

F.Y.B.COM. (SEM. II)
SUB : MATHEMATICS AND STATISTICAL TECHNIQUES

(A.T.K.T. Exam)

Date : 08/08/2015

MARKS : 75

Duration : 2½ Hours

- Note:** (1) All questions are compulsory.
(2) All questions carry equal marks.
(3) Figure to the right indicate marks.
(4) Use of simple calculator is allowed.

SECTION - II

Q.1 Solve any THREE of the following :

(a) Differentiate the following functions w.r.t. x :

(i) $3^x - x^2 + \log x$

(ii) $y = \frac{3x^2 - 14x - 7}{5x + 1}$

(b) Differentiate the following :

(i) $y = x^2 e^x$

(ii) $y = \frac{3x + 5}{5x + 3}$

(c) Find the elasticity of demand with respect to price at $p = 2$ if the demand function given by $D = 100 - 2p - 3p^2$.

(d) If the total cost (C) and total revenue (R) for a company are given by $C = 20 + 4x$, $R = 30x - x^2$, where x is the output, find the output at which the profit is maximum. What is the maximum profit?

Q.2 Attempt any THREE of the following :

(a) On what sum of money will the difference between the compound interest and simple interest for 2 years at 8% p.a. be Rs.384?

(b) For how many years must Rs.2,50,00,000 be invested at 10% p.a. to get Rs.2,89,40,625 if the interest is compounded half-yearly?

(c) What sum should be set aside at the end of each year at 8% p.a. compound interest for 4 years to replace Machinery which is expected to cost 20% more at that time than its present cost of Rs.1,00,000? The scrap value of the Machinery will realize Rs.10,000 at the end of 4 years.

- (d) A company sets aside Rs.80,000 at the end of every year to create a sinking fund. What will be the amount at the end of every 4 years at 9% p.a.?

SECTION - 2

Q.3 Attempt any THREE from the following :

- (a) Find Pearson's coefficient of correlation for the following data :

X	3	7	4	2	1	4	1	2
Y	11	16	9	4	7	6	3	8

- (b) Calculate the coefficient of rank correlation for the following data:

X	64	72	70	85	64	90	60	85	89	54
Y	47	43	29	47	25	52	46	50	51	20

- (c) Find the regression equation of y on x , given the following data. Also estimate y , when $x = 10$.

$$n = 12, \sum x = 100, \sum y = 80, \sum x^2 = 1128, \sum xy = 300$$

- (d) The following data are given about the height in cms and weight in kgs of 1000 policemen. Find the regression of weight on height and estimate the weight of a policeman whose height is 180 cms.

	Mean	S.D.
Height	170	15
Weight	68.2	9

Q.4 Attempt any THREE of the following :

- (a) Find the trend values using 3-yearly moving average method :

Year	1999	2000	2001	2002	2003	2004	2005	2006
Production	37	45	52	42	58	63	50	60

- (b) Fit a straight line trend by the method of least square to the following data representing annual sugar production of a sugar factory. Hence, estimate the production for the year 1992.

Year	1985	1986	1987	1988	1989	1990	1991
Production	24	25	23	21	27	26	29

- (c) Find Laspeyre's and Fisher's Price Index Number from the following data :

Commodity	Basic year		Current year	
	Price	Quantity	Price	Quantity
Rice	4	15	5	20
Pulses	8	20	12	30
Sugar	6	25	8	20
Oil	4	10	21	5

- (d) From the following data, calculate the cost of living index number for the year 2004 by the family budget method.

Commodity	Basic year		Current year	
	Price	Quantity	Price	Quantity
Rice	4	15	5	20
Pulses	8	20	12	30
Sugar	6	25	8	20
Oil	4	10	21	5

Q.5 Attempt any THREE from the following :

- (a) It is observed that 10% of the production is defective. If five units are selected from this production, find probability that :
- None of them is defective
 - At least one is defective.
- (b) The number of rickshaws crossing a road per minute is 2. Find the probability that on a specific minute, the number of rickshaws on the road is :
- only 1
 - at least 2
- (Use Poisson Distribution. Given $e^{-2} = 0.1353$)
- (c) A random variable X follow normal distribution with mean 50 and standard deviation 5. Find :
- $P(45 < X < 58)$
 - $P(X < 40)$
- (Area under SNV from
- $Z = 0$ and $Z = 1$ is 0.3413
 - $Z = 0$ and $Z = 1.6$ is 0.4452)
- (d) 1,500 candidates appeared for a certain examination. The mean marks were 58 with a standard deviation of 05 marks. Assuming the distribution of marks to be normal, find :
- the number of students securing more than 63 marks
 - the number of students securing marks between 60 and 68.
- (Given are for S.N.V.
- $Z = 0$ and $Z = 1$ is 0.3413
- $Z = 0$ and $Z = 0.4$ is 0.1554
- $Z = 0$ and $Z = 2$ is 0.4772)



Environmental Studies Sem II

Marks : 75

Time : 2½ hrs.

Note: All questions are compulsory.

Q1. (A) Name and mark the following in the outline map of Mumbai: (7)

- 1) Chembur station
- 2) Elephanta caves
- 3) Powai lake
- 4) Thane Creek.
- 5) Sahar airport
- 6) Essel world
- 7) Haji ali
- 8) Ghatkopar land slide

(B) Name and mark the following in the outline map of Konkan: (8)

- 1) Tarapur Atomic Power Plant.
- 2) Amboli Hill station
- 3) Vajreshwari Hot spring.
- 4) Pen
- 5) Devgad fort
6. Ganpati Phule temple
- 7 Mathesau
- 8 Jawhar
- 9 Karnala fort.

Q2 Discuss the advantages and disadvantages of railway transport. (15)

or

Explain the role of transport in today's modern world. (15)

