Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations May/June 2022

Engineering Mathematics-III

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Using Taylor's series method, compute the value of y at x=0.2 from $\frac{dy}{dx} = x + y$; $y(0) = 1$. 7M

   b) Using the bisection method, find a real root of the equation $\cos x = x e^x$ correct to three decimal places. 7M

OR

2. a) Apply fourth order Runge-Kutta method to $\frac{dy}{dx} = 3x + \frac{1}{2}y$, $y(0) = 1$ determine $y(0.1)$ correct to four decimal places. 7M

   b) Find a real root of the equation $3x = \cos x + 1$ by Newton-Raphson's method correct to four decimal places. 7M

UNIT–II

3. a) Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ by Simpson's 1/3 rule. 7M

   b) Using Lagrange formula find $f(4)$. Given 7M

x	0	2	3	6
y	-4	2	14	158

OR

4. The following table of values of x and y is given.

x	0	1	2	3	4	5	6
y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

Find $\frac{dy}{dx}$ *and* $\frac{d^2y}{dx^2}$ at x=6 14M

UNIT–III

5. a) Fit a straight line $y = a + bx$ to the data by the method of least squares 7M

x	0	1	3	6	8
y	1	3	2	5	4

   b) Form the partial differential equation by eliminating a, b from $ax^2 + by^2 + z^2 = 1$ 7M

OR

6. a) Form a partial differential equation by eliminating the arbitrary functions from $z = f(x+at)+g(x-at)$. 7M

   b) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = y\,f(x)+x\,g(y)$. 7M

UNIT–IV

7. a) Express $f(x)=x$ as half range sine in $0<x<2$ 7M

   b) Find the Fourier series to represent $f(x)=®\ x$ in $0\le x\le 2$ 7M

OR

8. a) Find the half range cosine series for $f(x)=x(2-x)$ in $0\le x\le 2$ and hence find prove that $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\frac{1}{5^2}-\frac{1}{6^2}+\ldots=\frac{®^2}{12}$ 7M

   b) Find the Fourier series to represent $f(x)=|x|$ when $-® < x < ®$ and deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots=\frac{®^2}{8}$ 7M

UNIT–V

9. a) Find the Fourier sin and cosine transform of $f(x)=\frac{e^{-ax}}{x}, a>0$ 7M

   b) Find the Fourier cosine transform of $f(x)=\begin{cases} x, & 0<x<1 \\ 2-x, & 1<x<2 \\ 0, & x>2 \end{cases}$ 7M

OR

10. Find the Fourier transform of $e^{-|x|}$. Hence show that $\int_0^{\infty}\frac{x\sin mx}{1+x^2}dx=\frac{®}{2}e^{-m}, m>0$ 14M

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Hall Ticket Number :										

R-17

Code: 7G536

II B.Tech. I Semester Supplementary Examinations May/June 2022

Fluid Mechanics and Hydraulic Machines

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Define the following.
   i) Absolute pressure ii) Gauge pressure iii) Vacuum pressure 6M

   b) The right limb of a simple U-tube manometer containing mercury is open to atmosphere while the left limb is connected to a pipe in which a fluid of sp.gr.0.9 is flowing. The center of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of a fluid in the pipe if the difference of mercury level in the two limbs is 20 cm. 8M

OR

2. Water flows through a pipe AB 1.2 m diameter at 3m/sec and then passes through a pipe BC 1.5 m diameter. At C the pipe branches. Branch CD is 0.8 m in diameter and carries one third of flow in AB. The flow velocity in branch CE is 2.5 m/sec. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. 14M

UNIT–II

3. Derive an expression for rate of flow through venturimeter. 14M

OR

4. A 45^0 reducing bend is connected in a pipe line, the diameters at inlet and outlet of the bend being 600 mm and 300 mm respectively. Find the force exerted by the on the bend if the intensity of pressure at inlet to the bend is 8.829 N/cm^2 and the rate of flow of water is 600 litres per second. 14M

UNIT–III

5. What are the various types of hydroelectric power stations and explain briefly about them. 14M

OR

6. Derive an expression for force exerted by a jet on a stationary curved plate when i) when the jet strikes the curved plate at the center ii) jet strikes the unsymmetrical curved plate at one end tangentially . 14M

UNIT–IV

7. Explain the characteristic curves of the hydraulic turbines 14M

OR

8. a) Define specific speed of the turbine and derive an expression for it. 7M

   b) A turbine is to operate under a head of 25 m at 200 r.p.m. The discharge is 9 cumec. If the efficiency is 90%, determine: i) specific speed of the machine ii) power generated iii) type of turbine. 7M

