FYBCom/Maths Stats/XYGDAH

11/03/2020

Q.1 Attempt **any four** of the following

A) Find the derivatives of the following functions: **05**

(i) $y = e^x (x^2 - 5x + 8)$

(ii) $y = \frac{logx+10}{3^x}$

B) The total cost C for an output D is given by $C = 100 + 50D - 2D^3 + D^4$. Find the rate at which the cost is changing when the output D = 1. **05**

C) The total revenue of selling x items is R = Rs.$(330x - x^2)$ each. Total cost of producing x items is C = Rs. (50 + 4x). Find the profit function. Further find x, for which the profit is maximum and also the maximum profit. **05**

D) The demand function is given by $p = 4 + 3D - 5D^2$, where p is price and D is demand. Find the total revenue, average revenue and marginal revenue when the demand is 2. **05**

E) If the demand function is $D = 15 - 4p + p^2$ where D = demand and p = price, find the elasticity of demand at p = 1. **05**

Q.2 Attempt **any four** of the following

A) A principal amounts to Rs.11800 after 4 years & to Rs.14040 after 7 years. Find the sum & the rate of simple interest. **05**

B) At what compound interest rate will Rs.33000 amount to Rs.48315.50 in 4 years? **05**

C) Find the number of years for which an annuity of Rs.10000 is paid at the end of each year, if its accumulated amount works out to be Rs.53680 with interest compounded at 20% p.a. **05**

D) How much money should a person invest at present at 8% p.a. compounded half yearly so that he would get an annuity of Rs.10000 at the end of every 6 months for the next 2 years ? **05**

E) A loan of Rs.100000 is to be repaid in 4 equal monthly installments starting from the end of the first month. The rate of interest is 6% p.a. compounded monthly. Find the amount of each installment. **05**

Q.3 Attempt **any four** of the following

A) Distinguish between correlation and regression. Explain the relation between the correlation coefficient and the regression coefficients. **05**

B) From the following data calculate the coefficient of correlation- **05**

No. of pairs of observations = 12
Sum of X values = 35
Sum of Y values = 60
Sum of squares of X values = 148
Sum of squares of Y values = 450
Sum of products of X and Y = 105

C) Calculate Spearman's rank correlation coefficient for the following data representing marks in two tests for a group of seven students- **05**

Marks in Test I	52	34	51	65	43	34	54
Marks in Test II	65	59	65	68	82	60	67

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D) From the following data, obtain the yield when the rainfall is 30 inches. The correlation coefficient between rainfall and yield is 0.8

	Rainfall (inches)	Yield (per acre)
Mean	27	40
Standard Deviation	3	6

E) Given the regression equation of y on x as $3x - 2y - 6 = 0$ and that of x on y as $8x - 3y - 44 = 0$, find **05**
(i) Coefficient of correlation between x and y, (ii) Mean values of x and y.

Q.4 Attempt **any four** of the following

A) What are seasonal variations? Explain briefly with example. **05**

B) Find 3 yearly moving averages for the following time series giving Exports of a company. **05**
Also plot the original time series and the moving averages on a graph paper.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Exports	46	53	62	57	62	78	60	85	88

C) Use the method of least squares to find straight line trend for the following time series of production in thousand units during 1995 – 2002. Also estimate production for the year 2003. **05**

Year	1995	1996	1997	1998	1999	2000	2001	2002
Production	80	90	92	83	94	99	92	102

D) From the following data calculate Laspeyre's, Paasche's and Fisher's index number. **05**

Commodity	2015		2018	
	Price	Quantity	Price	Quantity
Rice	40	20	48	30
Pulses	70	15	82	20
Sugar	35	4	39	6
Oil	62	5	70	8

E) Calculate the cost of living index number for the following data. **05**

Group	Weights W	Index Number I
Food	48	160
Fuel and lighting	7	120
Clothing	10	140
House Rent	10	100
Miscellaneous	15	80

Q.5 Attempt **any four** of the following

A) State the properties of Normal distribution. **05**

B) An unbiased dice is rolled 5 times. The number on the uppermost face is noted. Find the probability of getting 6 on the uppermost face (i) exactly 4 times, **05**
(ii) at least 4 times

C) If mean and variance of a Binomial distribution are 4 and 2 respectively, find the probability that number of successes is at least 7. **05**

D) It is observed that 1% of mangoes in a box are bad. Find the probability that in a box of 100 mangoes, the number of bad mangoes is (i) nil, (ii) less than 2. ($e^{-1} = 0.3679$) **05**

E) If the heights of 1000 soldiers in a regiment are distributed normally with a mean of 170 cms and a standard deviation 5 cms, how many soldiers have heights greater than 180 cms? (The area under the standard normal curve between $z = 0$ and $z = 2$ is 0.4773) **05**

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