SAMPLE QUESTION-ONLY FOR FORMAT (THIS PAPER MAY NOT BE ACCORDING TO SYLLABUS)

TRIBHUVAN UNIVERSITY

JANAPRIYA MULTIPLE CAMPUS

FACULTY OF MANAGEMENT

2018

Full Marks: 60

Pass marks: 30

Time: 3 Hours

BMTM / First Semester / MTH 111: Basic Mathematics

Candidates are required to give their answers in their own word as far as practicable.

Group "A"

1. ***Brief Answer Questions*** ***[10×1=10]***

i. Find the equation of the straight line making an angle 60,with x-axis and passing through the point (-3,5)
[Unit II]

ii. Find ninth term of the sequence 81,27,9 ……
[Unit I]

iii. Find amount of an immediate annuity of Rs2400 a year for 5 years reckoning compound interest at 4% per anum
[Unit III]

iv. Calculate the annual percentage rate (APR) [effective rate] for 8% per anum nominal rate of interest compounded quarterly.
[Unit VI]

v. Find Value of X: $log_3(x+5) = 2$
[Unit VII]

vi. State the nature of roots of quadratic equation : $7x^2 - 20x + 40 = 0$
[Unit VII]

vii. Find differential coefficient of $y = e^{3x}.(2x+5)$
[Unit VIII]

viii. The demand function for the mobiles is $P = 60 - 0.5Q$. Determine the number of mobiles demanded for which $ed = -1$
[Unit I]

ix. What type of solution, the following system of equation have?

$$2x - 5y = 10$$
$$-4x + 10y = -20$$

[Unit II]

x. Sketch the graph of $y = \left(\frac{1}{3}\right)^x$
[Unit II]

Group 'B'

Short Answer Questions ***[10×4=40]***

2. Mr. Harish wishes to invest Rs.10,00,000 in two parts ,one for his son aged 12 years and other for his daughter age 4 years in such a way that they should get the same amount when they are 15 years old. How should he divide the sum if the interest is 12% p.a. compounded annually?
   [Unit I]
3. A loan of Rs.50,000 is to be repaid in equal quarterly installment over a period of 5 years. If interest rate is 7.5 % per anum, compounded quarterly, calculate
   a. The amount of each quarterly payment
   b. The amount of interest paid.

   [Unit II]
4. In a two sector economy, autonomous consumption expenditure $C_0 = 280$, expenditure $I_0 = 80$ $b = 0.6$.
   a. Obtain the expenditure equation, & it'slope.
   b. Graph the equilibrium equation and the expenditure equation on the same diagram.
   c. Determine the equilibrium level of income ye (i) graphically and (ii) algebraically.

   [Unit III]

5. The demand function for a good is $P = 200 - 3Q$.and total cost function is $TC = 1440 + 8Q + 3Q^2$.
   i. Find the number of items to be produced at which the break –even points will be obtained.
   ii. Find the number of quantity to be produced in order to make the profit maximum. Also find the maximum profit.

   [Unit IV]
6. Let $f(x) = x^3 - x - 4 = 0\ and\ x_0 = 2$ .Find the root correct to three places of decimal by using Newton- Raphson method
   [Unit V]
7. The demand and supply function for a good given by $P_d = 100 - 0.5Q_d,\ P_s = 10 + 0.5Q_s$
   i. Determine the equilibrium price and quantity.
   ii. Analyze the effect of the introduction of price ceiling of Rs 40 in the market.
   iii. Calculate the profit made by black marketers if black marketer operated in the market.

   [Unit VI]

8. From the following table showing the age of the car (years) and annual maintenance cost (000'Rs).

Age (x)	2	4	6	8	10
Cost (y)	2	5	6	7	10

   Compute equation of line of best fit and estimate the cost when age of the car is 14 years.
   [Unit VII]

9. Decide which project is the most viable by calculating NPV at a discount rate of 8%

	Initial Cash	Return Back		
		Year I	Year II	Year III
Project A	50,000	20,000	20,000	20,000
Project B	50,000	20,000	10,000	30,000

   [Unit VIII]

10. The resale value V(in Rs) of a piece of industrial equipment has been found to be according to the function $V = 25{,}000\ e^{-0.6t}$, where t= year since purchase.
    i. What is expected resale value after 5 years?
    ii. How long does it take for the resale value of the asset to reach 25% of the original value?

[Unit II]

11. The demand and supply functions for a product are given by $Q = 80 - 0.02P \ \ and\ Q = -20 + 0.02P$ Respectively.

    i. Calculate equilibrium price and quantity plot demand and supply function in the from P=f(Q)
    ii. Calculate the consumer surplus at equilibrium.
    iii. Calculate the producer's surplus at equilibrium.
    iv. Calculate total surplus at equilibrium.

[Unit III]

Group 'C'

Comprehensive Answer Questions ***[10×1=10]***

12. Let the cost function of a firm be given by $C(x) = 300x - 10x^2 + \frac{1}{3}\ x^3 where\ x\ is\ an\ output.$
    a. Find the level of output at which marginal cost is minimum [4]
    b. Find level of output at which average cost is minimum [4]
    c. Find the level of output at which marginal cost is equal to average cost [2]

    [Unit I]

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