SET A

Unique Paper Code	: 61011104
Name of the Paper	: Statistics for Business Decisions
Name of the Course	: Bachelor of Management Studies (CBCS)
Semester	: I
Duration	: 3 hours
Maximum Marks	: 75

Instructions to Candidates:

(i)All Questions carry equal marks.

(ii) *The Question paper contains 6 Questions.*

(iii)Attempt any 4 Questions in all.

(iv) Use of Simple Calculator is allowed.

Q 1Explain the difference between Type I and Type II error. Given below are the fastest 100 meter running speeds (in seconds) for 10 student athletes from two schools:

School A	12	13	15	13.5	11	17	14.5	14	14	16
School B	14	14	16	15.5	12	17	18	13	15	13.5

Is there a significant difference between the average running speed of student athletes for the two schools? Test at 1% level of significance.

Q 2Differentiate between mathematical and positional averages and explain their utility. A factory works in two shifts: I and II. The details of wages paid to the workers in the two shifts are as follows:

Particulars	**Shift I**	**Shift II**
No. of Workers	80	120
Wages paid per day (INR)	47,440	86,400
Standard deviation (INR)	105	110

Find the mean wages paid in the two shifts. Also calculate the combined mean and combined standard deviation of the entire set of workers. Determine which group has greater variability in wages. Given that the modal wage paid to all the workers at the factory is Rs 785, comment on the skewness of the distribution of wages. Use the combined mean and standard deviation to estimate the number of workers who earn within the range defined by$\bar{x} \pm 2\sigma$ (mean plus/minus twice standard deviation). Give reason for your answer.

Q 3The sales (in Rs. '000) of readymade garments showroom are given below:

Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Sales	82	86	81	86	92	90	99	105

(a) Using the method of least squares, fit a straight-line trend equation to the data.

(b) What is the average annual change (increase or decrease) in sales?

(c) Obtain the trend values for the years 2013-2019.

(d) What are the expected sales for the year 2020?

Q 4 Assume that the probability of a student getting selected to IIM(Udaipur) from an MBA entrance coaching institute with 100 students is 5%. Which probability distribution will you choose to analyse the given data? Give reason for your answer.

Use the appropriate probability distribution to calculate: (i) the probability of not more than 2 students from the institute getting admitted to IIM(Udaipur) (ii) the probability of there being 3 or more students from the institute getting admitted to IIM (Udaipur) (iii) the probability of exactly 4 students from the institute getting admitted to IIM. Plot the probabilities for 3,4,5,6,7 students getting selected on a graph.

Q 5 Discuss the significance of the concept of regression in business and economic analysis giving suitable examples. Galaxy Garments is in the business of manufacturing and selling sportswear. The company wants to find the associationbetween R&D expenditure and Sales revenue in order to develop a forecast model. Use the following data pertaining to past ten yearsfor determining the Karl Pearson's coefficient of correlation:

Sales Revenue (in ₹ Crore)	31	35	34	34	12	13	13	16	17
R&D Expenditure (in ₹ Crore)	14.2	8.3	8.4	8.5	4.8	4.2	5.6	6	5.2

The company wants to develop a regression model in order to predict sales on the basis of the R&D expenditure. Find the regression coefficient of Sales on R&D expenditure and the resultant regression equation. Comment on the suitability of the model using standard error of estimate.

Q 6Write a short note on stock market indices. An index for stationary prices for the year 2019 based upon 2016 is to be constructed for a typical primary school comprising 300 students. The stationary items include pencil, sharpener, eraser, ruler, crayons, A-4 size sheets, and glue. The prices and quantities consumed for each item is given below:

Item	**2019**		**2016**	
	Price (in ₹)	Quantity	Price (in ₹)	Quantity
Pencil	3	1,100	2	1,000
Sharpener	4	400	3	360
Eraser	3	420	2	400
Ruler	7	180	4	200
Crayons	12	750	10	700
A-4 size sheets	510	125	475	140
Glue	35	350	28	425

Calculate the weighted price indices for stationary using Paasche's method; Laspeyre's method; Fisher's method; and quantity indices using Dorbish-Bowley's method; Marshall-Edgeworth method and Kelly's method.

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	**0.50**	**0.25**	**0.20**	**0.15**	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**	**0.001**	**0.0005**
two-tails	**1.00**	**0.50**	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.002**	**0.001**
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

Poisson Distribution Table

λ =	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
X=0	0.6065	0.3679	0.2231	0.1353	0.0821	0.0498	0.0302	0.0183	0.0111	0.0067
1	0.9098	0.7358	0.5578	0.4060	0.2873	0.1991	0.1359	0.0916	0.0611	0.0404
2	0.9856	0.9197	0.9197	0.8088	0.6767	0.5438	0.4232	0.3208	0.2381	0.1247
3	0.9982	0.9810	0.9344	0.8571	0.7576	0.6472	0.5366	0.4335	0.3423	0.2650
4	0.9998	0.9963	0.9814	0.9473	0.8912	0.8153	0.7254	0.6288	0.5321	0.4405
5	1.0000	0.9994	0.9994	0.9955	0.9834	0.9161	0.8576	0.7851	0.7029	0.6160
6	1.0000	0.9999	0.9991	0.9955	0.9858	0.9665	0.9347	0.8893	0.8311	0.7622
7	1.0000	1.0000	0.9998	0.9989	0.9958	0.9881	0.9733	0.9489	0.9134	0.8666
8	1.0000	1.0000	1.0000	0.9998	0.9989	0.9962	0.9901	0.9786	0.9597	0.9319
9	1.0000	1.0000	1.0000	1.0000	0.9997	0.9989	0.9967	0.9919	0.9829	0.9682
10	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9990	0.9972	0.9933	0.9863