Time: 3 hrs.   **Marks: 100**

maths
fYB com II
15 April 23
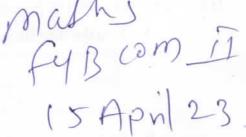
Note:
1. All questions are compulsory.
2. Figures to the right indicate full mark.
3. Graph papers will be provided on request.
4. Use of simple non-programmable calculator is allowed

SECTION I

Q.1   Attempt any FOUR from the following: **20**

A. Find the total revenue function and total profit function. Total cost function is $C=25+10x-x^2$ and the demand function is $p=50-x^2$. Find the profit at $x=5$

B. The supply function is $S=p^2-5p+2$, where p is in Rs. Thousands and S is in tons.
Find: i. the supply when price is 5   ii. The price when supply is 10

C. Write a short note of Equilibrium Point.

D. Write a short note on Demand and Supply function.

E. Find the total revenue function, if the price of the commodity is given by $p=300+x+x^2$, where x is the quantity demanded.

Q.2   Attempt any FOUR from the following: **20**

A. Find the derivatives of the following:
   i. $Y=2x^3+5x^2$

   ii. $Y=x^5+x^4-2x^3+5x^2+9$

   iii. $Y = \dfrac{2x^3+5x^2+3x+4}{x}$

   iv. $Y= x^{15} - 15^x + \log x$

   v. $Y= 5x^2 - 4x^2 - \dfrac{1}{x} + 8$

B. Find the derivatives of the following:
   i. $Y= 8^{x2} \cdot \log x$

   ii. $Y= 13^x \cdot e^x$

   iii. $Y= x \cdot \log x$

   iv. $Y= \dfrac{e^x}{5x^3+3}$

   v. $Y= \dfrac{x^3-1}{\log x}$

C. Find the double derivatives of the following functions:
   i. $Y=4x^4 - 7x^3 + 3x^2 - 2$

   ii. $Y= 2x^{10} - e^x$

   iii. $Y= e^x + x^{-3}$

   iv. $Y= 10x^5 + 8x^3 - 5x^2 + 8$

   v. $Y= e^x + \dfrac{1}{x^2} - 3x$

D. If Rs.2000 amounts to Rs.2700 at simple interest in 5 years, find the rate of interest. Also find, if Rs.6000 is kept at the same rate of interest, what amount will be received after 8 years?

E. Find the amount received when a sum of Rs.12000 is invested at 15% p.a. for 2 years, if the interest is compounded i. half yearly   ii. quarterly

SECTION-II

Q.3 Attempt any **FOUR** from the following: 20

A. Find the correlation coefficient for the following data:

X	4	7	8	3	4
Y	5	8	6	3	5

B. Find rank correlation coefficient for the following data:

A	30	80	70	60	50	90
B	70	61	87	45	40	57

C. Calculate the rank correlation coefficient for the data below:

Grade1	A+	B	C+	A	C
Grade2	A	B+	C	A+	C+

D. Find the regression equation of Y on X and X on Y.

X	10	8	15	5
Y	6	7	12	2

E. Find regression equation of X on Y. Also find the value of X when Y=7.

X	5	7	8	9	11
Y	4	6	5	2	3

Q.4 Attempt any **FOUR** from the following: 20

A. Calculate the Five yearly moving averages of policy holders of LIC branch given below.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
No. of Students	330	315	352	390	400	405	400	427	428	438

B. Find the seasonal indices for the data below:

Year	I	II	III	IV
2001	90	75	87	70
2002	75	80	78	75
2003	80	75	75	72
2004	85	82	80	81

C. Following table gives the prices of certain commodities in the year 2000 and 2007 taking 2000 as the base year, find the index number using

i. Simple Aggregative Method

ii. Simple Average of Relatives Method

Commodities	A	B	C	D	E
Prices in 2000	50	165	25	60	45
Prices in 2007	150	55	100	40	90

(2)

D. Fit a linear trend by the least square method to the following data.

Year	2000	2001	2002	2003	2004	2005	2006
Rs.(Cr)	54	79	78	65	69	94	100

E. Find the Laspeyre's , Paasches, Fisher's Index Numbers for each of the following.

Commodity	Base Year		Current Year	
	Price p_0	Quantity q_0	Price p_1	Quantity q_1
A	30	3	40	3
B	15	2	20	4
C	10	6	30	3
D	6	5	12	10

Q.5 Attempt any **FOUR** from the following: 20

    A. Write a short note on Corelation coefficient.

    B. Explain the least square Method in Time series.

    C. Write the condition of Poisson distribution.

    D. Write a short note on Normal Distribution.

    E. Write a short Note on Scatter Diagram.

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