

(*i*)  $P(Z \le -2)$  (*ii*)  $P(Z \ge 1.78)$ 

(7) A sample of underweight babies was fed a special diet and the following weight gains (lbs) were observed at the end of three month.

6.7	2.7	2.5	3.6	3.4	4.1	4.8	5.9	8.3
Calculate m	nean and sta	andard devi	ation.					

(8) Write in brief about Simple Random Sampling (SRS).

- (9) List out the various measures of central tendency. Define any one of them with its merits and demerits.
- Q.3(a) Write a note on Stratified Random Sampling.
  - (b) Present the following information through a most suitable diagram. State its objective(s).

## Country wise diabetic patients

	Year			
Country	2007	2015*		
India	40.9	69.9		
China	39.8	59.3		
USA	19.2	25.4		
Russia	9.6	10.3		

\* Projected or estimated \*\* figures in million.

OR

Q.3(a) Give three examples each of

(i) Nominal and Ordinal data (ii) Variable and Attribute, useful in Bioscience.

- (b) A study was conducted to comparing female adolescent who suffer from bulimia to healthy females with similar body composition and levels of physical activity. Listed below are measures of daily caloric intake, recorded in kilocalories per kg, for samples of adolescents from each group.
  - (i) Find the median daily caloric intake for both the bulimic adolescents and the healthy ones.
  - (ii) Which group has a greater amount of variability in the measurement?

Dail	y Caloric Ir	ntake(Kcal,	/Kg)		
Buli	mic	Healthy			
15.9	18.9	20.7	30.6		
16	19.6	22.4	33.2		
16.5	21.5	23.1	33.7		
17	21.6	23.8	36.6		
17.6	22.9	24.5	37.1		
18.1	23.6	25.3	38.4		
18.4	24.1	25.7	40.8		

Q.4(a) Define correlation. State the different types of correlations. Give two examples of each.

(b) Following table gives age and vital capacity for each of 12 workers in the cadmium industry.

Age	39	40	41	41	45	49	52	47	61	65	58	59
Vital Capacity	4.62	5.29	5.52	3.71	4.02	5.09	2.70	4.31	2.70	3.03	2.73	3.67

Calculate (i) the correlation coefficient and comment on it (ii) Predict the vital capacity of a worker whose age is 42 years.

OR

- Q.4(a) What is regression? State its uses. Write down the properties of regression coefficients.
  - (b) Hardik's parents recorded his height at various ages up to 84 months.

Age(months)	36	48	60	72	84
Height(inches)	35	38	41	43	45

(i) Compute r, the Pearson correlation coefficient and comment on it (ii) Predict the height at the age of 8 years.

- Q.5(a) It was claimed that 1 out of 3 dentists who recommend Sensodyne tooth paste for sensitivity of teeth to his/her patients. Suppose that the claim is true. If 10 dentists are selected independently and at random. Let X be the no. of dentists who recommend sensodyne tooth paste to his/her patients. (i) How is X distributed? (ii) Give the mean and standard deviation of X (iii) Determine  $P(X \ge 3)$ .
  - (b) The measurement of the length of the index finger of a human right hand is a normally distributed variable with a mean of 6 cm. and a standard deviation of 0.5 cm. What is the probability that the finger length of a randomly selected person will be (i) between 5 cm. and 7.5 cm (ii) more than 4.5 cm (iii) less than 5.3 cm.

OR

- Q.5(a) It is known that 10% of plants produced by a certain species of corn seed will be infertile. In a random sample of 5 such plants, what is the prob. that (*i*) exactly 1 (*ii*) 2 or less (*iii*) more than 3, will be infertile?
  - (b) Measurements of the acidity level (pH) of rain samples were recorded at 12 sites in an industrial region.

4.3	4.2	4.5	4.9	4.7	4.8
3.5	5.1	5.0	3.6	4.8	3.6

Is the mean acidity level (pH) of rainy water is same as normal water level i.e. 7? Test at 5% level of significance.

- Q.6(a) Given that Z is a standard normal variable, Sketch each one and evaluate the following probabilities. (i) $P(Z \le -2)$  (ii)  $P(Z \le 1.78)$  (iii)  $P(Z \ge -1.22)$  (iv)  $P(-1.62 \le Z \le 1.62)$ 
  - (b) Two diets were to be compared. Seventy five individuals were selected at random from a population of overweight people. Forty of this group were assigned to diet A and the remaining thirty five were placed on diet B. The weight losses in pounds over a period of one week were found and the following information was recorded.

	Sample size	Sample mean(lbs)	Sample variance
Diet - A	40	10.3	7.00
 Diet - B	35	7.3	3.25

Is Diet – A is better than diet – B? Test at  $\alpha = 0.05$ .

OR

Q.6(a) A study is conducted to determine whether the use of electronic fetal monitoring during labor affects the frequency of caesarian section deliveries. Caesarian delivery can be thought of as "disease" and electronic monitoring as the "exposure". Of the 5824 included in the study, 2850 were electronically monitored during labor and 2974 were not. The outcomes are as follows:

a di si ungusi ne di	EFM ex	posure	
Caesarian delivery	Yes	No	
Yes	358	229	
No	2492	2745	

Is there any association between the use of electronic fetal monitoring and the eventual method of delivery?

(b) Two types of drugs were used in 5 patients each for reducing their weights. The decrease in the weight after using the drugs for six months was recorded as given below:

0	0	-		-		
Drug-A	11	13	12	14	10	
Drug-B	12	9	8	15	9	

Is there significant difference in the efficiency of the two drugs? Test at  $\alpha$  = 0.05.

$$-x -$$

Page 3 of 3