Hall Ticket Number :										

R-20

Code: 20AC36T

II B.Tech. I Semester Supplementary Examinations June 2024

Managerial Economics and Financial Analysis

(Common to CE & ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	What is Law of demand?	1	L1
b)	Cost – volume- profit analysis.	2	L1
c)	Define departmental organizations.	3	L1
d)	Uses of Accounting rate of return.	4	L1
e)	Write a note on Debt-Equity ratio.	5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2. a)	Define Managerial Economics? Explain its scope.	6M	1	L2
b)	Explain the significance of Elasticity of Demand.	6M	1	L2
	OR			
3.	What is Law of demand? Explain the difference between demand schedule & demand curve.	12M	1	L3
	UNIT-II			
4. a)	Illustrate Cob-Douglas Production function	6M	2	L3
b)	Explain the managerial uses of Break-even analysis.	6M	2	L2
	OR			
5. a)	Explain cost output relationship in long-run.	6M	2	L2
b)	From the following particulars Calculate BEP. Fixed factory overheads cost – Rs. 60000 Fixed selling overheads cost – Rs. 12000 Variable manufacturing cost per unit – Rs. 12 Variable selling cost per unit – Rs. 3 Selling price per unit – Rs. 24.	6M		L3
	UNIT-III			
6.	Explain how the price is determined in case of perfect competition. Illustrate.	12M	3	L2

OR

7. What is monopolistic competition? Explain the determination of equilibrium output and price of firm under monopolistic competition. 12M 3 L3

UNIT-IV

8. What do you mean by Capital Budgeting? Explain different techniques of Capital Budgeting. 12M 4 L2

OR

9. A company has an investment opportunity costing Rs.40,000 with the following expected net cash inflows:

Year	Cash Inflows (Rs.)
1	7,000
2	7,000
6	8,000
7	10,000

Year	Cash Inflows (Rs.)
8	15,000
9	10,000
10	4,000

Determine the following:

a) Payback period.
b) NPV (10% discount rate)
c) Profitability Index. 12M 4 L4

UNIT-V

10. Given,
Gross profit ratio 20%
EPS 2/-Rs,
no of shares 25000@ 10/-Rs each
profit 25% of share capital.
Current ratio3:1 and
Acid test ratio1.5:1
Quick Assets 30,000/-
inventory turnover ratio10 times,
operating ratio 90%,
closing Stock less by Rs 6000/- in opening stock
find out
i) Current Liabilities ii) Quick Liabilities iii) Current Assets iv) Opening Stock v) Closing Stock. 12M 5 L4

OR

11. From the following Trail Balance of Maanas Prepare trading & Profit and loss a/c for the year ended 31st December 2020 and Blanace sheet as on that date.

Debit Balances	**Rs.**	**Credit Balances**	**Rs.**
Purchases	90,000	Sales	1,45,000
Returns	2,000	Returns	2,000
Cash in Hand	5,000	Commission	3,000
Cash at Bank	8,000	Capital	56,000
Debtors	20,500	Creditors	40,000
Furniture	13,000	**Total**	**246000**
Machinery	25,000		
Opening stock	15,000		
Rent	4,500		
Wages	11,000		
Insurance	1,000		
Carriage outwards	2,000		
Travelling expenses	1,000		
Bills receivable	34,000		
Salaries	8,000		
Drawings	6,000		
Total	**246000**		

Adjustments:

a) Closing stock Rs. 32,000 12M 5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A431T

II B.Tech. I Semester Supplementary Examinations June 2024

Signals & Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		CO	BL
a)	Consider a system that takes an input signal x(t) and outputs a signal **y(t)=2x(t)-1.** Determine whether the system is linear or nonlinear and explain your reasoning.		CO1	L3
b)	Explain the concept of Fourier transform and its relationship to Fourier series.		CO2	L2
c)	Define a linear time-invariant (LTI) system and explain its key properties. How does the concept of impulse response relate to the behavior of an LTI system?		CO3	L2
d)	Explain the relationship between convolution and correlation operations in the context of signals and systems.		CO4	L2
e)	Use the properties of Laplace transforms to derive the Laplace transform of the function x(t) = d/dt(sin(2πt)).		CO5	L3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
	UNIT-I				
2.	a)	Determine the Fourier series of the signal $x(t) = 3 \cos (0.5\pi t+\pi/3)$. Plot the magnitude and phase spectra.	4M	CO1	L3
	b)	Examine whether the following signals are periodic or not? If periodic determine the fundamental period. i) $x(t) = 3 \sin 200\pi t + 4 \cos 100t$ ii) $x(t) = 2 + \cos 2\pi t$ ii) $x(n) = e^{j\pi/2n}$ iv) $x(n) = \cos (n/6)\cos (n\pi/6)$	8M	CO1	L4

