Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations Nov/Dec 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 $\cos x = xe^x$ correct to three decimal places. 7M

OR

2. Solve $y' = y^2 + x, y(0) = 1.$ Using Taylor's series Method, Compute $y(0.1), y(0.2)$ and $y(0.3)$. 14M

UNIT–II

3. a) 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 7M

   b) Using Lagrange is interpolation formula find the value of $f(10)$ from the following table

x	5	6	9	11
y	12	13	14	16

7M

OR

4. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.1 from the following table.

X	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

14M

UNIT–III

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

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

7M

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

OR

6. a) Fit a curve $y = ae^{bx}$ to the following data by the method of least squares

x	0	1	2	3
y	1.05	2.10	3.85	8.30

7M

   b) Form a partial differential equation by eliminating the arbitrary functions from $z = f(x + at) + g(x - at)$. 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 $f(x)=\pi x$ in $0\le x\le 2$ 7M

OR

8. a) Obtain the Fourier series for $f(x)=\left(\frac{\pi-x}{2}\right)^2$ in $0<x<2\pi$ 7M

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

UNIT–V

9. a) 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

   b) Find the finite Fourier sine and cosine transforms of $f(x)$ defined by

$$f(x)=\begin{cases} 1, & 0<x<\frac{\pi}{2} \\ -1, & \frac{\pi}{2}<x<\pi \end{cases}$$ 7M

OR

10. a) Find the Fourier sin and cosine transform of $f(x)=2e^{-5x}+5e^{-2x}$ 7M

    b) Find the Fourier Transform of $f(x)=\begin{cases} a^2-x^2, if\ |x|<a \\ 0 \ \ if \ \ |x|>a>0 \end{cases}$, and hence show that $\int_0^a \frac{\sin x-\cos x}{x^3}dx=\frac{\pi}{4}$. 7M

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Hall Ticket Number :										

R-17

Code: 7G536

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Fluid Mechanics & Hydraulic Machinery

(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) Write briefly about different types of Pressure measuring devices 5M

   b) A U-tube containing mercury has its right limb open to atmosphere. The left limb is full of water and is connected to a pipe containing water under pressure, the center of which is in level with the free surface of mercury. Find the pressure of water in the pipe above atmosphere, if the difference of mercury level in the limbs is 5.08 cm. 9M

OR

2. a) Explain Centre of Buoyancy? Lake, has a maximum depth of 60m, and the mean atmospheric pressure is 91 kpa. Determine the absolute and gauge pressure in kpa at this maximum depth. 6M

   b) An incompressible fluid flows steadily through two pipes of diameter 0.15 m and 0.2 m, which combine to discharge in a pipe of 0.3 m diameter. If the average velocities in the 0.15m and 0.2 m diameter pipes are 2 m/s and 3 m/s respectively, find the average velocity in the 0.3 m diameter pipe 8M

UNIT–II

3. a) Explain the TEL and HGL with neat sketch. 7M

   b) Define the following with suitable examples.
   i) Body forces ii) Surface forces iii) Line forces. 7M

OR

4. a) Derive an expression for rate of flow through orifice meter 7M

   b) An orifice meter with orifice diameter 10cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives the readings of 19.62 N/cm^2 and 9.81 N/cm^2 respectively. Coefficient of discharge for the orifice metre is given as 0.6. Find the discharge of water through pipe. 7M

UNIT–III

5. a) What do you mean Hydroelectric power plant? Give the basis of selection and classification of these plants. Give the detailed construction and working principle of the Hydroelectric plant 7M

   b) A free jet moving with a velocity V strikes normally on a series of flat plates moving with a velocity of u and mounted radially on the periphery of a wheel. Determine the efficiency of the plates. 7M

OR

6. a) What is pumped storage power plant and explain its concept. 7M

   b) Describe the various storage requirements of hydroelectric power station. 7M

UNIT–IV

7. a) Define the various types of efficiencies of hydraulic turbines. 7M

   b) Explain the various parts of Pelton turbine and its working with the neat sketch. 7M

OR

8. a) Describe the cavitation in hydraulic turbines 7M

   b) Explain the governing of the hydraulic turbine with neat sketch. 7M

UNIT–V

9. What is indicator diagram of a reciprocating pump? Explain the working of a reciprocating pump with a neat sketches. 14M

