

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)

**BCom DEGREE EXAMINATION DECEMBER 2019**  
(First Semester)

Branch – **COMMERCE (BUSINESS ANALYTICS)**

**MATHEMATICS**

Time : Three Hours

Maximum : 75 Marks

**SECTION-A (20 Marks)**

Answer **ALL** questions

**ALL** questions carry **EQUAL** marks (10 x 2 = 20)

- 1 If Rs.4,000 earns an interest of Rs.2,500 in 50 months, find the rate of interest?
- 2 Write the formula of present value of an immediate annuity.
- 3 Define arithmetic progression.
- 4 The fourth and seventh terms of an A.P are 3 and 36. Find its fifteenth term.
- 5 Define column matrix with example.
- 6 If  $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{pmatrix}$ ,  $B = \begin{pmatrix} -1 & 0 & 5 \\ -1 & -2 & -4 \\ 1 & 2 & 3 \end{pmatrix}$ . Find A+B.
- 7 Define elasticity of demand.
- 8 Find the derivative of  $x^4 - 4x^3 + 3x^2 + e^x$ .
- 9 Write the formula for Producer's surplus.
- 10 Evaluate:  $\int_0^2 (x^3 - 4x^2 + 5) dx$ .

**SECTION - B (25 Marks)**

Answer **ALL** Questions

**ALL** Questions Carry **EQUAL** Marks (5 x 5 = 25)

- 11 a Find the simple interest and compound interest on Rs.20,000 for 5 years at 20%p.a.  
OR  
b Find the effective rate of interest equivalent to a nominal rate of 12% p.a., compounded monthly and compounded continuously.
- 12 a Find the sum of all natural numbers between 100 and 1000 which are divisible by 13.  
OR  
b Find the sum of the series  $0.7 + 0.07 + 0.007 + \dots \infty$ .
- 13 a Find the inverse of  $\begin{pmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{pmatrix}$ .  
OR  
b From the following inter industry transaction demand table, find  
(i) the value added by each industry  
(ii) the matrix of technical coefficients

Producer	User			Total Output
	A	B	C	
A	8	10	10	32
B	8	20	6	49
C	6	10	8	28

14 a Find  $\frac{dy}{dx}$  if (i)  $y = \frac{8x^2}{4x-1}$  (ii)  $y = \sqrt{7x} + 8^m$   
OR

b Find  $\frac{dy}{dx}$  when  $x=4t$ ,  $y=2t^2$ .

15 a Evaluate:  $\int \frac{dx}{(x-1)(x^2-5x+6)}$   
OR

b Evaluate:  $\int xe^{mx} dx$ .

**SECTION - C (30 Marks)**

Answer any **THREE** Questions

**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Mr. Guru acquired a plant delivered on Jan 1, 2019 on the following terms:  
(i) initial payment of Rs.40,000 immediately and  
(ii) 4 half-yearly installments of Rs.30,000 each commencing June 30, 2019.

Interest is 10% with yearly rests. What is the cash price?

- 17 If  $a^p=b^q=c^r$  and  $a, b, c$  are in G.P, prove that  $\frac{1}{p}, \frac{1}{q}, \frac{1}{r}$  are in A.P.

- 18 Show that  $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$  satisfies the equation  $A^2 - 4A - 5I = 0$ , and hence find  $A^{-1}$ .

- 19 If  $y=a^2x+bx$ , show that  $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} + 2y = 0$ .

- 20 Find:  $\int (\log x)^3 dx$ .

Z-Z-Z

END