GLOBAL COLLEGE OF MANAGEMENT

FIRST TERM EXAM-2072

Grade: XII Subject: Business Mathematics F.M.:100

Time: 3:00 hrs. P.M.:40

Set A

Attempt all the questions:

Group-A [10×2×3 = 60]

1. a. If x=-7 and y = 4, verify that $|x+y| \le |x|+|y|$

   b. Show that $\frac{a+ib}{c+id}+\frac{a-ib}{c-id}$ is rational numbers if a, b, c, d, are rational.

2. a. In a city of 26000 populations, 5000 read English local newspaper, 12000 read Nepali local newspaper and 1000 read both. What percentage read neither English nor Nepali newspaper?

   b. If A= {1, 2}, B = {2, 3} and C= {1, 3, 4}, then verify that $A\times(B\cap C)=(A\times B)\cap(A\times C)$

3. a. Find the three numbers in A.P Such that their sum is 33 and their product is 792.

   b. Sum to n terms of 4+44+444+…….

4. a. If $A=\begin{bmatrix}1 & 2\\ 3 & 1\end{bmatrix}$ show that A^2-2A-5I=0, where I and 0 are 2×2 identity and null matrices respectively.

   b. Solve the equations by using cramer's rule:

   $6x-3y = 4$

   $5x+y = -1$

5. a. Show that A (3, 5), B (1, 1), C (5, 3) and D (7, 7) are the vertices of a rhombus.

   b. Find the equation of the locus of a point which moves so that it is equidistance from the points (-1, -2) and (3, 4)

6. a. Find the equation of straight line joining the point (2, 3) to the point of intersection of $2x+3y+1=0$ and $3x-4y=8$.

   b. If fixed cost of 20 articles is 500 and variable cost for each article is 40. Find the total cost function. Also find the cost of 90 articles.

7. a. Evaluate: $\lim_{x\to 0}\frac{\sqrt{3+x^2}-\sqrt{3-x^2}}{x^2}$

   b. Find the derivative of $\frac{x^3+1}{x^2-1}$

8. a. Find $\frac{dy}{dx}$ when $y=2z^3-z^2-5z$ and $z=x^4$.

   b. A man left $\frac{2}{3}$ of his estate to his son and $\frac{1}{6}$ of the remainder to his daughter. The residue amounting to Rs. 12, 50, 000 was given to a charity. Find the value of his estate.

9. a. In a race of one kilometer, Mr. X beats Mr. Y by 70 meters, Mr. Y beats Mr. Z by 80 meters. By how much does Mr. X beat Mr. Z ?

   b. A buy an article and sells it to B at a profit of 10%. B sells it to C at a gain of 20%. If C paid Rs. 924 for it, what did A pay for it?

10. a. Hari and Bijaya invested Rs. 60000 and Rs. 36000 in a firm. They agreed to receive 10% interest on their capital out of the annual profit and remaining profit is shared in the ratio of their capitals. If Hari received a total amount of Rs. 16500. Find Bijaya's share.

b. Express the rate of £0.25 per yd in Rs. Per meter. If £1=Rs. 132 and 1000 meters = 1095 yards.

Group- B [8×5=40]

11. The product of the three in G.P. is 216. If 2, 8, 6 be added to them, the results are in A.P. find the numbers.

12. Show That $\begin{vmatrix} a & a^2 & a^3 \\ b & b^2 & b^3 \\ c & c^2 & c^3 \end{vmatrix} = abc(a-b)\,(b-c)\,(c-a)$

13. A function is defined as follows:

$$f(x) = \begin{cases} 4+2x & \text{for } -3/2 \le x < 0 \\ 4-2x & \text{for } 0 \le x < 3/2 \\ -4-2x & \text{for } x \ge 3/2 \end{cases},$$

show that $f(x)$ is continuous at $x = 0$ and discontinuous at $x = 3/2$

14. Find from the first principles, the derivative of $\sqrt{x+1}$

15. If 75 persons can perform a piece of work in 12 days of 10 hours each, how many men will perform a piece of work twice as great in tenth part of the time, if they work the same number of hours in a day, supposing that two of the second set can do as much work as three of the first set.

16. An article is listed 25% above selling price and the cost price is 20% below the selling price. Find the rate of discount and profit.

17. Shiva and Sindhu start a business contributing Rs. 11000 and Rs. 15000. Sindhu receives 20% of the profit for his salary as manager. At the end of 6 months. Shiva withdraws $\frac{1}{4}$ of his capital and two months later sindhu withdraws $\frac{1}{2}$ of his capital, Profit for the year resulted to Rs. 3982.5. What sum of money ought each to receive?

18. Determine the par of exchange between London and New York if £1 contained 61.635 grains of gold $\frac{11}{12}$ find and $1 contained 25.8 grains of gold $\frac{9}{10}$ fine.

