MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

VII SEMESTER B.TECH. (COMMON TO ALL)

END SEMESTER EXAMINATIONS- MAKE-UP, DECEMBER 2017

SUBJECT: ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT [HUM 4002]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.
- Interest factor table is provided in the last page (else use formulae).

1A.	Explain the law of demand and law of supply with relevant sketches.	(03)
1B.	A couple is planning to finance their three-year-old son's college education. Money can be deposited at 15% compounded quarterly. What quarterly deposit must be made from the son's 3rd birthday to his 18th birthday to provide $50,000 on each birthday from the 18th to the 21st? (Note that the last deposit is made on the date of the first withdrawal.)	(03)
1C.	You want to open a savings plan for your future retirement. You are considering the following two options: **Option 1:** You deposit $1,000 at the end of each quarter for the first 10 years. At the end of 10 years, you make no further deposits, but you leave the amount accumulated at the end of 10 years for the next 15 years. **Option 2:** You do nothing for the first 10 years. Then you deposit $6,000 at the end of each year for the next 15 years. If your deposits or investments earn an interest rate of 8% compounded quarterly, which is the best retirement plan?	(04)
2A.	Cycle Atherton wants to buy a car when he graduates college in two years. He has the following sources of money. He has $5,000 now in the bank in an account paying 8% compounded quarterly. He will receive $2,000 in one year from a trust. He will take out a car loan at the time of purchase on which he will make $500 monthly payments at 8% compounded monthly over four years. His uncle is going to give him $1,500 a quarter starting today for one year. In addition, he will save up money in a credit union through monthly payroll deductions at his part-time job. The credit union pays 15% compounded monthly. If the car is expected to cost $40,000, how much must he save each month?	(04)
2B.	A machine can be purchased today for $300,000. The annual revenue from the machine is calculated to be $67,000, and the equipment will last for 10 years. Expect	(03)

	the operating costs to be $3000 a year which will increase to $600 per year. The salvage value of the machine will be $20,000. Calculate the IRR for this machine?	
2C.	The following equation describes the conversion of a cash flow into an equivalent equal payment series with N=20: A = { [50+25(A/G, 15%,10)](F/A, 15%, 10) (F/P, 15%,10) + [500-10(A/G, 15%, 10)] (F/A, 15%, 10) - [200+100(A/G,15%,4] (P/A,15%,4) (F/P,15%, 20) – [1300+100(A/G, 15%,4)] (F/A, 15%, 4) (F/P,15%,10) – [1200-200(A/G, 15%, 6)] (F/A, 15%, 6) } X (A/F, 15%, 20) Reconstruct the original cash flow diagram	(03)
3A.	A private hospital borrowed Rs.3,00,000 to purchase a laboratory equipment from a bank. The loan is to be repaid in end-of-year equal installments over next five years at i= 8%. a) Compute the annual installment. b) At the end of six months, the hospital wants to negotiate with the bank to defer the first installment payment until the end of year 2, but still desires to pay 5 installments at 8% interest. Determine the deferred annuity (i.e. annual installment) if the bank approves with condition that the interest rate is 8% compounded semi-annually.	(03)
3B.	A newly constructed building costs INR 5,00,00,000. The same building is estimated to need renovation every 15 years at a cost of INR 50,00,000. Annual repairs and maintenance are estimated to be INR 10,00,000 per year for the first seven years and then increases to an amount of INR 12,50,000 from the eighth year onwards till fifteenth year and afterwards to an amount of INR 15,00,000 per year forever. If the interest rate is 15%, determine the capitalized cost of the bridge. Also, what is its equivalent annual cost?	(03)
3C.	Mr. Ram Lal requires a sum of Rs.10,00,000 at the end of 5 years from now for his son's education. He is considering the following alternatives to accumulate the funds required: i) Deposit a fixed sum in a bank at the end of every year for five years which will fetch him on maturity an amount of 10 lakhs. Bank pays him an interest at the rate of 8% per annum. ii) Buy a plot now by borrowing the amount required to buy it and sell it after 5 years so that it realizes Rs.10 lakhs. He has identified an area in which the market price is expected to grow at the rate of 15% per annum. The purchase price is repayable in 5 equal annual installments at the end of each year; the first installment is being paid at the end of the year. The loan carries an interest rate of 8% per annum. Advise Mr. Ram, with the necessary calculations, the best option.	(04)