TOTAL MARKS:- 75   **DURATION:- 2½ HOURS**

INSTRUCTIONS:- 1) All the questions are compulsory.
2) Answer both the sections on the same answer-book.
3) Use of simple nonprogrammable calculator is allowed.
4) Graph papers will be provided on request.

SECTION-I

Q1   Attempt any 3 from the following

A. A manufacturer makes toys and the weekly total cost is given by   (5)
   C = 1200+40x

   (i)   If each toy is sold at Rs 60, find no. of units to be produced and
           sold for no loss.
   (ii)   If selling price increases by 10%, find the no. of units to be
           produced and sold to ensure no loss.

B. Find the derivatives of the following   (5)

   (i) $y= \sqrt{x} \cdot e^x$
   (ii) $y= \dfrac{x^2 +2x-1}{2x-1}$

C. The total cost function of producing 'x' items is $C=3x^3-12x^2+90x$. Find the   (5)
   average cost function. Further find 'x' at which the average cost is
   decreasing.

D. Find the value of x at which total revenue $R=2x^3-63x^2+648x+300$ is   (5)
   maximum

Q2.   Attempt any 3 from the following

A. Mr. Nikhil Jhunjhunwala borrowed totally Rs 80000 from two known people.   (5)
   For one loan ,He paid 18% p.a and for the second loan he paid 25% p.a. after
   a year he paid Rs 15800 as a simple interest. How much money did he borrow
   at each rate?

B. Find the maturity amount of a 2 year fixed deposit of Rs 330000 at 6 % p.a. if   (5)
   the interest is compounded (i) Annually (ii) semiannually.

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.?

                                                                        (5)

D. Rehan takes a loan of Rs 30000 to be repaid in one year at 12% p.a. reducing   (5)
   balance interest rate. Find the EMI.

SECTION-II

Q3.   **Attempt any 3 from the following**

A. Find Karl Pearson's coefficient of correlation between X and Y   (5)

X	7	8	15	22	11	30	15	9
Y	12	15	13	24	12	32	17	10

B. Find Spearman's rank correlation coefficient between X and Y   (5)

X	60	75	85	35	42	58	60
Y	37	45	50	29	35	50	45

C. From the data on amount of rainfall (in cms) and production of rice (in   (5)
    quintals) find the two regression equation also find the most likely
    production if rainfall is 50

	Rain fall (in cm)	Production of rice (in quintals)
Mean	35	50
S.D	5	8

Correlation between rainfall and production is 0.8

D. Given the regression equation 2x+3y-5=0 , x+y-2=0. Find the means of x and   (5)
    y and the coefficient of correlation.

Q4.   **Attempt any 3 from the following**

A. Find 3 yearly moving averages and draw these on a graph paper. Also   (5)
    represent the original time series on the graph

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production (in 000')	12	15	20	18	25	32	30	40	44

B. Fit straight line trend by the method of least squares for the following data
    representing production in thousand units. Also estimate the trend for the   (5)
    year 2008.

Year	1999	2000	2001	2002	2003	2004	2005
Production (in 000')	14	15	17	16	17	20	23

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C. Construct cost of living index number with the help of the data given below   (5)

Item	Weights	Index Number
Food	24	160
Fuel and lighting	06	120
clothing	04	125
Rent	7	120
Miscellaneous	09	130

D. From the following data calculate Laspeyre's , paasche's and Fisher index   (5)
number

commodity	Base year		Current year	
	price	quantity	price	quantity
A	12	25	15	28
B	10	20	15	25
C	04	15	06	12
D	06	20	09	15

Q5. Attempt any 3 from the following

A. In a shooting competition , the probability of a man hitting a target is 2/5 if   (5)
he fires 3 times, find probability of hitting a target (i) at least two times (ii)
exactly one time.

B. A person receives on an average one missed call per day. Find probability   (5)
that he will receive (i) no missed call (ii) At least two missed calls during a
particular day. (e^{-1}=0.3679)

C. If X is normal variate with mean 40 and standard deviation 8 , find   (5)
(i)P (X ≥42) (ii) P (X ≥38) (area under the curve between Z = 0 and
Z = 0.25 is 0.0987)

D. In a certain examination mean of marks scored by 400 students is 45 with a   (5)
standard deviation of 15. Assuming the distribution to be normal find the no
of students securing marks between 30 and 60 (Area under the curve Z=0 and
Z=1 is 0.3413)

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