(Pages : 8)

Reg. No. : .....

Name : .....

Second Semester B.Com. Degree Examination, September 2022

First Degree Programme under CBCSS

Complementary Course :

CO 1231/CX 1231/CC 1231 : BUSINESS MATHEMATICS

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

(2020 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **1** or **2** sentences each.

Each question carries **1** mark.

1. Add $5x^2 - 6$ with $3x^2 - 5$.

2. Divide $(-4x^3)$ from $(-12x^5 + 28x^4 - 20x^3)$.

3. If $A = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 7 & 9 \\ 1 & 6 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & 2 \\ 4 & 2 & 5 \\ 6 & -2 & 7 \end{bmatrix}$. Show that $5(A+B) = 5A + 5B$.

4. Show that $\begin{vmatrix} 2 & 5 \\ 9 & 10 \end{vmatrix}$ is a non-singular matrix.

5. Find $\left(\frac{2}{5}\right) \times 5\frac{1}{4}$.

6. Divide 3/10 by (1/4 of 3/5).

7. Find the simple interest and amount for Rs.25,000 at 10% p. a for 26 weeks.

8. Purchase price of a machine Rs.1,80,000; Freight charges Rs.30,000; installation charges Rs.10,000; residual value Rs.16,000 and useful life 5 years. Calculate the depreciation for third year under the straight line method.

9. What are exchange rates?

10. What is markup pricing?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** Questions in not exceeding **1** paragraph. Each question carries **2** marks.

11. Multiply $(2x+3)\times(3x-5)$.

12. Find the factors of $2x^3+6x^2+4x$.

13. Solve the following equation : $4x-3y-1=0,\ 2x-5y+3=0$.

14. If $A=\begin{bmatrix}1 & 2 & 3\\ 2 & 4 & 6\\ 3 & 6 & 9\end{bmatrix}$ and $B=\begin{bmatrix}-1 & -2 & -4\\ -1 & -2 & -4\\ 1 & 2 & 4\end{bmatrix}$ find AB and BA. Also show that $AB \neq BA$.

15. Evaluate $\begin{vmatrix}2 & 0 & 4\\ 5 & -1 & 1\\ 9 & 7 & 8\end{vmatrix}$.

16. Find the inverse of $A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 2 & 1 \\ 1 & 1 & -2 \end{bmatrix}$ if it exists.

17. Anuradha can do a piece of work in 6 hours. What part of the work can she do in 1 hour, in 5 hours, in 6 hours?

18. Evaluate the following:

    (a) $3\frac{1}{2} \div 4$

    (b) $4\frac{1}{3} \div 3$

19. (a) Convert 0.07 into percentage.

    (b) What is 50% of 180?

20. Find the value of 'a' using the concept of BODMAS.

    $42 \div 2 + a \times 3 - 22 = 8$.

21. In how many ways can be College Football team of 11 players be selected from 16 players?

22. Rewrite the following examples using set notation :

    (a) First ten even natural numbers.

    (b) Set of days of a week.

    (c) Set of months in a year which have 30 days.

    (d) The numbers 3, 6, 9, 12, 15.

23. A person lends Rs.1,500, a part of it at 5% p.a. and the other part at 9% p.a. If he receives a total amount of interest of Rs.162 at the end of 2 years. Find the amount lent at different rate of interest.

24. On 1.1.2013 a machine was purchased for Rs.1,00,000 and Rs.50,000 was paid for installation. Assuming that the rate of depreciation was 10% on Reducing Balance Method, calculate amount of depreciation upto 31.12.2015.

25. What are the Disadvantages of cost plus pricing?

26. On December 31, 2010 Company B had total asset of 1,50,000, equity of 75,000, non-current assets of 50,000 and non-current liabilities of 50,000. Calculate the current ratio.

(8 × 2 = 16 Marks)

SECTION – C

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

27. Solve $\frac{x}{2}+\frac{y}{3}=5$

$\frac{x}{4}-\frac{y}{3}=7.$

28. Verify that $(AB^T)=B^T A^T$ when

$A=\begin{bmatrix}1 & -4 & 2\\ 4 & 0 & 1\end{bmatrix}_{2\times3}$ and $B=\begin{bmatrix}2 & -3\\ 0 & 1\\ -4 & -2\end{bmatrix}_{3\times2}$.

29. (a) Find the value of 3 + 3 of 3 ÷ 3 of 3 × 3.

(b) Find the value of x in the following equation $6162 + x + 3330 = 2545$.

(c) Find the value of $6 \div 2 + 7 \times 4$.

