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

M.B.A. (First Semester) Regular Examinations, January – 2025
23MBAPC11005 – Quantitative Techniques
(MBA)

Time: 3 hrs   Maximum: 60 Marks

(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.	A student placed Rs 1000 in his saving account of a bank at 5 percent interest rate. How much shall it grow at the end of three years?	CO1	K4
b.	A bag contains three white and five black balls. What is the chance that a ball drawn at random will be black?	CO2	K3
c.	From the following data of the wages of 7 workers, compute the median: 7400, 4100, 6160, 6080, 5200, 7120, 4150	CO3	K4
d.	Define regression coefficient. Explain with an example.	CO4	K1
e.	Write the components of time series.	CO5	K1

PART – B   **(10 x 5 = 50 Marks)**

Answer **ALL** questions

		Marks	CO #	Blooms Level
2. a.	A company wants to set up a reserve which will help the company to have an annual equivalent of Rs. 10,00,000 for the next 20 years towards its employees' welfare measures. The reserve is assumed to grow at the reate of 15% annually. Find the single-payment that must be made now as the reserve amount.	6	CO1	K3
b.	Differentiate the following: $$\left(\sqrt{x}^{\sqrt{x}}\right)$$ (OR)	4	CO1	K4
c.	Differentiate the following *w.r.t. x.* $$\frac{e^x + 1}{e^x - 1}$$	4	CO1	K3
d.	A company has to replace a present facility after 15 years at an outlay of Rs 5,00,000. It plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18% compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 15 years.	6	CO1	K4
3.a.	Eight coins are thrown simultaneously. Show that the probability of getting at least 6 heads is $\frac{37}{256}$.	4	CO2	K2
b.	Assuming that the probability of a fatal accident in a factory during the year is $\frac{1}{1200}$. Calculate the probability that in a factory employing 300 workers, there will be at least two fatal accidents in a year. *(Given $e^{0.25}$ = 0.7788)* (OR)	6	CO2	K3
c.	State and prove the Conditional Theorem of Probability.	4	CO2	K4
d.	The mean of the inner diameters (in inch) of a sample of 200 tubes produced by a machine is 0.502 and the standard deviation is 0.005. The purpose for which	6	CO2	K3

these tubes are intended allows a maximum tolerance in the diameter of 0.496 to 0.508 (i.e., otherwise the tubes are considered defective). What percentage of the tubes produced by the machine is defective if the diameters are found to be normally distributed?

4.a. The means of two samples of sizes 50 and 100 respectively are 54.1 and 50.3 and the standard deviations are 8 and 7. Obtain the mean and standard deviation of the sample of size 150 obtained by combining the two samples. | 3 | CO3 | K3

b. Calculate the arithmetic mean and median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three. | 7 | CO3 | K4

Class-limits	Frequency
130 – 134	5
135 – 139	15
140 – 144	28
145 – 149	24
3150 – 154	17
155 – 159	10
160 – 164	1

(OR)

c. An aeroplane flies around a square the sides of which measure 100kms each. The aeroplane covers at a speed of 100kms per hour the first side, at 200kms per hour the second side, at 300 kms per hour the third side and at 400 kms per hour the fourth side. Use the correct mean to find the average speed round the square. | 5 | CO3 | K3

d. Calculate the coefficient of skewness from the following data: | 5 | CO3 | K4

Mid-point:	15	20	25	30	35	40
Frequency:	12	18	25	24	20	21

5.a. In order to find the correlation coefficient between two variables X and Y from 12 pairs of observations, the following calculations were made: | 6 | CO4 | K4

$$\Sigma X = 30, \Sigma Y = 5, \Sigma X^2 = 670, \Sigma Y^2 = 285, \Sigma XY = 334$$

On subsequent verification it was found that the pair (X=11, Y=4) was copied wrongly, the correct value being (X=10, Y=14). Find the correct value of correlation coefficient.

b. From the following data, find the two regression equations: | 4 | CO4 | K3

X	1	2	3	4	5	6	7
Y	2	4	7	6	5	6	5

(OR)

c. In trying to evaluate the effectiveness in its advertising campaign, a firm compiled the following information: | 7 | CO4 | K3

Year	2014	2015	2016	2017	2018	2019	2020	2021
Advertising Expenditure ('000 Rs)	12	15	15	23	24	38	42	48
Sales (lakh Rs)	5.0	5.6	5.8	7.0	7.2	8.8	9.2	9.5

Calculate the regression equation of sales on advertising expenditure. Estimate the probable sales when advertisement expenditure is Rs. 60 thousand.

d. The coefficient of correlation between two variates X and Y is 0.64. Their covariance is 16. The variance of X is 9. Find the standard deviation of Y series. | 3 | CO4 | K4

6.a. Calculate trend values from the following data relating to the production of tea in India by the *moving average method*, on the assumption of a four-yearly cycle: | 5 | CO5 | K3

Year :	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Production (mm lb) :	464	515	518	467	502	540	557	571	586	612

b. The sales of a company in lakhs of rupees for the years 2001 to 2007 are given below: 5   CO5   K4

Year :	2001	2002	2003	2004	2005	2006	2007
Sales (Rs lakhs) :	32	47	65	92	132	190	275

Find trend values by using the equation $Y_c = ab^X$ and estimate the value for 2008.

(OR)

c. Calculate the trend values by the method of least square. Also calculate the increase in sales and trend value for 2022.   5   CO5   K4

Year :	2011	2012	2013	2014	2015	2016	2017
Sales (Rs lakhs) :	125	128	133	135	140	141	143

d. Fit a straight line trend to the data and estimate the profit for the year 2017   5   CO5   K3

Year:	2010	2011	2012	2013	2014	2015	2016
Profits of a firm (in lakhs Rs):	60	72	75	65	80	85	95

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