B. Com
SECOND SEMESTER
BUSINESS MATHEMATICS
BCM – 07/ BCM-202

(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs. **Full Marks: 70**

(PART A : Objective)

Time: 20 min. **Marks: 20**

Choose the correct answer from the following: **1×20=20**

1. If a is the 1st term and d is the common difference in a A.P. series then t_n is equal to

a) $a+nd$ b) $a+(n-1)d$ c) $a+d$ d) $d+(n-1)a$

2. The common difference of 7,12,17,22, ...is:

a) 2 b) 3 c) 4 d) 5

3. Which one of the following series is in G.P.?

a) 9, 27, 81, ... b) 7, 37, 47, ...
c) 6, 4, 8, ... d) 57, 61, 65, ...

4. The sum of the series $a,ar,ar^2,...$ up to ∞ (infinite) is:

a) $\frac{1}{1-r}$ b) $\frac{a}{1-r}$ c) $\frac{a}{1+r}$ d) $\frac{1}{1+r}$

5. The value of $log1$ is:

a) 0 b) 1 c) 2 d) 3

6. The value of $\log a^a$

a) 0 b) 1 c) 2 d) 3

7. The roots of $ax^2+bx+c=0$ are real and unequal if:

a) $b^2=ac$ b) $b^2>4ac$ c) $b^2=4ac$ d) $b^2<4ac$

8. The distance between two points (x_1,y_1) and (x_2,y_2) is

a) $\sqrt{(x_1-y_1)^2+(x_2-y_2)^2}$ b) $\sqrt{(x_1-y_1)+(x_2-y_2)}$
c) $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$ d) $\sqrt{(x_1-x_2)+(y_1-y_2)}$

9. The value of $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ is:

a) $ad-bc$ b) $ab-dc$ c) $ad+bc$ d) $bc-ad$

10. Which one of the following matrix is a column matrix?

a) $\begin{pmatrix}1\\2\\3\end{pmatrix}$ b) $\begin{pmatrix}1 & 0\\0 & 2\end{pmatrix}$ c) $(1\ \ 3\ \ 4)$ d) $\begin{pmatrix}0 & 0\\2 & 0\end{pmatrix}$

11. The value of $\lim_{x\to 1}(x^2+1)$ is

a) 4 b) 5 c) 2 d) 3

12. $\frac{d}{dx}\log x$ is equal to:

a) $2x$ b) $\frac{1}{x}$ c) x^2 d) x

13. If P is the principal, r is the rate of interest, then the compound interest in n years is:

a) $\frac{\Pr n}{100}$ b) $\frac{100}{\Pr n}$ c) $P(1+\frac{r}{100})^n$ d) $P(1+\frac{r}{100})$

14. The size of the matrix $\begin{pmatrix}a & d & c\\1 & b & 3\end{pmatrix}$

a) 2x3 b) 3x2 c) 2x1 d) none of these

15. Which among the following have become classical illustrations in linear programming?

a) Diet problem b) Cost problem
c) Budget problem d) None of these

16. The method used to solve L.P.P. when there are more than two variables is:

a) Graphical method b) Simplex method
c) Matrix method d) None of these

17. If the primal involves maximization, the dual involves:

a) maximisation b) minimization
c) no objective function d) none of these

18. Dual of the dual of a primal is:

a) dual b) absurd
c) primal d) none of these

19. Any feasible solution which optimizes the objective function of a general L.P.P. is:

a) feasible solution b) non-feasible solution
c) solution d) optimum solution

20. Any solution set represented by a point of the feasible region is called the:

a) objective solution b) feasible solution
c) continuous solution d) none of these

*****

(PART B : Descriptive)

Time: 2 hrs. 40 min. **Marks: 50**

(Answer question no. 1 & any four (4) from the rest)

1. Find A^{-1} where, $A=\begin{pmatrix}1 & -3 & 2\\2 & 0 & 0\\1 & 4 & 1\end{pmatrix}$ (10)

2. The sum of three numbers in A.P. is 15 and their product is 80, find the numbers. Also find the three numbers in G.P. whose sum is 26 and product is 216. (5+5=10)

3. Find the area of the triangle whose vertices are (-2, 3), (6, 2), (4, 7). Also find the equation of the line which passes through the points (3, 4) and (9, 12). (6+4=10)

4. Find the amount of an annuity consisting of payments of Rs. 800 at the end of every 3 months for 3 years at the rate of 8% compounded quarterly. (10)

5. Solve by using Cramer's rule: (10)
$x+y-z=3,\ 2x+3y+z=2,\ 8y+3z=1.$

6. a) If a, b, c are the pth, qth and rth term of an A.P. then show $a(q-r)+b(rp)+c(p-q)=0$. (5)

b) Find the equation of straight line passing through the origin and making with the x-axis an angle of (i) 45° (ii) 60° (5)

7. a) If a^2, b^2, c^2 are in A.P. then show that $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P. (5)

b) The length of a line segment whose end points are (2, -3) and (10, y) is 10 cm. Find y. (5)

8. Examine the limit and continuity. (4+6=10)

(i) Examine whether the limit $\lim_{x\to 2} f(x)$ exists or not where

$$f(x)=\begin{cases}2x+1, & x>2\\ x-1, & x\le 2\end{cases}$$

(ii) Examine the continuity at $x=2$ of $f(x)$, where

$$f(x)=\begin{cases}2x+3, & x>2\\ 3x+1, & x\le 2\end{cases}$$

*****