PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCom DEGREE EXAMINATION DECEMBER 2019
(First Semester)

Branch - BCom (BUSINESS ANALYTICS)

MATHEMATICAL TECHNIQUES FOR BUSINESS ANALYTICS

Time: Three Hours Maximum: 75 Marks

SECTION-A HO Marksl
Answer ALL questions
ALL questions carry EQUAL marks (10x1 = 10)

1 The order of $\begin{vmatrix} 2 & 3\,l^{1} \\ 3 & 2\ 1 \end{vmatrix}$ is
(i) 2x2 (ii) 2x3 (iii) 3x2 (iv) 3 x 1

2 A is a square matrix, then A'! exists if
(i) |A|=0 (ii) jA|*0 (iii) |A|=adj A (iv) |A|=A-'

3 A set is a collection of
(i) Numbers (ii) Elements (iii) Objectives (iv) Real numbers

4 If A and B are disjoint sets then A n B =
(i) ♦ (ii) A (iii) B (iv) $A^{1}$

5 If A(-3,3), B(5,9) then AB
(i) 9 , (H) 10 (iii)2 VlO (iv) 20

6 The slope of 5x+2y=l 1 is
(i) 5 (ii) -5 (iu)-f (iv) 11

7 The Simple Interest formula is
(i) pn (ii) pnr (iv) Anr

8 The sum of AP is
(i) n(a+l) (ii) 2n(a+l) (iii) **f ( a** + l) (iv) **i ( a + l )**

9 If y=f(x) increase as x increases at (x, y) then dy/dx _____ at (x, y)
(i) =0 (ii) >0 (iii) <0 (iv) **=-oo**

10 If y = $2x^2+3x$ then dy/dx =
(i) $6x^2$ (ii) 4x+3 (iii) $2x^2$ **(iv) 3(2x²-1)**

SECTION - B (25 Marks!
Answer ALL questions
ALL questions carry EQUAL Marks (5x5 = 25)

11 a Compute the inverse of $\begin{vmatrix} 1 & 0 & 2 \\ 3 & 1 & 1 \\ 2 & 1 & 2 \end{vmatrix}$ using elementary Row (column) operations.

OR

**b** If **A** = $\begin{vmatrix} '2 & 1 & O \\ 3 & 2 & 0 \\ 1 & 0 & 1 \end{vmatrix}'$ & B = $\begin{vmatrix} ''1 & 1 & 1 & O \\ 2 & & 1\,1\,0 \\ 2 & 3 & 1\,2 \end{vmatrix}'$ find AB?

12 a Using Venn diagram prove that $(AuB)^{1} = A^{1}$ n B!.

OR

b Find AuB if
i) A = {2,4,5}, B= {4,7,12,13,0}
ii) A= {a,b,c},B = {x,y,z}
iii) A = {5,6,7,8},B= {6,7}

13 a Find the equation of the line which passes through the pair of points given below:
(i) (2,4) and (3,4) (ii) (-3,1) and (2-1)

OR

b Find the point of intersection of the following lines:
i) x+3y-5=0, x-2y+5= 0. ii) 3x+4y-13=0, 2x-7y+l=0.

14 a Two refrigerators cost Rs.8000 each. The first one is sold at a profit of 15% and 3% is the profit when both the refrigerators are sold. Determine the percentage of loss incurred in selling the second refrigerators.

OR

b A discount of 10% on cash sales and 3% on credit sales is given by a dealer who had listed his articles 25% higher than the actual cost. If 3/5 of his stock where sold on cash sales, find the percentage of his gross profit?

15 a Determine whether the following curve rise (or) fall at the given points:
$y=2x^2-6x+2$ at x=2 and x=l.

OR

b A box with square top and bottom is to be made to contain 250 cubic cms. Material for top and bottom costs Rs.2 per square cm. and the material or the side costs Re. 1 per square cm. What is the cost of the least expensive box that can be made?

## SECTION -C (40 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5x8 = 40)

16 a Find the inverse of $\begin{matrix} 3 & 1 & 3' \\ 3 & 3 & 1 \\ 2 & 0 & 3 \end{matrix}$ by adjoint matrix method.

OR

b Using Crammer's rule solve: x+2y-z=2; 3x-4y+2z=l and -x+3y-z=4.

17 a In a survey concerning the smoking habits of consumers it was found that, 55% smoke cigarette A, 50% smoke B, 42% smoke C, 28% smoke A and B, 20% smoke A and C, 12% smoke B and C and 10% smoke all the three cigarettes.
(i) What **%** do not smoke? (ii) What % smoke exactly two brands of cigarettes?

OR

b If f(x)=5x+7 find f(a), f(-a), f(x+h) and [f(x+h)-f(x)j ^.

18 a A line passes through (-3,10) and sum of its intercepts on axes is 8. Find the equation.

OR

b A company estimates that when its sales is Rs.60,000 its variable expense will be Rs.30,000 for a fixed expense of Rs. 10,000. Find the break-even point. What is the profit when the sales is Rs.50,000.

19 a An item is purchased for Rs. 10,000.
(i) If the depreciation if 9% per annum find the value of the machine after 10 years.
(ii) If the depreciation is 6% per annum for the first 4 years and 9% per annum for the next 6 years what is the value of the machine?

OR

b (i) Define Sinking Fund.
(ii) A firm has purchased an item on a fixed payment plan of Rs.20,000 per year for 8 years. Payments are to be made at the beginning of each year. What is the present value of the total cash flow of payments for an interest rate of 20% per year?

20 a A rectangular field is y metres long, x metres wide, what is the minimum amount of fence which will enclose 10,000 square metres.