OR

10. The outer diameter of the impeller of a Centrifugal pump is 400 mm and the outlet width is 50 mm. The pump is running at 800 rpm and working against a head of 15 m. The vane angle at the outlet is 40° and the manometry efficiency is 75%. Determine the following. (i) Flow velocity at the outlet (ii) The velocity of water leaving the vane (iii) Angle made by the absolute velocity with the direction of motion at the outlet (iv) Discharge of pump 14M

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Hall Ticket Number :										

R-17

Code: 7G232

II B.Tech. I Semester Supplementary Examinations Nov/Dec 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) Represent +25 and -25 in sign magnitude, sign 1's complement and sign 2's complement representation. 7M

   b) i) Convert the hexadecimal number 68BE to binary and convert it from binary to octal
   ii) Express the number $(26.24)_8$ in Decimal
   iii) Implement AND Gate using NAND Gates. 7M

OR

2. a) Simplify using Boolean algebra and implement using NAND-NAND Network.
   i) ABC'+A'BC+ABC+A'BC' ii) (yz'+x'w)(xy'+zw') 7M

   b) The Hamming code 101101101 is received .Correct it if any errors. There are four parity bits and odd parity is used. 7M

UNIT–II

3. a) What is the difference between canonical form and standard form? Which form is preferable while implementing a Boolean function with gates? 7M

   b) Implement EX-NOR Gate using only NAND Gates. 7M

OR

4. a) Realize the following expression using K-map
   F=Σm (0, 1, 2, 4, 5, 6, 9, 11, 12, 13, 14, 15) and Implement the same using NOR logic. 7M

   b) Simplify the following Boolean function for minimal SOP form using K-map and implement using NAND gates. *F (W X Y Z)* =Σ(1,3,7,11,15) + *d*(0, 2,5) 7M

UNIT–III

5. a) Compare Programmable logic devices. 7M

   b) Draw and explain the block diagram of n-bit parallel adder. 7M

OR

6. a) Design a combinational circuit using PROM. The circuit accepts a 3 bit binary number and generates its equivalent excess 3 code. 8M

   b) Design 4x16 decoder using two 3x8 decoders with block diagram. 6M

UNIT–IV

7. a) Draw the logic symbols and truth tables of JK and T flip flop 7M

   b) Draw the logic Diagram truth table of SR Latch. 7M

OR

8. a) Draw the excitation tables of SR, JK and T flip flops. 7M

   b) Explain the operation of twisted ring counter with the help of logic diagram and its timing diagrams. 7M

UNIT–V

9. a) Discuss the various blocks ASM chart. 7M

   b) Compare ASM Chart and the State Diagram. 7M

OR

10. Draw and explain the circuit of Moore type FSM. 14M

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Hall Ticket Number :										

R-17

Code: 7G334

II B.Tech. I Semester Supplementary Examinations Nov/Dec 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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UNIT–I

1. a) Distinguish between Exact and approximate models of BJT using h-parameters. 7M
   b) State and prove millers theorem. Explain its significance in transistor circuit analysis. 7M

OR

2. Draw and discuss the Frequency response of RC Coupled, Direct coupled and Transformer coupled amplifiers with relevant diagrams. 14M

UNIT–II

3. Explain voltage series feedback employed in emitter follower with neat diagrams and obtain the expressions for voltage gain, current gain, input and output impedances. 14M

OR

4. a) Derive the expression for transfer gain with feedback? 7M
   b) What is Sampling. Explain about it with neat diagrams. 7M

UNIT–III

5. Sketch the topology of a generalized resonant circuit of LC oscillator using the impedances Z1, Z2, Z3. At what frequency will this circuit oscillate? 14M

OR

6. a) Explain about the crystal oscillators and mention their advantages 7M
   b) Write short notes on Frequency stability of oscillators 7M

UNIT–IV

7. a) Derive the expression for efficiency in class B amplifier 7M
   b) What is the Max power dissipation per each transistor and derive the expression for it. 7M

OR

8. a) Define the terms i) DC Power Input ii) AC Power Output iii) Efficiency 6M
   b) Explain the operation of Complementary symmetry Class B amplifier. 8M

UNIT–V

9. a) What is RC low-pass circuit? What is meant by ringing circuit? 7M
   b) Explain the RC Integrator with Exponential input. 7M

OR

10. a) Discuss about transistor clippers. 7M
    b) State and prove clamping circuit theorem. 7M

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