18CSU03B/14CSU01B

PSG COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS)

BCom (CS) DEGREE EXAMINATION DECEMBER 2019

(First Semester)

Branch – **CORPORATE SECRETARYSHIP**

MATHEMATICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 The simple interest on Rs.5000 at 10% for 3 years is ____.
(i) Rs.500 (ii) Rs.1000 (iii) Rs.1500 (iv) Rs.6500

2 The compound interest on Rs.20,000 at 20% for 5 years is ____.
(i) Rs.29766.40 (ii) Rs.29700.40 (iii) Rs.29566.40 (iv) Rs.26500.40

3 If A is a singular matrix, |A|=___.
(i) 0 (ii) 1 (iii) ∞ (iv) -1

4 If $A=\begin{pmatrix}1 & 2\\ 3 & 4\end{pmatrix}$, 2A=____.

(i) $\begin{pmatrix}2 & 4\\ 3 & 4\end{pmatrix}$ (ii) $\begin{pmatrix}2 & 2\\ 6 & 4\end{pmatrix}$ (iii) $\begin{pmatrix}2 & 4\\ 6 & 8\end{pmatrix}$ (iv) $\begin{pmatrix}7 & 10\\ 15 & 22\end{pmatrix}$

5 The differential coefficient of e^{2x-3} is ____.
(i) e^x (ii) e^{2x-3} (iii) $2e^{2x-3}$ (iv) 3x

6 Find $\frac{d}{dx}\left(\frac{1}{x}\right)$ = ____.

(i) log x (ii) 0 (iii) $-\frac{1}{x^2}$ (iv) $\frac{1}{x^2}$

7 The value of $\int_0^1 (x-1)dx$ = ___.

(i) $\frac{1}{2}$ (ii) $-\frac{1}{3}$ (iii) $-\frac{1}{2}$ (iv) $\frac{1}{3}$

8 $\int x^{1/2}dx$ = ____.

(i) $\frac{1}{\sqrt{x}}$ (ii) $\frac{x^{5/2}}{5/2}$ (iii) $\frac{x^{3/2}}{3/2}$ (iv) $\frac{x^{3/2}}{3}$

9 Linear programming is ____.
(i) a constraint optimization model (ii) a constraint decision making model
(iii)a mathematical programming model (iv) all of the above

10 The non-negative variable which are added to the left hand side of the constraints in '≤' form to make them into '=' form are ____ variable.
(i) slack (ii) surplus (iii) artificial (iv) non-negative

SECTION - B (25 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 5 = 25)

11 a The true discount on a bill due after 6 months at 9% p.a is Rs.270. Find its face value.

OR

11 Cont...

b In a company machine costs Rs.80,000 and its life is esteemed to be 20 years. Sinking fund is created for replacing the machine at the end of its life time when its scrap realizes a sum of Rs.5,000 only. Calculate the amount which should be provided every year for the sinking fund if it accumulates at 9% p.a. compounded annually.

12 a Examine whether AB=B and BA=A given $A=\begin{bmatrix}4 & -2\\ 3 & -1\end{bmatrix}$ and $B=\begin{bmatrix}2 & 4\\ 3 & 6\end{bmatrix}$.

OR

b Use determinants and solve:

$\frac{1}{a}+\frac{2}{b}=4;$

$\frac{3}{a}-\frac{1}{b}=5.$

13 a Find the derivative of the following (i) $y=(x^2+5)(3x+1)$ (ii) $y=\frac{3x^2}{4x-1}$.

OR

b Find the derivative of the following (i) $(2x-7)^4$ and find the value when x=5.

14 a Evaluate (i) $\int_0^2 (x^2-4x+5)dx$ (ii) $\int_0^4 (\sqrt{x}+e^x)dx$.

OR

b If the marginal revenue function is $R'(x)=15-9x-3x^2$, find the revenue function and demand function.

15 a ABC animal feed company must produce atleast 200 kg of a mixture consisting of ingredients A and B daily. A costs Rs.3 per kg and B costs Rs.5 per kg. Not more than 80 kg of A can be used and atleast 60 kg of B must be used. Find the L.P.P to find the minimum cost mixture.

OR

b Solve by graphical method:

Minimize $Z=3x_1+2x_2$

Subject to

$x_1-x_2\leq 1$

$x_1+x_2\geq 3$

and $x_1,x_2\geq 0$

SECTION -C (40 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 8 = 40)

16 a The difference between the compound interest and the simple interest for 3 years at 5% p.a. on a certain sum of money was Rs.610. Find the sum.

OR

b A person sells a bill one month before the legally due date at 12% p.a. and invests the amount in a security which just offsets the loss in discounting. Find the rate of interest paid for the investments in the security.

17 a Find the inverse of the matrix $A=\begin{bmatrix}2 & -1 & 1\\ -1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$

OR

b Solve the equations by Cramer's rule.

$2x-y+3z=1;\quad x+y+z=2;\quad x-y+z=4$

a Find for what values of x, the following expression is maximum and minimum respectively $2x^3-21x^2+36x-20$. Find also the maximum and the minimum values.

OR

b (i) If $y=(4x^3-x)(7x^2+6x+3)e^x$, then find $\frac{dy}{dx}$.

(ii) If C(x) rupees is the total cost of manufacturing x toys and $C(x)=500+\frac{50}{x}+\frac{x^2}{10}$, find the average cost and the marginal cost when x=20.

19 a (i) Evaluate $\int e^x x^2 dx$ by integration by parts.

(ii) Integrate $(\log x)^3 dx$.

OR

b Find the consumers' producers' surplus at equilibrium price is the demand function is $D=\frac{25}{4}-\frac{p}{8}$ and supply function is p=5+D.

20 a A manufacture produces two types of models M_1 and M_2. Each M_1 model requires 4 hours of grinding and 32 hours of polishing whereas each M_2 model requires 2 hours of grinding and 5 hours of polishing. The manufacture has 2 grinders and 3 publishers. Each grinder works for 40 hours a week and each polishers works for 60 hours a week. Profit on an M_1 model is Rs.3.00 and on an M_2 model is Rs.400. Whatever is produced in a week is sold in the market. How should the manufacture allocate his production capacity to the two types of models so that he may make the maximum profit in a week? and solve it by Graphical method.

OR

b Use Simplex method to solve

Max $Z=5x_1+3x_2$

Subject to

$x_1+x_2\leq 2$

$5x_1+2x_2\leq 10$

$3x_1+8x_2\leq 12$

and $x_1,x_2\geq 0$

Z-Z-Z END