MN3AAC

TOTAL MARKS:- 60 **DURATION:- 2 HOURS**

INSTRUCTIONS:-

1) All the questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of simple non-programmable calculator is allowed.

SECTION - I

Q.1) Attempt **ANY 2** questions from the following.

A) The daily cost of production C for x units of a product is given by C= 3.5x + 12000. **(6)**

(i) If each unit is sold for Rs.6, determine the minimum number of units that should be produced & sold to ensure no loss.

(ii) If 6000 units are sold daily, what price per unit should be charged to guarantee no loss

B) Find the derivatives of the following functions. **(6)**

1) $y = 5^x(\sqrt{x} - 5)$

2) $y = \dfrac{x^2 + 5x - 2}{2 - 5x}$

3) $y = e^x x^e + ex - e^e$

C) The average cost of a commodity is given by $AC = x + 4 + \dfrac{4}{x}$, where x is output. **(6)**

Find the total cost function, the marginal cost function & also the output x at which the average cost is equal to the marginal cost.

Q.2) Attempt **ANY 2** questions from the following.

A) The difference between the simple interest & compound interest on a certain sum for 2 years at 8% p.a. is Rs.384. Find the sum. **(6)**

B) A sum of Rs. 50000 is invested in a scheme which gives 8% p.a. compound interest. Find the interest in the 4^{th} year. **(6)**

C) Find the accumulated value of an annuity of Rs.5000 paid at the end of each 6 months for 2 years at 12%p.a. compounded semi-annually. **(6)**

SECTION - II

Q.3) Attempt **ANY 2** questions from the following.

A) Calculate Spearman's rank correlation coefficient for the following data. **(6)**

x	67	65	58	59	63	65	72	65
y	55	61	62	60	58	61	53	60

B) Estimate the marks in Statistics of a student who secured 65 marks in Mathematics from the following bivariate data : **(6)**

P.T.O.

	Mathematics	Statistics
Mean marks	70	80
Standard deviation	8	10
Correlation coefficient	0.8	

C) Given the two regression equations $3x - 2y = 6$ & $8x - 3y = 44$. Find the mean values of x & y & the correlation coefficient (r). **(6)**

Q.4) Attempt **ANY 2** questions from the following.

A) Calculate 4 yearly moving averages from the following time series. **(6)**

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sales	64	65	62	67	68	70	77	80	85

B) Fit a straight line trend by the method of least squares & estimate the trend 2013. **(6)**

Year	2005	2006	2007	2008	2009	2010	2011
Yield(tons)	70	74	78	80	82	86	90

C) Calculate Laspeyre's, Paasche's, Dorbish Bowley's & Fisher's index number from the following data. **(6)**

Commodity	2008		2011	
	Price	Quantity	Price	Quantity
A	45	20	48	20
B	60	21	65	22
C	25	4	30	8
D	12	12	15	14

Q.5) Attempt **ANY 2** questions from the following.

A) On an average Aakash can solve 40% of the given problems. Find the probability that, out of 6 problems, he can solve (i) exactly 4 problems, (ii) none of the problems. **(6)**

B) The probability that a drunk driver meets with an accident is 0.008. Among 1000 drunk drivers on the road, find the probability that, (i) exactly 2 will meet with an accident, (ii) at most 2 will meet with an accident. **(6)**
(Given $e^{-8} = 0.00034$).

C) The income of a group of 1000 persons was found to be normally distributed with mean Rs8000 & standard deviation Rs.500. Find the number of persons having income (i) between Rs.7500 & Rs. 8500, (ii) less than Rs.7500. **(6)**
(The area under the standard normal curve between $z = 0$ & $z = 1$ is 0.3413).

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