This question paper contains 7 printed pages]

	Roll No.
S. No.	of Question Paper : 3124
Unique	Paper Code : 32375902 IC
Name o	of the Paper : Applied Statistics
Name	of the Course : Statistics : G.E. for Honours
Semest	er : IV
Duratio	on : 3 Hours Maximum Marks : 75
(Write y	our Roll No. on the top immediately on receipt of this question paper.)
	Attempt six questions in all.
Q. 1	is compulsory, further select two questions from
	Section I and three from Section II.
	Use of simple calculator is allowed.
1. (a) Name the characteristic movement of time series with
	which you will mainly associate the following :
	(i) Fall in production of rice due to flood
	(ii) An era of recession

(iii) Increase in literacy rate in a developing country

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- (b) Fill in the blanks :
 - (i) When the time series data is found to be

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- increasing/decreasing by equal absolute percentage
- the method can be used to measure trend.
- (ii) Periodic Changes in time series data may be classified as and variations.
 (c) Describe assignable causes of variation in Statistical Quality Control.
- (d) Name the different test to be satisfied by a good index number ? Which is an ideal index number ?
- (e) How do you decide on the type of control chart to control process variability ?
- (f) What is CDR ? Discuss its advantages.
- (g) What is process control and product control ?

8. (a) What do various columns of a complete life table represent ? Fill in the blanks of the following skeleton life table which are marked with questions marks, where the symbols have their usual meanings.

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Age	I _x	d _x	<i>q</i> _{<i>x</i>}	<i>p</i> _x	L _x	T _x	<i>e</i> _x 0
9	93832	1293	?	?	?	3699301	30.42
10	?	1210	-		1	-	- 70

- (b) Discuss the following measures :
 - (i) Age-SDR
 - (ii) IMR
 - (iii) GFR.

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 (a) Explain with examples when variable control charts are not suitable. Name different attribute control charts.
 Discuss the construction of control chart for proportion of defectives.

(b) Discuss the criteria for detecting lack of control in \overline{X} ? and R-charts. 6,6

- (a) Define the term "Vital Statistics". Describe the methods of collection of vital statistics data.
 - (b) Compute the crude and standardized death rates of the two populations A and B from the following data taking population of town A as standard population : 6,6

Age group (Years)		Α	В		
peu expense anal	Population	Deaths	Population	Deaths	
Below 5	15,000	360	40,000	1,000_	
5–30	20,000	400	52,000	1,040	
Above 30	10,000	280	8,000	240	
Total	45,000	1,040	1,00,000	2,280	

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Section I

(a) Describe the different components of a time series. Give suitable examples for each.

(b)

Name different methods for measuring trend in a time series. Fit a straight line to the following series. Estimate production of steel for 2012 : 6,6

	Year	Production	of steel	(m. tons)
•	2001	Charle rabit seller	60 -	al de la
	2002	in exclusion of both	72	
	2003	interno do line s	75	
	2004	en Produtos Labos o	65	
	2001	5 Gen 1401	80	
	2005		80	
	2006		85	
	2007		95	

P.T.O.

(a) Define seasonal fluctuations of a time series. Describe
 Ratio to trend method for measuring the seasonal
 variations, stating clearly the assumptions made.

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(b) Define the following :

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- (i) Marshall-Edgeworth price index number
- (ii) Value index number
- (iii) Fisher's quantity index number. 6,6
- (a) What is a consumer index number ? Describe aggregate expenditure method to construct consumer index number.
 - Give any two uses of consumer index number.
- (b) Compute price index numbers for the year 2005 with
 2000 as base year, using : 6,6
 - (i) Laspeyre's method
 - (ii) Paasche's method and
 - (iii) Fisher's method.

Further, show that Fisher's index number satisfies Time

reversal test.

	Commodity	Quantity	y (Units)	Expenditure (Rs.)	
		2000	2005	2000	2005
· · · ·	Α	100	150	500	900
20.	, B	80	100	-320	500
	С	60	72	150	360
	D	30	33	360	297

Section II

- (a) What do you understand by SQC ? Discuss briefly its need and utility in industry.
 - (b) The torque reading of a bearing used in a wing-flap actuator assembly is a critical quality characteristic to be maintained. It is known from the past experience that when the process is in control, bearing torque has a normal distribution with mean $\mu = 80$ inch-pounds and standard deviation s = 10 inch-pounds where samples of size n = 10 were used. Deduce the central line and control limits for controlling process average. 6,6

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