OR

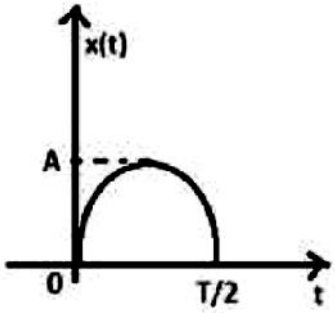
3. a) Determine the discrete time Fourier series of $x(n)=\cos^2(\pi n/6)$ — 4M CO1 L3

   b) State and prove any four properties of Fourier series — 8M CO1 L2

UNIT-II

4. a) Discuss the limitations of Fourier series in representing non-periodic signals. How does the Fourier transform overcome these limitations and provide a more comprehensive representation of signals in the frequency domain? — 6M CO2 L4

   b) Determine the Fourier transform of the sinusoidal pulse shown below.



6M CO2 L3

OR

5. a) Determine the Fourier transform of a train of impulses of unit height separated by T sec. — 6M CO2 L3

   b) Determine out the Fourier Transform of $x(t) = e^{-at}\cos(w_o t)\, u(t)$ — 6M CO2 L3

UNIT-III

6. a) The response of an LTI system to a step input, $x(t) = u(t)$ is $y(t) = (1-e^{-2t})\, u(t)$. Determine the response to an input of $x(t) = 4u(t) - 4u(t-1)$? — 6M CO3 L4

   b) State and prove sampling theorem for band limited signals. — 6M CO3 L2

OR

7. a) Obtain conditions for the distortion less transmission through a system. — 6M CO3 L3

   b) Determine the response of an LTI for input $x(n) = \{1,2,3,1\}$ if $h(n) = \{1,2,1,-1\}$ — 6M CO3 L3

UNIT-IV

8. a) State and prove the properties of Auto-correlation function. 4M CO4 L2

   b) Perform the convolution of the following signals.
   i) x(t) = 5 u(t) and h(t) = 3 u(t)
   ii) x(t) = e^{-5t} u(t) and h(t) = e^{-2t} u(t) 8M CO4 L4

OR

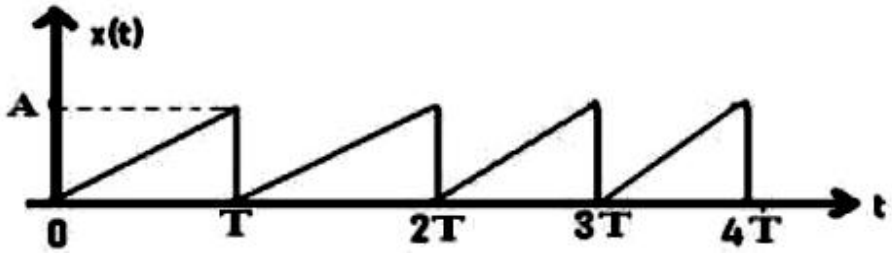
9. a) Evaluate the convolution of x(n) = {2,-1,3,2} with h(n) = {1,-1,1,1} using graphical method. 8M CO4 L4

   b) Use convolution in time property of Fourier transform and determine the output of the system with input, x(t)=e^{-3t} u(t) and impulse response, h(t) = e^{-4t} u(t). 4M CO4 L2

UNIT-V

10. a) State and Prove the following properties of Laplace Transform i) Time Shifting ii) Shifting in the s-Domain iii) Time Scaling 6M CO5 L2

    b) Find out the Laplace transform of the signal shown in below figure.



6M CO5 L4

OR

11. a) Find the all possible sequences with Z-Transform given by

$$X(z) = \frac{1-\frac{1}{2}z^{-1}}{1+\frac{3}{4}z^{-1}+\frac{1}{8}z^{-2}}$$

6M CO5 L4

    b) Find the Z-Transform of x1(n)= n.u(n) ; x2(n)= (n-3).u(n-3) ; x3(n)= (n-3).u(n) 6M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC32T

II B.Tech. I Semester Supplementary Examinations June 2024

Transform Techniques & Complex Variables

(Common to EEE &ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer ***all*** the following short answer questions (5 X 2 = 10M) CO BL

a) Find Laplace transform of tcosat. CO1 L4

b) Find the inverse transforms of $\frac{s+2}{(s^2-4s+13)}$ CO2 L2

c) Find a_0 in the expansion of f(x)=xsinx. CO3 L4

d) Evaluate using Cauchy's integral formula $\int_c \frac{e^{2z}}{(z-1)(z-2)} dz$, where C is the circle |z|=3. CO4 L2

e) Find the nature and location of singularities of 1/ (cosz-sinz). CO5 L3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT–I

