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B.B.A. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2016

First Semester

Complementary Course—FUNDAMENTALS OF BUSINESS MATHEMATICS

(2013 Admission onwards)

Time : Three Hours

Maximum Marks : 80

Part A

Answer all questions.

Each question carries 1 mark.

1. If $A = \{1, 2, 3, 4\}$ and $B = \{2, 4, 6\}$, find $A \cup B$.
2. Define rational numbers.
3. Give an example for a geometric progression.
4. Divide 1000 in the ratio 2 : 3.
5. Find the value of 9C_3 .
6. If $\log_a \sqrt{2} = \frac{1}{6}$, find the value of a .
7. What do you mean by annuity contingent? ax
8. If $a = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, find determinant of A.
9. Define a symmetric matrix.
10. If A is a square matrix with determinant $(A) \neq 0$, what is the formula for A^{-1} ?

(10 × 1 = 10)

Part B

Answer any eight questions.

Each question carries 2 marks.

11. If $A = \{1, 2, 3\}$, $B = \{3, 5, 7\}$, $S = \{1, 3, 7\}$ and $T = \{2, 4, 6\}$ find $(A \times B) \cap (S \times T)$ and $(A \cap S) \times (B \cap T)$.
12. Prove that $\sqrt{5}$ is irrational.
13. If $A : B = 3 : 4$ and $B : C = 5 : 2$, then find the value of $A : B : C$.
14. Find a geometric series whose 3rd and 6th terms are 1 and $-\frac{1}{8}$ respectively.
15. Find $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots \infty$.

Turn over

Handwritten calculations and notes at the bottom of the page, including a long division problem and a sequence of terms: $40320 n^1, n^2, n^3$.

16. Find 5th and 7th terms of the series 6, 4, 3,
17. In how many ways can 5 boys and 5 girls be seated around a table so that no 2 boys are adjacent.
18. If $\log_{10} 2 = 0.3010$, find the value of $\log_8 25$.
19. What is the present value of Rs.10,000 due in 2 years at 8% per annum compound interest if the interest is paid half-yearly?
20. Explain rank of a matrix with an example.
21. If $A = \begin{bmatrix} 1 & 2 & 4 \\ 1 & 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 8 & 1 \\ 3 & 6 & 2 \end{bmatrix}$, find $2A - B$.
22. Write the co-efficient matrix of the system of equations $x + y - 2z = 2$, $2x + 6y - 3z = -1$, $3x + 4y - 2z = 3$.

(8 × 2 = 16)

Part C

Answer any **six** questions.
Each question carries 4 marks.

23. Find four numbers in A.P. whose sum is 20 and the sum of whose squares is 120.
24. How many arrangements can be made with the letters of the word MATHEMATICS and in how many of them vowels occurs together?
25. A machine costs the company Rs. 97,000 and its effective life is estimated to be 12 years. If the scrap realises Rs. 2,000 only, what amount should be retained out of profits at the end of each year to accumulate at compound interest at 5% per annum?
26. If $a^x = b^y = c^z = d^w$, show that $\log_a (bcd) = x \left(\frac{1}{y} + \frac{1}{z} + \frac{1}{w} \right)$.
27. Rs.432 is divided amongst three workers A, B and C such that 8 times A's share is equal to 12 times B's share which is equal to 6 times C's share. How much did A get?

28. If $A = \begin{bmatrix} 2 & 1 & 0 \\ 3 & 2 & 1 \\ 1 & 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 0 & 1 & 2 \\ 3 & 1 & 0 & 5 \end{bmatrix}$, find AB.

29. If a, b and c are in H.P., show that $\frac{a}{b+c}, \frac{b}{c+a}$ and $\frac{c}{a+b}$ are also in H.P.

30. Find the determinant of $A = \begin{bmatrix} 2 & 3 & -4 \\ 0 & -4 & 2 \\ 1 & -1 & 5 \end{bmatrix}$ (52)

31. Find the determinant of $\begin{bmatrix} 3 & 2 & 1 \\ 4 & 1 & -7 \\ 0 & 3 & 4 \end{bmatrix}$

(6 × 4 = 24)

Part D

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

32. A survey of 400 recently qualified Chartered Accountant revealed that 112 joined industry, 120 started practice and 160 joined the firm of practising chartered accountants as paid assistants. There were 32 who joined service and also did practice; 40 had both practice and assistantship and 20 had both job in industry and assistantship. There were 12 who did all the three. Indicate how many could not get any of these and how many did only one of these ?
33. Out of 5 males and 6 females, a committee of 5 is to be formed. Find the number of ways in which it can be done so that among the persons chosen in the committee there are (i) 3 males and 2 females ; (ii) at least one female ; and (iii) not more than 3 males.
34. Find the inverse of $A = \begin{bmatrix} 2 & 3 & -4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$.
35. Using matrix method, solve the system of equations $5x - 6y + 4z = 15$, $7x + 4y - 3z = 19$, $2x + y + 6z = 46$.

(2 × 15 = 30)