"Best of Luck"

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Set B

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions:

Group-A [10×2×3 = 60]

1. a. Rewrite $-3 < x < 7$ using the absolute value sign.

   b. Show that $\frac{a+ib}{c-id} - \frac{a-ib}{c+id}$, is a complex number if a, b, c, d are real

2. a. In a market survey of 600 consumers of tea it was found that 300 purchased Mechi tea, 250purchased Muna tea and 150 purchased both brands. How many purchased neither of them?

   b. If A={1, 2}, B= {2, 3} and C = {1, 3, 4}, then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$

3 a. Divide 69 into three parts such that parts may form an A.P. and the product of the first two terms is 483.

   b. Sum to n terms of 5+55+555+……..

4 a. Show that $A^2+3A+4I=0$ if $A = \begin{bmatrix} -1 & -1 \\ 2 & -2 \end{bmatrix}$ where I and O are unit and zero matrices respectively.

   b. Solve the equations by using Cramer's rule :
   $2(x-1) = y$, $3x+4y-3=0$

5 a. Show that the points (a, a), (-a, -a) and $(-a\sqrt{3}, a\sqrt{3})$ are the vertices of an equilateral triangle.

   b. Find the equation of the locus of a point which moves so that it is equidistance from the points (1, 2) and (5, 6).

6 a. Find the equation of the straight line through the intersection of $3x + 2y=8$ and $4x+y=9$ with the slope of 3.

   b. A taxi charges Rs 10 at the time of starting and Rs. 8 for each additional kilometer. If y is the total taxi charge for x kilometers. Determine the relationship $y = f(x)$. Also find $f(10)$.

7 a. Evaluate: $\lim_{x\to 0} \frac{\sqrt{1+2x} - \sqrt{1-2x}}{x}$.

   b. Find the derivative of $(3x^2+ 5x+6)(x^2- 5x +3)$.

8 a. Find $\frac{dy}{dx}$ when, $y = 3t^2 + 2t + 1$ and $t = x^3 + 3x^2$

   b. If 9 cows can plough a piece of land in 15 days working 8 hours a day, how many hours each day have 12 cows to work to plough a land twice as great is 18 days.

9 a. In a race of 1 kilometer, Mr. X beats Mr. Y by 120 meters , Mr. Y beats Mr. Z by 100 meters. By how much does Mr. X beats Mr. Z?

   b. An article is sold for Rs.150 at a gain. If it has been sold for Rs.135 there would have been a loss equal to 50% of the original gain. Find the cost price of the article.

10 a. Ram and Shyam are partners. Ram contributes Rs. 20,000 and Shyam Rs. 30,000. Ram acts as a manager, get 24% of the total profit for manager remaining amount divided according to their capital contribution. Shyam gets Rs. 4560 in his share. What would Ram get.

b. 8 chairs cost as much as 3 desks, 6 desks cost as much as 2 daraj's, 7 daraj's cost as much as 2 sofas. If 4 sofas cost Rs.10, 000, finds the cost of a chair.

Group –B [8×5=40]

11 Three numbers are in A.P. and their sum is 15. If 1, 3,9 be added to them respectively, they form a G.P. Find the numbers.

12 Show That $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c)$

13 A function is defined as follows:

$$f(x) = \begin{cases} 3+2x & \text{for } \frac{-3}{2} \le x < 0 \\ 3-2x & \text{for } 0 \le x < \frac{3}{2} \\ -3-2x & \text{for } x \ge \frac{3}{2} \end{cases}$$

Show that $f(x)$ is continuous at x=0 and discontinuous at $x = \frac{3}{2}$.

14 Find from the first principle, the derivative of $\sqrt{x+3}$.

15 If 5 men, 10 women and 30 boys can do a piece of work in 81 days working 8 hours a day, in how many days will 10 men, 10 women and 10 boys do $\frac{2}{3}$ of the work working 9 hours, assuming their capacity of doing work to be in the raio 3:2:1.

16 The list price of an article is 25% above the selling price and cost price is 40% below the list price. Find the rate of discount and profit.

17 Three partners A, B and C start a business contributing Rs. 15,000, Rs. 20,000, and Rs. 24,000 respectively. B receives 20% of the profit for his salary as manager. At the end of 5 months, A withdraws $\frac{1}{3}$ of his capital and at the end of 7 months C withdraws $\frac{1}{4}$ of his capital. Profits for the year amounted to be Rs. 35,000. What sum of money would A, B and C receives?

18 Determine the par of exchange between England and Germany assuming that £1 = 123.27 grains of gold, $\frac{11}{12}$ fine and 10 marks = 61.4 grains of gold, $\frac{9}{10}$ fine.

"Best of Luck"