

E 8455

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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 × 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  $A^2 - 5A - 14I = 0$  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 :—

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

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

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

$$(2 \times 15 = 30)$$