Hall Ticket Number :										

R-17

Code: 7G334

II B.Tech. I Semester Supplementary Examinations March 2021

Analog Electronics-I

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) State and prove millers theorem. Explain its significance in transistor circuit analysis.
   b) Briefly explain how transistor acts as an amplifier, and draw h-parameter model of transistor.

OR

2. A CE amplifier has the h-parameters given as hie=1000Ω hre=$2x10^{-4}$ and hoe=25μmho and hfe=50. Where both load and source resistances are 1kΩ. Then determine current gain, voltage gain, input and output resistances, overall input and output resistances.

UNIT–II

3. a) Explain the concept of feedback with block diagram.
   b) Briefly discuss about the effect of feedback on amplifier bandwidth

OR

4. a) Prove that negative feedback increases the bandwidth and decreases distortion.
   b) An amplifier has an open loop gain 1000 and a feedback ratio of 0.04. if the open loop gain changed by 10% due to temperature, then find the percentage change in gain of the amplifier with feedback.

UNIT–III

5. a) What is the condition for oscillations?
   b) In a transistorized Hartley oscillator, the two inductances are2mHand 20mHwhile the frequency is to be changed from950 KHz to 2050 KHz. Calculate the range over which the capacitor is to be varied.

OR

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

UNIT–IV

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

OR

8. a) A Class B Push-Pull amplifier supplies power to a loud speaker of 10Ω.The transformer has a turns ratio of N1:N2 of 4:1 and efficiency is 95%.calculatethe following.(i)Max power output(ii)Max power dissipation in each transistor
   b) Write short notes on Class-A direct coupled Class-A power amplifier.

UNIT–V

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

OR

10. a) Explain the RC Integrator with Exponential input.
    b) Discuss about Positive peak clampers.

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Hall Ticket Number :										

R-17

Code: 7G233

II B.Tech. I Semester Supplementary Examinations March 2021

Electrical Circuits-I

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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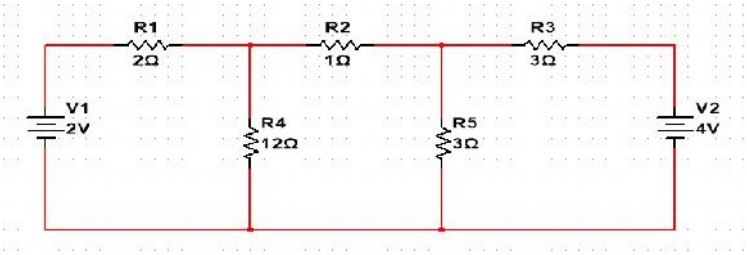
UNIT–I

1. a) Explain in detail the V-I relationship for R, L and C with neat diagrams.
   b) What is current and voltage division rule?

OR

2. Find the current through R_4=12 ohms resistance for the circuit shown below using nodal analysis.



UNIT–II

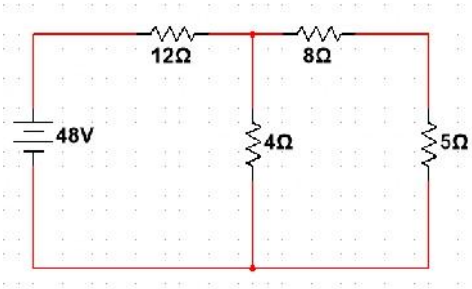
3. a) Define Time period and form factor.
   b) Discuss about power triangle and power factor in ac circuits.

OR

4. a) Define the terms (i) Resonant Frequency(ii) Band width(iii)Resonance(iv) Q-factor
   b) Derive the expression for resonant frequency bandwidth for a parallel RLC circuit.

