GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech(Third Semester) Examinations, November – 2024
23BCMBS23001 / 23BCDBS23001 – Applied Statistics
[CSE(AIML) & CSE(DS)]

Time: 3 hrs   Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A   (2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	Write any four types of diagrams used to present statistical data.	CO1	K1
b.	List various measures of dispersion.	CO2	K1
c.	Define standard error	CO3	K1
d.	Define Type I and Type II error	CO4	K1
e.	The mean and variance of a random sample of 64 observations were 160 and 100 respectively. Find the 95% confidence limits for the population mean.	CO5	K2

PART – B   (10 x 5 = 50 Marks)

Answer *ALL* the questions

		Marks	CO #	Blooms Level
2. a.	Draw the stem and leaf diagram of given observations:	5	CO1	K2

4.7, -30, 2.38, 13.7, 9.38, -11.324, -7.523, 18.198, 17.527, 32.55, 21, 17, 14, 28.382, 17.98

		Marks	CO #	Blooms Level
b.	Distinguish between primary and secondary data and discuss various methods of collecting primary data.	5	CO1	K1

(OR)

		Marks	CO #	Blooms Level
c.	Draw the histogram for the following frequency distributions:	5	CO1	K2

Variable	10 – 15	15 – 20	20 – 25	25 – 30	30 – 40	40 – 60	60 – 80
Frequency	7	19	27	15	12	12	8

		Marks	CO #	Blooms Level
d.	Write short notes on Box plots and Probability plots	5	CO1	K1
3.a.	Calculate the mean and standard deviation from the following data:	5	CO2	K2

Age under (in years)	:	10	20	30	40	50	60	70	80
No. of persons dying	:	15	30	53	75	100	110	115	125

		Marks	CO #	Blooms Level
b.	Obtain the correlation co-efficient for the following data on x and y	5	CO2	K2

x	79	90	98	70	60	79	69	57
y	126	138	156	111	108	139	129	109

(OR)

		Marks	CO #	Blooms Level
c.	The following are measurements of the air velocity x (in cm/s) and evaporation coefficient y (in mm^2/s) of burning fuel droplets in an impulse engine:	10	CO2	K3

x	:	20	60	100	140	180	220	260	300	340	380
y	:	0.18	0.37	0.35	0.78	0.56	0.75	1.18	1.36	1.17	1.65

Fit a straight line to these data by the method of least squares, and use it to estimate the evaporation coefficient of a droplet when the air velocity is 190 cm/s.

4.a.	A research worker wishes to estimate the mean of population by using sufficiently large sample. The probability is 0.95 that the sample mean will not differ from the true mean by more than 25% of the standard deviation. How large a sample should be taken?	5	CO3	K2
b.	Let $X_1, X_2, X_3, \ldots X_n$ be a random sample from $N(\mu, \sigma^2)$ population with p.d.f $f(X, \mu, \sigma^2) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{X-\mu}{\sigma}\right)^2}$. Find the maximum likelihood estimator of μ.	5	CO3	K2

(OR)

c.	A sample of 450 items is taken from a population whose s.d is 20. The mean of the sample is 30. Test whether the sample has come from the population with mean 29. Also calculate the 95% confidence limits for the population mean.	5	CO3	K2
d.	Let $X_1, X_2, X_3, \ldots X_n$ be a random sample from exponential distribution $f(X, \lambda) = \frac{1}{\lambda} e^{-\lambda X}, x > 0, \lambda < \infty$. Find the MLE of λ.	5	CO3	K2
5.a.	The manufacturer of television tubes knows from the past experience that the average life of a tube is 2,000 hours with a s.d of 200 hours. A sample of 100 tubes has an average life of 1,950 hours. Test at 5% LOS whether the sample came from a normal population of mean 2,000 hours.	5	CO4	K2
b.	What do you mean by (i) level of significance (ii) critical values	5	CO4	K1

(OR)

c.	Explain the procedure for testing of hypothesis	5	CO4	K1
d.	In a city a sample of 1000 people were taken and out of them 540 are vegetarian and the rest are non-vegetarian. Can we say that both habits of eating are equally popular in the city?	5	CO4	K2
6.a.	The heights of six randomly chosen sailors are in inches : 63, 65, 68, 69, 71, 72. Those of 10 randomly 61, 62, 65, 66, 69, 69, 70, 71, 72, 73. Test whether the sailors are on the average taller than soldiers	5	CO6	K3
b.	In a random sample of 500 men 300 are found to be smokers. In another random sample of 1000 men 550 are found to be smokers. Do the data indicate that the two set of men are significantly different with respect to the prevalence of smoking among men.	5	CO6	K3

(OR)

c.	A simple sample of heights of 6,400 Englishmen has a mean of 67.85 inches and a s.d of 2.56 inches, while a simple sample of heights of 1,600 Indians has a mean of 68.55 inches and a s.d of 2.52 inches. Does the data indicate that Indians are on the average taller than Englishmen?	5	CO6	K3
d.	In one sample of 10 observations from a normal population, the sum of squares of deviations of the sample values from the sample mean is 102.4 and in another sample of 12 observations from another normal population the sum of squares of deviations of the sample values from the sample mean is 120.5. Examine whether the two normal populations have the same variances.	5	CO6	K3

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