UNIT–V

9. Explain about the various losses in the centrifugal pumps. 14M

OR

10. The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 r.p.m. The vane angle of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of the water. 14M

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Hall Ticket Number :										

R-17

Code: 7G232

II B.Tech. I Semester Supplementary Examinations May/June 2022

Switching Theory and Logic Design

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks
		UNIT–I	
1.	a)	Distinguish between weighted and non-weighted codes with examples.	6M
	b)	Represent the Decimal number 8620 in i) BCD ii) Excess 3 iii) Gray Codes.	8M
		OR	
2.	a)	State duality theorem. List Boolean laws and their duals.	8M
	b)	Realize XOR gate using minimum number of NAND Gates.	6M
		UNIT–II	
3.	a)	Implement EX-NOR Gate using only NAND Gates.	7M
	b)	Convert the given expressions in to standard SOP Form. i. F(A,B,C) = A+AB+CB. ii. F(P,Q,R) = PQ+R+PR.	7M
		OR	
4.	a)	Find all the prime implicants for the following Boolean function using K-map and determine which are essential? F(A,B,C,D) = Σm(1,3,4,5,9,10,11,12,13,14,15)	6M
	b)	Reduce the following four variable function using k map Y=A'B'CD'+ABCD'+AB'CD' + AB'CD+ AB'C'D' + ABC'D' +A'B'CD + A'B'C'D'.	8M
		UNIT–III	
5.	a)	Draw and explain the block diagram of n-bit parallel adder.	7M
	b)	What is programmable logic array? How it differs from PROM.	7M
		OR	
6.	a)	What is encoder? Design octal to binary encoder.	6M
	b)	Design a BCD to Excess- 3 code converter using PAL.	8M
		UNIT–IV	
7.	a)	What is Race around condition? How it can be eliminated.	7M
	b)	Explain the operation of SR Flip-Flop.	7M
		OR	
8.	a)	Convert SR to JK flip-flop.	6M
	b)	Design mod 8 synchronous counter using T flip-flop.	8M
		UNIT–V	
9.	a)	Compare ASM Chart and the State Diagram.	7M
	b)	Discuss mealy and Moore machine models of sequential machines.	7M
		OR	
10.		Draw the state diagram and state table for sequence detector which can detect a sequence of 101 and implement using D Flip-flop	14M

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Hall Ticket Number :										

R-17

Code: 7G334

II B.Tech. I Semester Supplementary Examinations May / June 2022

Analog Electronics-I

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. A CC amplifier has the h-parameters given as hie=1100Ω hre=$2x10^{-4}$ and hoe=25μA/V and hfe=50. Where both load and source resistances are 2kΩ. Then determine current gain, voltage gain, input and output resistances, overall input and output resistances. 14M

OR

2. a) Explain about Two stage RC–coupled amplifier. 10M
   b) What is the significance of 3dB Bandwidth? 4M

UNIT–II

3. When the negative feedback is applied to an amplifier of gain 100, the overall gain falls to 50. Calculate (i) the feedback factor β (ii) if the same feedback factor maintained, the value of the amplifier gains required if the overall gain is to be 75 14M

OR

4. a) List out the Classification of feedback amplifiers 7M
   b) Derive the expression for transfer gain with feedback? 7M

UNIT–III

5. a) Explain the Working of transistorized wein-bridge oscillator with neat diagram. 10M
   b) A wein bridge oscillator has a frequency of 400Hz, if the value of C is 100pF then determine the value of R 4M

OR

6. a) List out the classification of oscillators 6M
   b) Explain about the crystal oscillators and mention their advantages 8M

UNIT–IV

7. a) Note the advantages of Large signal amplifiers. 7M
   b) Derive the expression for efficiency in class B amplifier 7M

OR

8. a) Describe the circuit used to overcome cross over distortion. 8M
   b) Explain crossover distortion in Class B power amplifier. 6M

UNIT–V

9. a) State and prove clamping circuit theorem. 8M
   b) List out the classification of clippers and clampers. 6M

OR

10. a) Discuss the response of RC low-pass circuit with step and pulse inputs along with output waveforms. 8M
    b) A 1KHz square wave output from an amplifier has rise time tr = 200ns and percentage of tilt is 10%, determine lower and upper frequencies. 6M

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