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Reg. No.....

Name.....

B.B.A. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2017

First Semester

Complementary Course—FUNDAMENTALS OF BUSINESS MATHEMATICS

(2013—2016 Admissions)

Time : Three Hours

Maximum Marks : 80

Part A

*Answer all the ten questions.
Each question carries 1 mark.*

1. Define power set.
2. Write first five prime numbers.
3. Write the seventh term of the series 1, 3, 9, 27,
4. If $5x = 3y$, find $x : y$.
5. Find the value of ${}^{10}P_4$.
6. Find the logarithm of 1728 to the base $2\sqrt{3}$.
7. What do you mean by annuity ?
8. Give an example for a symmetric matrix.
9. What do you mean by a triangular matrix.
10. Define inverse of a matrix.

(10 × 1 = 10)

Part B

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

11. If $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $B = \{3, 5, 7\}$ and $C = \{2, 4, 6\}$ find $A - (B \cup C)$ and $(A - B) \cup (A - C)$.
12. Prove that $\sqrt{2}$ is irrational.

Turn over

13. An amount of Rs. 100 is being divided among two persons in the ratio $\frac{1}{10} : \frac{1}{15}$. How much money does each get ?
14. Find the 20th term of the arithmetic progression 15, 13, 11,
15. Find $\frac{1}{2} + \frac{1}{6} + \frac{1}{18} + \dots \infty$.
16. Define harmonic progression. Give an example.
17. In how many ways can 4 white and 3 black balls be selected from a box containing 20 white and 15 black balls.
18. Find the value of $\frac{2 \log 6 + 6 \log 2}{4 \log 2 + \log 27 - \log 9}$.
19. Find the compound interest on Rs. 10,000 for 4 years at 5 % per annum.
20. What do you mean by rank of a matrix ? What is the rank of the matrix $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$?
21. If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$, find $A + B$.
22. Convert into matrix form : $x + 2y - z = 5$, $3x - y + 2z = 9$, $5x + 3y + 4z = 15$.

(8 × 2 = 16)

Part C

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

23. The sum of 3 numbers in G.P. is 35 and their product is 1000. Find the numbers.
24. A guard of 12 men is formed from a group of n soldiers in all possible ways. Find (i) The number of times a two particular soldiers A and B are together on guard ; and (ii) The number of times three particular soldiers C, D and E are together on guard.
25. A limited company intends to create a depreciation fund to replace at the end of the 25th year assets costing Rs. 1,00,000. Calculate the amount to be retained out of profits every year if the interest rate is 3 %.

26. If $x = \log_{2a} a$, $y = \log_{3a} 2a$ and $z = \log_{4a} 3a$, then prove that $xyz + 1 = 2yz$.
27. 60 litres of diesel is required to travel 600 km. using a 800 cc engine. If the volume of diesel required to cover a distance varies directly as the capacity of the engine, then how many litres of diesel is required to travel 800 kms. using 1200 cc engine ?
28. If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ -3 & 2 \end{bmatrix}$, find AB and BA . Is $AB = BA$?
29. If $A = \begin{bmatrix} 2 & -3 & 1 \\ 4 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 & 4 \\ 1 & 3 & -5 \end{bmatrix}$, show that $(A + B)^t = A^t + B^t$.
30. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$, find AA^t .
31. What do you mean by singular matrix ? Show that $A = \begin{bmatrix} 2 & 3 & -4 \\ 0 & -4 & 2 \\ 1 & -1 & 5 \end{bmatrix}$ is non-singular.

(6 × 4 = 24)

Part D

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

32. Out of total 150 students who appeared for ICWA Examination from a centre, 45 failed in Accounts, 50 failed in Mathematics and 30 failed in Costing. Those who failed both in Accounts and Mathematics, were 30, those who failed both in Mathematics and Costing were 32 and those who failed both in Accounts and Costing were 35. The students who failed in all the three subjects were 25. Find out the number who failed at least in any one of the subjects.
33. (a) The question paper of 'Cost Accounting and Income Tax' contains ten questions divided into two groups of 5 questions each. In how many ways can an examinee answer six questions taking at least two questions from each group ?
- (b) Out of 10 consonants and 4 vowels, how many words can be formed each containing 6 consonants and 3 vowels.

Turn over

34. Find the inverse of $A = \begin{bmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{bmatrix}$.

35. Using matrix method, solve the system of equations :

$$x - 2y + 3z = 4, 2x + y - 3z = 5, -x + y + 2z = 3.$$

(2 × 15 = 30)