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Reg. No. : ....

Name : ....

Second Semester B.Com. Degree Examination, September 2022

First Degree Programme under CBCSS

Complementary Course II

CO 1231/CC 1231/CX 1231 : BUSINESS MATHEMATICS

(Common for Commerce/Commerce and Tax Procedure and Practice/Commerce with Computer Applications)

(2018 & 2019 Admission)

Time : 3 Hours   Max. Marks : 80

PART – A

Answer **all**. Each carries **1** mark.

1. Evaluate $\dfrac{5}{12}+\dfrac{4}{7}-\dfrac{7}{24}$.

2. Find the smallest number in the following $\dfrac{3}{14},\dfrac{5}{16},\dfrac{5}{9}$ and $\dfrac{7}{18}$.

3. Find the fraction equivalent to 0.8888....

4. Find the value of $8^2-12*5+\dfrac{18}{3}-2*6$.

5. Is the matrix $A = \begin{bmatrix} 1 & 6 & -5 \\ 6 & 2 & 4 \\ -5 & 4 & 3 \end{bmatrix}$ a symmetric matrix?

6. Find $8C_3$.

7. Find $\dfrac{dy}{dx}$ if $y = 3x^3 + 12\log x$.

8. Evaluate $\int (x^3 + 3x + 5)dx$.

9. What is sum-of-year digits method of depreciation?

10. The exchange rate of UK POUND/INR is 106. A UK tourist wants to purchase a traditional mirror costing Rs.21,200. How much Pound should he pay?

$(10 \times 1 = 10 \text{ Marks})$

PART – B

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

11. Bablu bought 24 apples and ate 1/6 of them. His brother ate 2/3 of them. Find the remaining number of apples.

12. If $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 1 & 2 \\ 1 & 3 & 2 \end{bmatrix}$, find A^T.

13. If $A = \{5, 8, 9, 11, 12\}$ and $B = \{4, 9, 15, 12\}$, find $A - B$ and $B - A$.

14. Solve the system of linear equations $2x - 3y = 1$, $x + 5y = 7$.

15. Find the equation whose roots are 3/7 and –4/5.

16. In how many ways can the letters of the word DAUGHTER be arranged so that the vowels may never be separated?

17. Find the derivative $\dfrac{dy}{dx}$ if $y = (1-5x)^6$.

18. Find AB if $A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -1 \\ -3 & 2 \end{pmatrix}$.

19. Construct a histogram for the following frequency table.

class	0-10	10-20	20-30	30-40	40-50	50-60
frequency	4	10	21	9	4	2

20. Convert 34 yard/minutes to meter/second (1 yard = 0.9144 meters).

21. A machine costing Rs. 1,00,000 depreciates at 10% pa. If the useful life of the machine is 10 years, find the scrap value.

22. From the following figures find the break-even point in units and sales:

Selling price per tonne Rs.69.50; Variable cost per tonne Rs.35.50; Fixed expenses Rs.18.02 lakhs.

(8 × 2 = 16 Marks)

PART – C

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

23. Convert 9.5487487..........to a fraction.

24. Find the value of the determinant $\begin{bmatrix} 1 & -2 & 3 \\ 4 & -1 & -2 \\ -2 & 1 & 5 \end{bmatrix}$.

25. Solve using cross multiplication $3x + y + 2z = 3$, $2x - 3y - z = -3$, $x + 2y + z = 4$.

26. There are 6 books of Economics 3 on Mathematics and 2 on Accountancy. In how many ways can these be placed on a shelf if the books on the same subject are together?

27. Find $\dfrac{dy}{dx}$ if $y = \tan(e^x \sin x)$.

28. Evaluate $\int \dfrac{x}{1 + 4x^2} dx$.

29. Find the value of k if the equation $9x^2 - 12x + k = 0$ has equal roots.

30. A man decides to deposit Rs.20,000 at the end of each year in a bank which pays 10% p.a. compound interest. If the instalments are allowed to accumulate, what will be the total accumulation at the end of 9 years?

31. The publisher of a book pays the author a lump sum plus an amount for every copy sold. If 500 copies are sold, the author would receive Rs. 750 and for Rs. 1350 copies Rs.1175. How much would the author receive if 10,000 copies are sold?

(6 × 4 = 24 Marks)

PART – D

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

32. (a) Find A^{-1} if $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 4 \\ 4 & 3 & 2 \end{bmatrix}$.

(b) Solve the system of equations using matrix method

$$2x + 4y - 6z = -4, \quad x + 5y + 3z = 10, \quad x + 3y + 2z = 5$$

33. (a) Represent the following data by a percentage bar diagram

Head of expenditure	Budget of family A	Budget of family B
Food	240	400
Clothing	50	100
Rent	60	150
Education	30	80
Fuel and light	20	70
Total	400	800

(b) In how many ways can the letters of the word BALLOON be arranged, so that the two L's do not come together?

34. (a) Find $\dfrac{dy}{dx}$ if $y = \log(x + \sqrt{1 + x^2})$.

(b) If $z = \dfrac{x}{x^2 + y^2}$ find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$.

35. (a) Calculate

(i) Debtors Turnover Ratio and

(ii) Average Collection Period from the following data:
Total sales Rs. 3,20,000
Cash sales Rs. 50,000
Sales returns Rs. 20,000
Debtors as on 1-1-2020 Rs. 25,000
Debtors on 31-12-2020 Rs. 35,000
Bills Receivable on 1-1-2020 Rs. 15,000
Bills Receivable on 31-12-2020 Rs. 25,000

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(b) After retirement from a company, an employee is entitled to pension, the amount of which varies directly as the square root of the number of years of service. Mr.Soloman has served 9 years longer than Mr.Soman and receives a pension greater by Rs. 110. If, however, the length of service of Mr. Soloman had exceeded that of Mr. Soman by $4\frac{1}{4}$ years their pensions would have been in the ratio of 9:8. How long had they served and what were their respective pensions?

(2 × 15 = 30 Marks)

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