B.Com. /B.Com (CS) / B.Com (A&F) DEGREE EXAMINATION APRIL 2017
FOURTH SEMESTER

COURSE	:	ALLIED – CORE
PAPER	:	STATISTICAL TECHNIQUES FOR BUSINESS
TIME	:	3 HOURS MAX. MARKS: 100

SECTION – A

I. ANSWER ALL THE QUESTIONS   **(10 X 2 = 20)**

1) What is time series?
2) Find the centred 4 year moving averages from the following times series:

Years	2010	2011	2012	2013	2014	2015
Profits (`in lacs)	30.1	45.4	39,3	41.4	42.2	46.4

3) Differentiate the following pairs of concepts:
    A) Statistics and Parameter,   B) Type I and Type II errors

4) A random sample of 200 tins of coconut oil gave an average weight of 4.95kgs with a
    standard deviation of 0.21kg. Do we accept the hypothesis of net weight 5 kgs per tin at
    1% level?
5) State any two basic conditions for the application of Chi-square test?
6) Fill in the blanks:
    a) In a contingency table, v = ----------------------------.
    b) The degrees of freedom are determined by the number of --------------------placed
       upon the expected frequencies.
7) State any two uses of F-test.
8) Which of the following statement is True or False:
        a) Analysis of variance cannot be used when there are samples of unequal sizes.
        b) MSC stand s for mean square of between samples.

9) On the basis of the following information compute: r 23.1
    r12 = 0.70, r13 = 0.61, r23 = 0.40

10) Define multiple correlation coefficients.

SECTION – B
II.   ANSWER ANY FIVE QUESTIONS   **(5 X 8 = 40)**

11) The following are the annual profits in thousands of rupees of a certain business:

Year	2010	2011	2012	2013	2014	2015	2016
Profit (`)	60	72	75	65	80	85	95

    a) Use the method of Least Squares to fit a straight line to the above data
    b) Also make an estimate of the profits for the year 2018.

12) The sales manager of a large company conducted a sample survey in Tamil Nadu and Karnataka taking 400 samples in each case. The results were:

Particulars	Tamil Nadu	Karnataka
Average Sales	2,500	2,200
Standard Deviation	400	550

Test whether the average sales is the same in the 2 states at 1% level.

13) Out of 8000 graduates in a town, 800 are females and out of 1600 graduates employed 120 are females. Use Chi-square test to determine if any distinction is made in appointment on the basis of gender.

14) There are three main brands of a certain talcum powder. A set of 120 sample values is examined and found to be allocated among four groups (A, B, C and D) and three brands (I, II, III) as shown here under:

Brands	Groups			
	A	B	C	D
I	0	4	8	15
II	5	8	13	6
III	18	19	11	13

Is there any significant difference in brands preference? Answer at 5% level using One –way ANOVA.

15) The following zero order correlation coefficients are given:
   $r_{12} = 0.98$, $r_{13} = 0.44$ and $r_{23} = 0.54$
   Calculate multiple correlation coefficient treating first variable as dependent and second and third variables as independent.

16) Given the following, determine the regression equation of
   1) x_1 on x_2 and x_3 and   2) x_2 on x_1 and x_3

   $r_{12} = 0.8$, $r_{13} = 0.6$, $r_{23} = 0.5$
   $\sigma_1 = 10$, $\sigma_2 = 8$, $\sigma_3 = 5$

17) An IQ test was administered to 5 persons before and after they were trained. The results are given below:

Candidates	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in IQ after the training programme.

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SECTION – C

III. ANSWER ANY TWO QUESTIONS (2 X 20 = 40)

18) Calculate seasonal indices by the ratio to moving average method from the following data:

Year / Quarters	2013	2014	2015	2016
Q1	75	86	90	100
Q2	60	65	72	78
Q3	54	63	66	72
Q4	59	80	85	93

19) A leading shoe manufacturer has 500 show rooms across the country. The company wants to know the average difference in sales of these showrooms. It also wants to know the average sales difference between salesmen. For ascertaining the productivity of different salesmen, the company had adopted a practice of retaining one salesman for three months at one showroom. The company randomly selected four showrooms and three salesmen from each of the showrooms. The following table exhibits the average sales in thousand rupees from showroom and the individual contribution of the three salesmen placed at different showrooms.

Salesmen	Showroom 1	Showroom 2	Showroom 3	Showroom 4
S1	38	40	41	39
S2	45	42	49	36
S3	40	38	42	42

Using coding method, subtracting 40 from the given values and examine whether the salesmen significantly differ in productivity? Whether there is a significant difference between the average sales of showrooms?

Take 99% as confidence level for testing the hypotheses.

20) Three samples are taken comprising 120 doctors, 150 advocates and 130 university teachers. Each person chosen is asked to select one of the three categories that best represents his feeling toward a certain national policy. The three categories are in favour of policy (F), against the policy (A), and indifferent toward the policy (l). The results of the interviews are given below:

Occupation	Reaction			Total
	F	A	l	
Doctors	80	30	10	120
Advocates	70	40	40	150
University Teachers	50	50	30	130
Total	200	120	80	400

On the basis of this data can it be concluded that the views of Doctors, Advocates and University teachers are homogeneous in so far as National Policy under discussion is concerned.

21) The table shows the corresponding values of three variables, X1, X2 and X3. Find the least square regression equation of X3 on X1 and X2. Estimate X3 when X1 = 10 and X2 = 6

$\overline{X1}$	3	5	6	8	12	14
$\overline{X2}$	16	10	7	4	3	2
$\overline{X3}$	90	72	54	42	30	12

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