2. a) Find the Laplace transform of f(t) = $\begin{cases} \frac{t}{\tau}, & when\ 0 < t < \tau \\ 1, & when\ t > \tau \end{cases}$ 6M CO1 L3

b) Find the Laplace transform of the triangular wave of period 2a given by

f(t) =t, 0<t<a

=2a-t, a<t<2a. 6M CO1 L1

OR

3. a) Evaluate $L\{t \int_0^t \frac{e^{-t}\sin t}{t} dt\}$ 6M CO1 L2

b) Find $L(te^{at}\int_0^t \frac{e^{-t}\sin t}{t})$ 6M CO1 L1

UNIT–II

4. Find the inverse transforms of $\frac{2s^2-6s+5}{s^3-6s^2+11s-6}$ — 12M CO2 L3

OR

5. Solve ty''+2y'+ty=cost given that y(0)=1 — 12M CO2 L3

UNIT–III

6. Obtain the Fourier expansion of xsinx as a cosine series in (0,π). — 12M CO3 L4

OR

7. Find the Fourier cosine transform of $f(x)=1/(1+x^2)$.
Hence derive Fourier sine transform of $\varphi(x) = x/(1+x^2)$. — 12M CO3 L1

UNIT–IV

8. a) If ω=φ+iψ represents the complex potential for an electric field and $\psi=\frac{x}{x^2-y^2+x^2+y^2}$, determine the function φ. — 6M CO4 L1

b) If $F(\varsigma)=\int_c \frac{4z^2+z+5}{z-\varsigma}dz$, where C is the ellipse $(x/2)^2+(y/3)^2=1$, find the value of F(3.5). — 6M CO4 L2

OR

9. Evaluate $\int_c \frac{e^z}{(z^2+\pi^2)^2}dz$, where c is |z|=4 by using Cauchy Integral formula — 12M CO4 L2

UNIT–V

10. Find the Laurents' expansion of $f(z)=\frac{7z-2}{(z+1)z(z-2)}$ in the region 1<z+1<3. — 12M CO5 L2

OR

11. Evaluate $\int_c \frac{\sin\pi z^2+\cos\pi z^2}{(z-1)^2(z-2)}dz$, where C is the circle |z|=3 by using residue threorem. — 12M CO5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A433T

II B.Tech. I Semester Supplementary Examinations June 2024

Analog Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Draw the h-parameter model for CE amplifier.	1	L2
b)	What are the disadvantages of positive feedback?	2	L1
c)	What is oscillator? Explain the types of oscillators.	3	L1
d)	What is Class-A power amplifier?	4	L1
e)	Discuss the response of RC high pass circuit to ramp input voltage.	5	L4

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2. a)	Draw the circuit diagram of CB amplifier and explain its operation in detail.	6M	1	L3
b)	In the CE amplifier calculate the mid frequency voltage gain and lower 3-dB point. The transistor has h-parameters h_{fe}=400 and h_{ie} = 10kΩ, the circuit details are R_s = 600Ω, R_L = 5kΩ, R_e=1kΩ, V_{cc} = 12V, R_1 = 15kΩ, R_2 = 2.2 kΩ and C_e = 50μF.	6M	1	L3
	OR			
3. a)	Draw and explain BJT small signal model, compare the performance of CE, CB, and CC amplifier.	6M	1	L3
b)	If the Common Emitter h –parameters of a transistor are given by h_{ie} = 2000 Ω, h_{fe} = 49, h_{re} = 5.5 × 10^{-4} and hoe = 2.5 × 10^{-5}. Find the common base h-parameters of the transistor.	6M	1	L3
	UNIT–II			
4. a)	Derive the input resistance, output resistance and voltage gain with feedback for Voltage shunt negative feedback amplifier using block diagram.	6M	2	L3
b)	An amplifier has an input resistance of 200 KΩ, with a certain negative feedback introduced in the above amplifier the input resistance is found to be 20 MΩ and overall gain is found to be 1000. Calculate the loop gain and feedback factor.	6M	2	L3
	OR			

5.	a)	Draw the current shunt feedback circuit diagrams. Explain in detail.	6M	2	L2
	b)	A voltage amplifier is characterized by an open loop voltage gain of 100. Input resistance of 50KΩ and output resistance of 2KΩ, Negative feedback of 10% of output voltage is introduced in series with the input to bring the distortion below acceptable level. Find the modified values of these parameters.	6M	2	L3

UNIT–III

6.	a)	Draw and derive the expression for frequency of oscillation for Wien bridge oscillator.	6M	3	L2
	b)	A Hartley Oscillator is designed with L_1 = 2 mH, L_2 = 20 µH and a variable capacitance. Determine the range of capacitor values if the frequency of oscillation is varying between 950 KHz and 2050 KHz.	6M	3	L3

OR

7.	a)	Draw and explain the operation of Hartley oscillator	6M	3	L2
	b)	Obtain the expression for frequency of oscillations and condition of oscillations for colpitt's oscillator. A colpitt's oscillator has C_1=0.16 µF, C_2=15.8µF and its frequency of oscillation is 20KHz. Calculate the value of L.	6M	3	L3

