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Reg. No. : .....

Name : .....

Second Semester B.Com. Degree Examination, May 2019

First Degree Programme under CBCSS

Complementary Course

CO1231/CC1231/CX1231 : BUSINESS MATHEMATICS

(Common for CO 1231/CC 1231/CX 1231)

(2018 Admn)

Time : 3 Hours Max. Marks : 80

All the first 10 questions are compulsory. Each question carries 1 mark.

1. Find the sum of $\frac{2}{3}+\frac{6}{15}+\frac{3}{5}$.

2. Evaluate $\frac{3}{5}\times\left(\frac{-4-1}{6}\right)+\frac{5}{2}$

3. Find the value of $14P_4$.

4. Define a symmetric matrix.

5. Evaluate the determinant of the square matrix $\begin{bmatrix}4 & 1\\ 3 & 2\end{bmatrix}$.

6. Write the power set of the set $A=\{3, 4\}$.

7. Solve the equation $14y-18=13$.

P.T.O.

8. What is annuity ?

9. Solve the quadratic equation $x^2 - 5x + 6 = 0$.

10. Find the derivative of $y = x^2 + \frac{1}{x} + 7$. **(10 × 1 = 10 Marks)**

Answer any **eight** questions from among the questions 11 to 22. They carry 2 marks each.

11. Prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ where $A = \{1, 3, 4, 7\}$ $B = \{2, 3, 4, 8\}$ and $C = \{1, 3, 4, 9\}$.

12. If $nC_2 = 10$. Find n.

13. Sum of two numbers is 95. If one exceeds the other by 15. Find the numbers.

14. If $A = \begin{bmatrix} 5 & 3 \\ 4 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 8 \\ 9 & 1 \end{bmatrix}$ find $2A + 3B$.

15. Evaluate $\begin{vmatrix} x & 1 & 2 \\ 2 & x & 2 \\ 3 & 1 & x \end{vmatrix}$

16. Find the product $(p^2 - q^2)(2p + q)$.

17. If $y = 2x + \frac{4}{x}$, prove that $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = 0$.

18. Eliminate arbitrary constants a and b from $z = (x - a)^2 + (y - b)^2$ to form the partial differential equation.

19. $\int \frac{x + a}{x - a} dx$.

20. If simple interest on a certain sum is Rs. 360 for 2 years at 6% per annum. Find the sum.

21. After allowing a discount of $7\frac{1}{2}\%$ on the marked price of an article, an article is sold for Rs. 555. Find its marked price.

22. A man wishes to pay back his debt of Rs. 5,044 due after 6 years by 6 equal yearly instalment. Find the amount of each instalment, money being worth 10% per annum compound interest. **(8 × 2 = 16 Marks)**

Answer any six questions from among the questions 23 to 31. They carry 4 marks each.

23. The base of an isosceles triangle is $\frac{4}{3}$ cm. The perimeter of the triangle is $4\frac{2}{15}$ cm. What is the length of either of the remaining equal sides?

24. The table below gives the ages of drivers of cars involved in total accidents during a certain year. Draw a pie-diagram to represent the data :

Ages of drivers	Under 20	20-40	40-60	Over 60	Total
Percent of totals	15	60	20	5	100

25. If $A = \begin{bmatrix} 2 & 1 & 1 \\ -1 & 0 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ calculate $A^2 - 5A + 9I$.

Where $I = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

26. Find the inverse of $\begin{bmatrix} 2 & -4 \\ -3 & 5 \end{bmatrix}$

27. At what rate percent compound interest per annum with Rs. 640 amount to 774.40 in 2 years.

28. Distinguish between Straight Line Method and diminishing balance method.

29. Find a partial differential equation by eliminating a, b, c from $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$.

30. If $y = ae^{mx} + be^{-mx}$ prove that $\frac{d^2y}{dx^2} - m^2y = 0$.

31. The total cost function (in rupees) if x units of a product is $c(x) = x^2 + 78x + 2500$ and the demand function is $p = 600 - 8x$, when the price is Rs. 1 per unit. Show that the maximum net revenue (ie, profit) is obtained when 29 units are produced. Also find the price at which profit is maximums.

(6 × 4 = 24 Marks)

Answer any two questions from among the questions 32 to 35. They carry 15 marks.

32. Using Cramer's rule, solve

$x + y + z = 6$, $2x + 3y - z = 5$, $6x - 2y - 3z = -7$.

33. Explain the need for providing depreciation what are the methods of recording depreciator.

34. (a) Explain bar diagrams

(b) Draw a simple bar diagram to represent the following figures relating to manufacturing of machines.

Years	1984	1985	1986	1987	1988
No. of machines	1200	1700	1900	2800	2100

(c) What are the advantages of diagram and graphs?

35. (a) Explain different types of sets and set operations with examples.

(b) What are the rules of differentiation? Explain it with examples.

(2 × 15 = 30 Marks)
