



RR-0333

**First Year B. Com. (Honours) Examination**  
**March / April – 2010**  
**Mathematics & Statistics**

Time : 3 Hours]

[Total Marks : 70

**Instructions :**

(1)

नीचे दर्शाविए निशानीवाणी विगतो उत्तरवही पर अवश्य कभवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="F.Y. B.COM. (HONOURS)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="MATHEMATICS &amp; STATISTICS"/>	<input type="text"/>
Subject Code No. : <input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="3"/> <input type="text" value="3"/>	Section No. (1, 2,.....) : <input type="text" value="NIL"/>
Student's Signature	

- (2) Answer **all** the questions.  
(3) Figures to the **right** indicate full marks of the question.  
(4) Graph papers and statistical tables would be supplied on request.

1 (a) Evaluate : 6

(1)  $\lim_{x \rightarrow \frac{1}{2}} \frac{2x^2 + 3x + 1}{2x^2 - x - 1}$

(2)  $\lim_{x \rightarrow 5} \frac{x^3 - 125}{x^2 - 25}$

(b) The total cost function to produce  $x$  units of a commodity is given by  $100 + 0.015x^2$  and the total revenue function is  $3x$ , then how many units should be produced to get maximum profit ? Also find the maximum profit. 4

2 (a) Evaluate : 6

(1)  $\int \left[ \sqrt{x} + \frac{1}{\sqrt{x}} \right]^2 dx$

(2)  $\int_1^2 (3x - 4)(2 - 5x) dx$

- (b) Obtain the compound interest and effective rate of interest if an amount of Rs. 20000 is deposited in a bank for one year, at the rate of 8% per annum, compounded semi annually. 4
- 3 (a) Explain the following terms : 4  
conversion period, sinking fund.
- (b) (1) In what time the amount Rs. 85,000 would be Rs. 157675 at 4.5% p.a. ? 3
- (2) Vihangi invests Rs. 10000 every year starting from today for next 10 years. The interest rate is 8% p.a., compounded annually. Calculate future value of the annuity. 3
- 4 (a) Define optimum solution and give the mathematical formulation of linear programming problem. 4
- (b) Solve the following linear programming problem by simplex method : 6  
maximize  $Z = 3x_1 + 4x_2$   
subject to  $2x_1 + 3x_2 \leq 16$ ,  
 $2x_1 + x_2 \leq 8$
- 5 (a) Solve the given LPP by graphical method : 5  
minimize  $Z = 10x + 5y$   
subject to  $3x + 5y \leq 150$ ,  $5x + 4y \geq 100$ ,  
 $0 \leq x \leq 30$ ,  
 $0 \leq y \leq 15$ ,  
 $x, y \geq 0$
- (b) Obtain total transportation cost by Vogel's approximation method for the following transportation problem : 5

Origin	$D_1$	$D_2$	$D_3$	$D_4$	Supply
$O_1$	5	3	6	2	19
$O_2$	4	7	9	1	37
$O_3$	3	4	7	5	34
Demand	16	18	31	25	90

6 (a) Define the following terms with illustration : 4  
Unit matrix, Transpose of a matrix.

(b) Solve the following equations using inverse of a 6  
matrix :

$$3 - 2y + 3z = 4$$

$$2x + y - 3z = 5$$

$$-x + y + 2z = 3$$

7 (a) If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$  then prove that 5

$$A^3 - 3A^2 - A + 9I = 0$$

(b) Obtain IBFS and TTC Min [Min – Max] method : 5

Origin	$D_1$	$D_2$	$D_3$	$D_4$	Supply
$O_1$	23	27	16	18	30
$O_2$	12	17	20	51	40
$O_3$	22	28	12	32	53
Demand	22	35	25	41	123