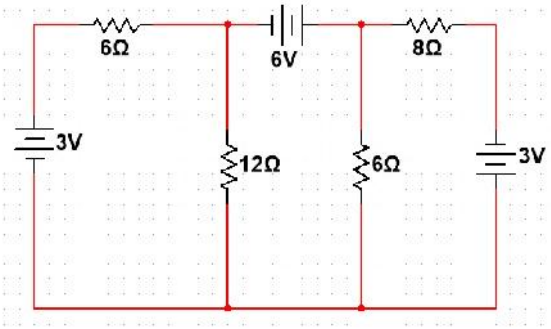
UNIT–III

5. a) State and explain super position theorem for DC circuits with an example.
   b) Find the current through 5 ohms resistor using Thevenins theorem



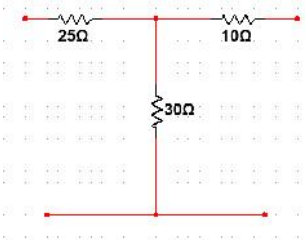
OR

6. Verify Tellegens theorem for the given circuit



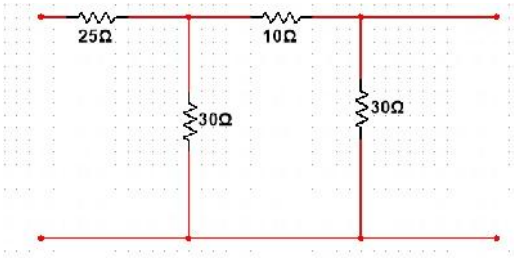
UNIT–IV

7. Find Z parameters for the given network



OR

8. Find Y parameters for the given network



UNIT–V

9. a) Explain self and mutual inductance in coupled magnetic circuits.

   b) What is a magnetic circuit? Compare magnetic circuit with an electrical circuit.

OR

10. A steel ring of 180 cm mean diameter has a cross sectional area of 250 mm^2. Flux developed in the ring is 250 micro webers. When a 4000 turns coil carries certain current. Calculate (i) m.m.f required (ii) Reluctance (iii) current in the coil. Assume relative permeability of steel is 1100.

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Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations February 2021

Engineering Mathematics-III

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Find the real root of equation $x^3 - x - 11 = 0$ by bisection method. 7M

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

OR

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

   b) Given $\frac{dy}{dx} = \frac{y - x}{y + x}$ with initial condition $y = 1$ at $x = 0$. Find y for $x = 0.1$ by Euler's method. 7M

UNIT–II

3. a) Using Newton's forward interpolation formula and the given table of values

x	1.1	1.3	1.5	1.7	1.9
F(x)	0.21	0.69	1.25	1.89	2.61

   Obtain the value of f(x) when x = 1.2 7M

   b) Find the first and second derivatives of the function tabulated below at the point x = 1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
y	3.375	7.0	13.625	24.0	38.875	59.0

7M

OR

4. a) Evaluate f(10) given f(x) = 168, 192, 336 at x = 1, 7, 15 respectively. Use Lagrange interpolation. 7M

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

UNIT–III

5. a) By the method of least squares, find the straight line that best fits the following data.

x	1	2	3	4	5
y	14	27	40	55	68

7M

   b) Form the partial differential equation by eliminating the arbitrary constants $x^2 + y^2 + (z - c)^2 = a^2$ 7M

OR

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

   b) Solve $p \tan x + q \tan y = \tan z$. 7M

UNIT–IV

7. a) Find the Fourier series expansion for $f(x) = ® - x$ in $0 < x < ®$ 7M

   b) Expand $f(x) = \cos x, 0 < x < ®$ in half range sine series. 7M

OR

8. Determine the Fourier series for $f(x) = x \sin x$ in the interval $0 < x < 2®$ 14M

UNIT–V

9. a) Find the finite Fourier sine and cosine Transforms of $f(x)$ defined by $f(x) = 1$ where $0 < x < ®$ 7M

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

OR

10. Find the Fourier cosine transform of $f(x) = \frac{1}{1+x^2}$, hence, derive the Fourier sine transform of $¤(x) = \frac{x}{1+x^2}$ 14M

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Hall Ticket Number :										

R-17

Code: 7G536

II B.Tech. I Semester Supplementary Examinations March 2021

Fluid Mechanics and Hydraulic Machines

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define the following properties of the fluid.
   i) Specific Weight ii) Specific Gravity iii) viscosity iv) Surface Tension 08M
   b) Calculate the Density, Specific weight and Specific gravity of One liter of liquid, which weighs 7N. 06M