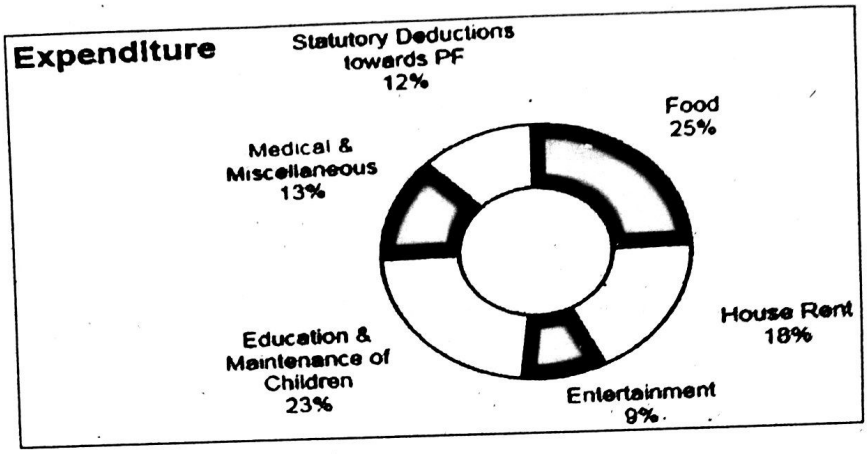
30. (a) Simplify :

$[72-12\div 3-2]+(18-6)\div 4$

(b) Find the value of $40-[20-\{14-(16-6\times4-2)\}]$.

(c) Simplify: $8\div8$ of $8+8/8\div8\times8+8$.

31. Analyze the following pie chart and answer the questions given below. Given is the distribution of the monthly family budget of a person X. The total earnings of person X are Rs. 3,600 per month basic, plus 10% as transport and meals allowance on the monthly salary.



(a) Calculate the amount of expenditure on Education and Maintenance per month, if a person X pays 23% of its total earnings as Education and Maintenance of children?

(b) What is the medical and miscellaneous expenditure per annum (in Rs)?

(c) What is the approximate earning left of person X (in Rupees) per month after deducting payment of education and maintenance?

(d) What is the total amount per month the family spends on house rent and statutory deductions towards PPF expenses?

32. (a) In how many of the permutations of 8 things taken 3 at a time, will two particular things always occur?

(b) Solve for n given ${}^{n}P_4 = 30 \times {}^{n}P_2$

33. (a) $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 5, 8\}$, $C = \{3, 4, 5, 6, 7\}$, find $A \cup (B \cup C)$.

(b) In a class of 50 students, 15 read Physics, 20 Chemistry and 20 read Mathematics, 3 read Physics and Chemistry, 6 read Chemistry and Mathematics and 5 read Physics and Mathematics, 7 read none of the subjects. How many students read all the three subjects?

34. If $y = (x^3 + 2x^2 + 5x)^{-3}$, find $\frac{dy}{dx}$.

35. Calculate the Rate of Depreciation under Straight Line Method (SLM) in each of the following cases :

Machine No.	Cost of Machine (₹)	Expenses incurred at the time of purchase to be capitalized (₹)	Estimated Residual Value (₹)	Expected Useful Life in years
1	90,000	10,000	20,000	8
2	24,000	7,000	3,100	6
3	1,05,000	20,000	12,500	5
4	2,50,000	30,000	56,000	10

36. Which are the different types of return on investments?

37. What is break even pricing? What are its advantages?

38. What are the limitations of ratio analysis?

(6 × 4 = 24 Marks)

SECTION – D

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

39. Solve the following equation by matrix inverse method: $x + 2y = 6,\ 3x + 4y = 16$.

40. Find the values of

(a) ${}^7P_5$

(b) ${}^7P_1$

(c) ${}^7P_0$

(d) ${}^7P_7$.

41. In a class of 50 students appearing for an examination of ICWA, from a centre, 20 failed in Accounts, 21 failed in Mathematics and 27 failed in Costing, 10 failed both in Accounts and Costing, 13 failed both in Mathematics and Costing and 7 failed both in Accounts and Mathematics. If 4 failed in all the three, find the number of

(a) Failures in Accounts only

(b) Students who passed in all the three subjects.

42. (a) Find $\frac{dy}{dx}$ if $y = (2x-5)^6$.

(b) $y = \log(1+\sqrt{x})$, find $\frac{dy}{dx}$.

(c) If $y = 10^x x^{10}$, find $\frac{dy}{dx}$. Let $y = u \cdot n$ where $u = 10^x$ and $v = x^{10}$.

(d) Integrate the following w.r.t.x.

(i) x^4

(ii) x^{100}

(iii) x

(iv) 1

(v) -7

(vi) $x^{-4/5}$

(vii) $\sqrt[3]{x^4}$.