Extra

20/11/19

VCD FYBCOM SEM II Mathematical & Statistical Techniques MARKS 100 3HRS

Note: - 1) All questions carry equal marks.
2) Figures to the right indicate marks to a sub-question.
3) Graph paper will be provided on request.
4) Use of non-programmable calculator is allowed.

Q.1] Attempt any Four of the following:

a) A workshop produces toy car. The total cost function is given by $C = 2000 + 50x$, where C is total cost of producing X toys cars. The total revenue R is given by R = 100X. Find the point at which the workshop will have break-even point. [5]

b) Find dy/dx if $y = (x^2 - 4x + 3)\, x^3$ [5]

c) The demand and supply curves of a commodity are given by $D = 19 - 3p$ and $S = 5p - 1$. Find the equilibrium price and the quantity exchanged. [5]

d) Divide 20 into two parts so that their product is maximum. [5]

e) The cost function is given by $C = 3x^3 + 5x^2 + 4$. Find the average cost and the marginal cost when x=4 [5]

Q.2] Attempt any Four of the following:

a) For how many years Rs. 1,20,00,000/- be invested at 8% per annum to get Rs.1,40,38,302.72 /- if the interest is compounded half yearly. [5]

b) At what simple interest rate will Rs. 12,000/- earn Rs. 1,920/- in 2 years. [5]

c) On what sum of money will the difference between compound interest and simple interest for 2 years, at 8% per annum be Rs. 2,840/- [5]

d) Find the accumulated value after 4 years of an immediate annuity of Rs. 20,000/- per annum with interest compounded at 6% per annum. [5]

e) A loan of Rs. 1,00,000/- is to be returned in 4 equal monthly installments at 12% per annum. Calculate EMI using reducing balance method. [5]

Q.3] Attempt any Four of the following:

a) Distinguish between correlation and regression. [5]

b) For bivariate distribution, mean value of X – 65, mean value of Y = 53. Standard deviation of X = 4.7 and standard deviation of Y = 5.2. Correlation correlation, r = 0.78. Find two regression equation. [5]

c) Given two regression equations as 4X – Y – 23 = 0 and 3X – 2Y + 4 = 0. Find mean values of X and Y. Also find coefficient of correlation. [5]

d) Calculate Karl-Pearson's coefficient of correlation for the following data. [5]

X	17	8	12	13	10	12
Y	13	7	10	11	8	9

e) Find spearman's rank correlation coefficient for the following data: [5]

X	105	112	107	115	160	152	148	132
Y	120	127	135	123	140	142	138	110

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Q.4] Attempt any Four of the following:

a) Describe the various stages in construction of index number. [5]

b) From the following data, calculate the cost of living index number for year 2004. [5]

Group	Price in 2000	Price in 2004	Weight
Food	5	12	60
Clothing	16	30	05
Fuel	10	25	10
Rent	20	60	15
Miscellaneous	18	36	10

c) From the following data, calculate Marshall-Edgeworth index number. [5]

Commodities	Base Year		Current year	
	Price p_0	Quantity q_0	Price p_1	Quantity q_1
A	2	20	3	30
B	4	15	5	20
C	3	40	6	50

d) Estimate the trend values by taking a three yearly moving average. [5]

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
Students	340	315	352	380	400	405	390	370	310

e) Fit a linear trend for following series. Estimate the production units for year 2010. [5]

Year	2001	2002	2003	2004	2005	2006	2007
Production units	125	128	133	135	140	141	143

Q.5] Attempt any Four of the following:

a) For binomial variable X, mean of X is 4 and variance of X is 4/3 . Find P(x=0) [5]

b) For a binomial distribution, Mean = 9 and standard deviation $= \sqrt{6}$. Find the corresponding n and p. [5]

c) Explain briefly properties of normal distribution. [5]

d) 20% of a company's vouchers are defective. An auditor picks 5 bills at random. Find the probability that no bill is defective. [5]

e) If x is a normal variate with mean 240 and standard deviation 10, find $P(230 \leq X \leq 260)$. Given that the area under the standard normal curve between z = 0 and z = 1 is 0.3413 and that between z = 0 and z = 2 is 0.4773. [5]

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