71

D2BHC2305 (PAGES 3) Reg.No.....

Name: .....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2024

(Regular/Improvement/Supplementary)

B.Com. HONOURS

GBCH2B09T: BUSINESS MATHEMATICS

Time: 3 Hours **Maximum Marks: 80**

PART A: Answer *all* the questions. Each carries *one* mark.

Choose the correct answer.

1. The equation of y-axis.....
   (a) $y = 0$ (b) $x = 0$ (c) $x = 1$ (d) $y = x$
2. The determinant of a matrix $A = [3]$
   (a) 1 (b) 0 (c) 3 (d) 2
3. The cardinality of $A = \{1,2,3,4,5\}$ is.....
   (a) 2 (b) 3 (c) 4 (d) 5
4. The value of 0! Is .....
   (a) 0 (b) 1 (c) 5 (d) 2
5. If the events A and B in a random experiment is independent, then $P(B|A)$ is .....
   (a) $P(A \cup B)$ (b) $P(A)$ (c) $P(B)$ (d) $P(A \cap B)$

Fill in the Blanks.

6. The slope of the line passing through two points $(-2,5), (3,-1)$ is $m =$.....
7. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $|A| =$.....
8. Let A and B are 2 finite sets, if $A \cap B = \emptyset$, then $n(A \cup B) =$.....
9. The value of $n!$ Is .....
10. When a die is rolled, then the probability of getting the number 1 is .....

(10 x 1 = 10 Marks)

PART B: Answer any *eight* questions. Each carries *two* marks.

11. Find the equation of the line passing through the point $(-2,3)$ with slope -4.
12. Solve $2x - 3 \geq -4$, and represent it on number line.
13. Find the determinant of the matrix $A = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 5 & 1 \\ 0 & 3 & 4 \end{bmatrix}$.

(PTO)

14. Find the number of 4 letter word with or without meaning which can be formed out of the letters of the word *KING*. Assuming that,
    (a) repetition of the digits is not allowed.
    (b) repetition of the digits is allowed.
15. In how many ways can 5 girls and 3 boys be selected in a row so that no 2 boys are together?
16. Find the number of ways of selecting 9 balls from 6 red, 5 white and 5 blue balls, if each selection consist of 3 balls of each colour.
17. If $P(A) = \frac{3}{5}, P(B) = \frac{3}{10}$ and $(A \cap B) = \frac{15}{16}$, are the events A and B are independent.
18. Find the limit (a) $\lim_{x \to 2}(x+1)x$.
    (b) $\lim_{x \to 3} \frac{x+1}{x}$.
19. Find the second order derivative of $y = 6x + 2$.
20. If the price of a commodity falls from Rs. 80 to Rs. 50 quality demanded for the commodity increases from 100 units to 160 units. What is the price elasticity of demand for the commodity?

(8 x 2 = 16 Marks)

PART C: Answer any *six* questions. Each carries *four* marks.

21. Find the slope, x-intercept and y-intercept of the line whose equation is $3x - 4y = 12$.
22. A company buys a fax machine for Rs. 2,700 it worth Rs.100 at the end of 5 years. What was the machine worth after 3 years?
23. Find the inverse of the matrix using Gauss Jordan method, $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.
24. Use the inverse of the co-efficient matrix to solve the linear system,
    $4x - 5y = 1$
    $-3x - 4y = 1$
25. A factory manufactures two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labour hours are required. To manufacture product B, 2.5 machine hours and 1.5 labour hours are required. In a month 300 machine hours and 240 labour hours are available. Profit per unit for A is Rs. 50 and for B is Rs. 40. Formulate the problem of LLP.
26. How many words with or without meaning can be formed using the letter *DAUGHTER* assuming that no letters can be repeated,
    (a) All letters are used at a time.
    (b) All vowels occur together.
    (c) All vowels do not occur together.

27. A group consists of 9 boys and 4 girls. In how many ways can a team of 7 has to be selected, if the team has,

(a) No girl (b) Exactly 3 girls

28. Find the expected value of number of heads, when 3 coins are thrown.

(6 x 4 = 24 Marks)

PART D: Answer any *two* questions. Each carries *fifteen* marks.

29. Solve using simplex method,

Maximize: $Z = 5x_1 + 3x_2$

Subject to: $x_1 + x_2 \leq 2$

$5x_1 + 2x_2 \leq 10$

$3x_1 + 8x_2 \leq 12$

with $x_1 \geq 0, x_2 \geq 0$

30. a) Find the union of the following sets and represent it using Venn diagram,

(i) $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$.

(ii) $A = \{-7,-8,7,8\}$ and $B = \{-7,-8\}$.

(iii) $A = \{a,b,c,d\}$ and $B = \{x,y,z\}$.

b) Find the intersection of the sets and represent it using Venn diagram,

(i) $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$.

(ii) $A = \{-7,-8,7,8\}$ and $B = \{-7,-8\}$.

(iii) $A = \{a,b,c,d\}$ and $B = \{x,y,z\}$.

c) Find the power set of the set $A = \{-3,-2,-1,0\}$.

31. a) Find the derivative of (i) $\frac{2(x+1)}{x^2+2x-3}$, (ii) $x^2 + 3x^3 + x\cos x$, (iii) $x^2 \cos x$

b) Find the second order derivative of (i) $y = x^3 + \sin x$, (ii) $y = 6x^3 + x\cos x$

c) Find the extreme values of $f(x) = x^3 - 3x$

(2 x 15 = 30 Marks)