UNIT–IV

8.	a)	With a neat diagram, explain the principle of operation of class B push-pull amplifier and find its efficiency.	6M	4	L2
	b)	A push pull amplifier utilizes a transformer whose primary has a total of 160 turns and whose secondary has 40 turns. It must be capable of delivering 40W to an 8Ω load under maximum power conditions. What is the minimum possible value of V_{cc}?	6M	4	L3

OR

9.	a)	Draw the class-A transformer coupled power amplifier and explain its operation and derive the equation for its efficiency and explain its working.	6M	4	L3
	b)	A class B amplifier provides a 15V peak output signal to 10Ω load. The system operates on a power supply of 20V. Determine the efficiency of the amplifier.	6M	4	L3

UNIT–V

10.	a)	Derive an expression for the output of a high-pass circuit excited by a square input.	6M	5	L3
	b)	Explain clipping at two independent levels using diodes.	6M	5	L2

OR

11.	a)	A 10Hz symmetrical square wave with 2Vp-p amplitude is applied to a high pass RC circuit having a lower 3 dB cutoff frequency 5Hz. Obtain the transient response.	6M	5	L3
	b)	State and prove the clamping circuit theorem.	6M	5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A432T

II B.Tech. I Semester Supplementary Examinations June 2024

Digital Logic Design

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
	a) Convert the given $(42)_{16}$ to Decimal and Octal	CO1	L3
	b) List the advantages of Tabulation method over K-map method	CO2	L1
	c) Write about code converters	CO3	L2
	d) Draw the logic diagram of D Flip flop	CO3	L3
	e) Compare two differences between Mealy and Moore models	CO4	L5

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2. a)	Solve $(111011)_2 - (110111)_2$ using 1's complement method	6M	CO1	L3
b)	Convert the given $(431)_{10}$ into Base 2, Base 5 and Base 8	6M	CO1	L3
	OR			
3. a)	Draw logic symbols of Logic gates	6M	CO1	L3
b)	Generate a Hamming code for the given data with Even Parity 1101	6M	CO1	L3
	UNIT-II			
4. a)	Determine minimal sum of products using tabulation method for the given F= $\sum_m$ (1,4,5,6,7,9,11,15)	7M	CO2	L3
b)	Design a NAND gate circuit for AND operation.	5M	CO2	L6
	OR			
5. a)	Solve for minimal SOP using K-map F= π (0,1,2,4,7)+d(3) and realize using NOR gates	6M	CO2	L3
b)	Develop the NAND circuit after minimization for the given Boolean function F(A,B,C,D)= Σ_m (0,1,2,3,4,6,8,10,12,14)	6M	CO2	L6
	UNIT-III			
6.	Design a combinational logic circuit for 3 bit Binary-to-Gary code converter.	12M	CO3	L6
	OR			

7.	a)	Develop a comparator two compare A and B code words of two bits each.	6M	CO3	L6
	b)	Design and implement a Full adder circuit using 3:8 Decoder.	6M	CO3	L6

UNIT-IV

8.	a)	What is excitation table? Write the excitation table for T Flip flops.	6M	CO3	L2
	b)	Interpret operation of JK FF using characteristics table and logic diagram	6M	CO3	L2

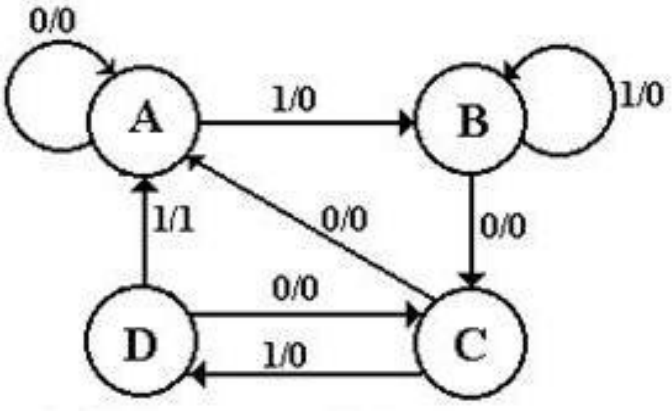
OR

9.		Design Synchronous Mod-6 up counter using state table, state equations and D Flip Flops	12M	CO3	L6

UNIT-V

10.	a)	Construct the ASM charts for the following state transitions: If X=1, control goes from T1 to T2 and then to T3. If X=0 control goes from T1 to T3	8M	CO4	L6
	b)	What are the building blocks of ASM chart? and describe its role.	4M	CO4	L2

OR

11.		Apply the knowledge of state transition to get State table, ASM chart for the given State diagram 	12M	CO4	L3

*** End ***