

OLD
Part II 3-Tier

2016

STATISTICS

(Honours)

PAPER—VA

(PRACTICAL)

Full Marks : 50

Time : 4 Hours

Answer all questions.

1. The following table gives the census population data for USA. Fit a Logistic curve with a suitable methods : 8

Year	Population (in millions)	Year	Population (in millions)
1800	5.3	1890	63
1810	7.2	1900	76
1820	9.6	1910	92
1830	12.9	1920	105.8
1840	17.1	1930	122.8
1850	23.2	1940	131.7
1860	31.4	1950	150.7
1870	38.6	1960	179.3
1880	50.2		

(Turn Over)

2. The values of l_x , i.e., number of persons living at age x , are as given below :

x	105	106	107	108	109	110	111
l_x	96	55	33	12	5	2	0

- (a) Calculate the remaining entries of the life table for $x \geq 105$.
- (b) Let, A, B, C are three men of age 103, 104 and 105 years respectively. Find the probability that :
- At Least one of them will be alive for one year more.
 - All will be dead in two years time.
 - Exactly one of the three is alive in two years.

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3. The following table given the production of Iron ore (lakh tonnes) in India from 2010 to 2013 for different quarters :

Year	1 st quarter	2 nd quarter	3 rd quarter	4 th quarter
2010	126	108	79	113
2011	131	110	73	110
2012	116	90	72	108
2013	124	97	69	101

Compute the seasonal indices by Ratio to trend method assuming linear trend.

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4. The following table gives the number of defects noted at final inspection of aircraft. Plot suitable control chart and comment on the state of control :

<i>Aircraft No.</i>	<i>Number of</i>
1	7
2	15
3	13
4	18
5	10
6	14
7	20
8	11
9	15
10	24
11	14
12	8
13	12
14	9

<i>Aircraft No.</i>	<i>Number of</i>
15	22
16	23
17	12
18	7
19	19
20	28
21	20
22	21
23	27
24	25
25	12
26	10
27	15
28	14

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5. Practical note book and Viva-voce.

5+5

OLD**Part II 3-Tier****2016****STATISTICS****(Honours)****PAPER—VB****(PRACTICAL)***Full Marks : 50**Time : 4 Hours**The figures in the margin indicate full Marks.**Answer all questions.*

1. Find the roots of the following equations using Newton Raphson method :

$$xe^x - 2 = 0.$$

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2. Use a suitable interpolation formula for estimating the population of India in 1941 from the following table :

(Turn Over)

<i>Census Year</i>	<i>Population of India (in lakhs)</i>
1901	2383
1911	2520
1921	2512
1931	2789
1941	-
1951	3610
1961	4391

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3. Write a C program to calculate quartile deviation for a dataset.
- 8
4. Use any software (Ms Excel/Minitab) to analyse the following data.

<i>Y</i>	<i>X1</i>	<i>X2</i>	<i>X3</i>
79.99	540.0	155.0	676.0
61.89	540.0	151.0	676.0
40.27	332.5	142.5	594.0
41.05	332.5	130.0	594.0
44.30	198.6	132.4	825.5
47.03	266.0	114.0	670.0
43.70	380.0	95.0	594.0
36.45	380.0	95.0	594.0
45.85	266.0	144.0	670.0
39.29	475.0	0.0	594.0
38.07	198.6	132.4	825.5
28.02	198.6	132.4	825.5
43.01	427.5	47.5	594.0

(a) Fit a multiples regression model Y on X1, X2 and X3 and assess the goodness of fit.

(b) Which predictors from X1, X2 and X3 are significant?

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5. Find the eigen values and the corresponding eigen vectors of the following matrix :

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$$\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$$

6. Determine the conditions for which the system of equations has (a) only one solution (b) no solution (c) many solution :

$$x+y+z = 1$$

$$2x+y+3z = b$$

$$x+ay+3z = b + 1$$

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7. Practical note book and Viva-voce.

5+5