QP Code:RJ23MBA009 | Reg. No | | | | | | | | | | | AY 23

GIET UNIVERSITY, GUNUPUR – 765022

M.B.A (First Semester) Regular Examinations, January – 2024

23MBAPC11005 – Quantitative Techniques

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. Find the derivative of $x^4 + 2e^x + 3$	CO1	L4
b. If the probability of defective bolts be $\frac{1}{10}$, find the mean for the Binomial Distribution of defective bolts in a total of 400.	CO2	L3
c. Coefficients of variation of two series are 75% and 90% and their standard deviations are 15 and 18 respectively. Find their mean.	CO3	L4
d. In a correlation analysis, the values of the Karl Pearson's coefficient of correlation and its probable error were found to be 0.90 and 0.04 respectively. Find the value of "n".	CO4	L3
e. Draw a trend line by the Semi-Average Method using the following data:	CO5	L4

Year:	2013	2014	2015	2016	2017	2018
Production of Steel (in lakh tonnes)	253	260	255	266	259	264

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** questions	Marks	CO #	Blooms Level
2. a. For a certain establishment the total cost function C and the total revenue function R are given by $C = x^3 - 12x^2 + 48x + 11$ and $R = 83x - 4x^2 - 21$ where x = output, obtain the output for which profit is maximum and the maximum profit.	10	CO1	L3
(OR)			
b. A man borrowed a 3-year loan of Rs 10,000 at 9 percent from his employer to buy a motorcycle. If the employer requires three equal end-of-year repayments, then find his annual instalment.	4	CO1	L3
c. 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	L4
3.a. In a bolt factory, machines M1, M2 and M3 manufacture respectively 25, 35 and 40 percent of the total output. Of their output, 5, 4 and 2 percent respectively, are defective bolts. One bolt is drawn at random from the product and is found to be defective. What is the probability that it is manufactured in the machine M2?	7	CO2	L2
b. Find the area under the normal curve between z = –0.6 and z = –1.4	3	CO2	L3
(OR)			
c. Find the probability that at most 5 defective bolts will be found in a box of 200 bolts, if it is known that 2 percent of such bolts are expected to be defective. *(Given $e^{0.4} = 0.0183$).*	4	CO2	L4
d. A grinding machine is set so that its production of shafts has an average diameter of 10.10 cms. and a standard deviation of 0.20 cms. The product specifications	6	CO2	L3

call for shaft diameters between 10.05 cms and 10.20 cms. What proportion of output meets the specifications presuming normal distribution?

4.a. A factory produces two types of electric lamps A and B. In an experiment relating to their life, the following results were obtained: 10 CO3 L3

Length of life (in hours)	***Number of Lamps A***	***Number of Lamps B***
500 – 700	5	4
700 – 900	11	30
900 – 1100	26	12
1100 – 1300	10	8
1300 – 1500	8	6
Total	60	60

Compare the variability of the life of the two varieties using Coefficient of Variation.

(OR)

b. The arithmetic mean and standard deviation of a series of 20 items were calculated by a student as 20 cm and 5 cm respectively. But while calculating an item 13 was misread as 30. Find the correct arithmetic 3mean and standard deviation. 5 CO3 L3

c. Find the Mean Deviation about the A.M. from the following data: 5 CO3 L4

Daily Wages (Rs)	8 – 11	12 – 15	16 – 19	20 – 23	24 – 27
Number of workers	5	11	20	10	4

5.a. Calculate the coefficient of correlation between X and Y series from the following data: 10 CO4 L4

$$\sum_{i=1}^{15}(X_i - \bar{X})^2 = 136$$

$$\sum_{i=1}^{15}(Y_i - \bar{Y})^2 = 138$$

and

$$\sum_{i=1}^{15}(X_i - \bar{X})\,(Y_i - \bar{Y}) = 122$$

(OR)

b. Find the rank correlation coefficient of the following data: 10 CO4 L3

Series A	115	109	112	87	98	120	98	100	98	118
Series B	75	73	85	70	76	82	65	73	68	80

6.a. Fit a straight line trend equation by the method of least squares and estimate the trend values and also estimate the value for 2020. 10 CO5 L3

Year	2011	2012	2013	2014	2015	2016	2017	2018
Values	80	90	92	83	94	99	92	104

(OR)

b. Fit a parabolic trend to the following time-series data and estimate the production in 2012: 10 CO5 L4

Year :	2001	2002	2003	2004	2005	2006	2007
Production (in '000 units) :	42	49	62	75	92	122	158

--- End of Paper ---