



RAN - 1808060501020001

**RAN-1808060501020001****First Year B.Com (Honours) Sem-I Examination****March / April - 2019****Mathematics and Statistics Paper-I****સૂચના : / Instructions**

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.

Fill up strictly the details of signs on your answer book

Name of the Examination:

First Year B.Com (Honours) Sem-I

Name of the Subject :

Mathematics and Statistics Paper-I

Subject Code No.: 1808060501020001

Seat No.:

--	--	--	--	--	--

Student's Signature

**Instruction:**

- (1) All the questions are compulsory.
- (2) Figures to the right indicate full marks of the questions.
- (3) Simple calculator can be used.

**1. a) Evaluate:****6**

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

ii)  $\lim_{x \rightarrow 0} \frac{\sqrt{2+3x} - \sqrt{2-5x}}{4x}$

b) If  $y = x^3 \log \frac{1}{x}$ , prove that  $\frac{x dy}{dx} + x^3 = 3y$ **3**c) The total cost function to produce x units of commodity is  $900 + 0.030x^2$  and total revenue function is  $12x$ . Then how many units should be produced to get maximum profit? Also obtain maximum profit.**4****2. a) Evaluate:****9**

i)  $\int \frac{e^{3x} + e^{-3x}}{e^x} dx$

ii)  $\int \frac{x^3 - 2x^2 + 5x + 2}{x\sqrt{x}} dx$

iii)  $\int_2^3 \left( \frac{x+1}{x} \right) dx$

**RAN-1808060501020001 ]****[ 1 ]****[ P.T.O. ]****P0173**

- b) Explain Definite Integration 3
3. a) Define inverse of a matrix and give the condition for the existence of the inverse. 3
- b) If  $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$  then find  $AB$  and  $BB^T$  4
- c) A person buys 2 pineapples, 3 mangoes and 4 apples in Rs. 43. Another person buys 1 Pineapple, 4 mangoes and 2 apples in Rs. 34, and a third person buys 5 pineapples, 2 mangoes and 3 apples in Rs. 66. Find the price of each fruit using inverse of a matrix. 6
4. a) Let 3
- $$A = \begin{bmatrix} a & -1 & x \\ y & b & 2 \\ 3 & z & c \end{bmatrix}$$
- i) If  $A$  is symmetric matrix, find  $x, y, z$
- ii) If  $A$  is Skew - symmetric matrix, find  $a, b, c, x, y, z$
- b) Prove that 6
- $$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$
- satisfies the equation
- $A^3 - 6A^2 + 9A - 4I = O$
- , where,
- $O$
- is null matrix.
- c) If  $A = \begin{bmatrix} 2 & 5 & 7 \\ 1 & 2 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 2 & 1 \\ 4 & 7 & 9 \\ 5 & 2 & 4 \end{bmatrix}$  then find  $AB$  3
-