OR

2. a) Explain the phenomenon of Surface Tension. 08M
   b) Find the surface tension in a soap bubble of 40mm diameter when the inside pressure is 2.5 N/m^2 above atmospheric pressure. 06M

UNIT–II

3. a) Describe the Reynolds's experiment with neat sketch 07M
   b) Explain the TEL and HGL with neat sketch. 07M

OR

4. The water is flowing through the taper pipe of length 100m having diameters 600mm at the upper end and 300mm at the lower end, at the rate of 50litres/sec. The pipe has the slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher end is 19.62 N/cm^2. 14M

UNIT–III

5. Explain the elements of hydroelectric power station with neat sketch. 14M

OR

6. A jet of water of diameter 75 mm moving with a velocity of 25m/sec strikes a plate in such a way that the angle between the jet and plate is 60^0. Find the force exerted by the jet on the plate (i) in the direction normal to the plate (ii) in the direction of the plate. 14M

UNIT–IV

7. a) Explain the classification of turbines. 08M
   b) Define the various types of efficiencies of hydraulic turbines. 06M

OR

8. a) Explain the Draft tube theory and list out its functions. 08M
   b) A water turbine has a velocity of 6 m/sec at the entrance to the draft tube and velocity of 1.2 m/sec at the exit. For friction losses of 0.1m and tail water 5m below the entrance to the draft tube, find the pressure head at the entrance. 06M

UNIT–V

9. Define centrifugal pump. Explain the working of single stage centrifugal pump with neat sketch. 14M

OR

10. A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 r.p.m. works against a total head of 40 m. The velocity of flow through the impeller is constant and equal to 2.5 m/sec. The vanes are set back at an angle of 40^0 at outlet. If the outer diameter of the impeller is 500mm and width at the outlet is 50mm, determine: (i) Vane angle at inlet (ii) Work done by the impeller on water per second (iii) manometric efficiency. 14M

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Hall Ticket Number :										

R-17

Code: 7G232

II B.Tech. I Semester Supplementary Examinations March 2021

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 (5 x 14 = 70 Marks)

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UNIT–I

1. a) Solve the Following
   i) $(456.25)_{10}$ = (_____)$_{16}$
   ii) $(1011101.001)_2$ = (_____)$_8$
   iii) $(21C.DC)_{16}$ = (_____)$_2$
   iv) $(56.24)_8$=(_____)$_{10}$
   b) Represent +25 and -25 in sign magnitude, sign 1's complement and sign 2's complement representation.

OR

2. a) Distinguish between weighted and non-weighted codes with examples.
   b) Represent the Decimal number 8620 in i) BCD ii) Excess 3 iii) Gray Codes.

UNIT–II

3. a) Simplify the the following Boolean functions to minimum number of literals.
      i) xy+y'z'+wxz' ii) w'x'+x'y'+w'z'+yz
   b) What is the difference between canonical form and standard form? Which form is preferable while implementing a Boolean function with gates?

OR

4. Simplify the following Boolean expressions using K-map and implement them using NOR gates:
   i. F (A, B, C, D) = AB'C' + AC + A'CD'.
   ii. F (W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ.

UNIT–III

5. a) Implement full adder using two half adders. Give the internal logic function and truth table.
   b) Compare Programmable logic devices.

OR

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

UNIT–IV

7. a) Distinguish between combinational and sequential circuits.
   b) Explain clocked sequential circuits with an example.

OR

8. Design a sequential circuit with two D-Flip-Flops A and B and one input x. When x=0, the state of the circuit remains the same. When x=1, the circuit goes through the state transitions from 00 to 01 to 11 to 10 back to 00 and repeats.

UNIT–V

9. a) Compare between Moore and Mealy machine.
   b) Discuss the various blocks ASM chart.

OR

10. What are the conditions for the two machines are to be equivalent? For the machine given below, find the equivalence partition and a corresponding reduced machine in standard form.

PS	NS,Z	
	X=0	X=1
A	F,0	B,1
B	G,0	A,1
C	B,0	C,1
D	C,0	B,1
E	D,0	A,1
F	E,1	F,1
G	E,1	G,1

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