E 8455 (Pages : 3) Reg. No.....

Name.....

B.B.A. DEGREE (CBCS) EXAMINATION, JANUARY/FEBRUARY 2018

First Semester

Complementary—FUNDAMENTALS OF BUSINESS MATHEMATICS

(For B.B.A.)

Time : Three Hours Maximum Marks : 80

Part A

Answer any **ten** *questions.*
Each question carries 2 *marks.*

1. Define powerset of a set. How many elements in the powerset of a set contain 3 elements.
2. If $A = \{a, b, c, d, e\}$, $B = \{b, c, f, g, h\}$ and $C = \{b, f, i, j, k, l\}$. Find $(A - B) - C$.
3. Define Cartesian products of two sets.
4. Define real number.
5. If $12x = 5y$ find $x : y$.
6. Find the mean proportional to 6 and 24.
7. State Fundamental principle of counting.
8. Find the value of $8P_6$.
9. Find the value of x if $\log_{10} x = \sqrt{2}$.
10. Define symmetric matrix.
11. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 1 \\ 2 & 1 \end{bmatrix}$. Find $2A + 3B$.
12. Define singular matrix.

$(10 \times 2 = 20)$

Part B

Answer any **six** *questions.*
Each question carries 5 *marks.*

13. Write down all the power set of $u = \{a, b, c, d, e\}$.
14. If $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 4, 9, 16, 25\}$. Find $A \times B$ and $B \times A$.

Turn over

15. Given the square of x varies as cube of y and $x = 3$ when $y = 4$. Find the value of y when $x = \frac{1}{\sqrt{3}}$.

16. If $\frac{a}{3} = \frac{b}{4} = \frac{c}{4}$ then show that $\frac{a+b+c}{b-a} = 14$.

17. Salaries of A, B, C, D are in the ratio 3 : 4 : 5 : 6. The sum of their salaries is Rs. 3,600. Find their respective salaries.

18. A family of 4 brothers and 3 sisters is to be arranged for a photograph in one row. In how many can they be seated if : (a) All sisters sit together ; and (b) No sisters sit together.

19. Prove that $\frac{1}{\log_a N} + \frac{1}{\log_b N} + \frac{1}{\log_c N} = 1$ if $abc = N$.

20. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$. Prove that $A^2 - 5A - 14\,I = 0$ where $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

21. Verify the result $(AB)^t = B^t\,A^E$ where $A = \begin{bmatrix} 3 & 2 & 1 \\ 2 & 0 & 1 \\ -2 & 5 & -9 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 3 & -4 \\ 3 & 2 & 1 \end{bmatrix}$.

(6 × 5 = 30)

Part C

Answer any **two** *questions.*
Each question carries 15 *marks.*

22. If $A = \{1, 3, 5, 7\}, B = \{5, 9, 13, 17\}, C = \{1, 3, 9, 13\}$. Find (a) $(A - B) - C$; (b) $A \cup (B \cap C)$; (c) $A - (B \cup C)$; (d) $(A \times B) \cup (A \times C)$; and (e) $A \times (B \cup C)$.

23. (a) Prove that $\sqrt{2}$ is an irrational number.

(b) If $x \propto y^2$, $x = 15$ when $y = 4$. Find the relation between x and y.

(c) The monthly incomes of two persons are in the ratio 4 : 5 and their monthly expenditure is in the ratio 7 : 9. If each save 50 per month. Find their monthly income.

24. (a) Show that $7 \log \left(\frac{16}{15}\right) + 5 \log \left(\frac{25}{24}\right) + 3 \log \left(\frac{81}{80}\right) = 1$.

(b) In how many ways can 5 Telugu, 3 English and 3 Tamil books be arranged if the books of each different language are kept together.

(c) How many different words can be formed with the letter of the word 'STATISTICS'.

25. (a) Find the inverse of A where $A \begin{bmatrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$.

(b) Solve the following equations using matrix method :—

$2x - 3y + 5z = 11$

$5x + 2y - 7z = -12$

$-4x + 3y + z = 5$.

(2 × 15 = 30)