Hall Ticket Number :										

R-17

Code: 7G334

II B.Tech. I Semester Supplementary Examinations August 2021

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) Explain about Two stage RC–coupled amplifier. 10M

   b) What is the significance of 3dB Bandwidth? 4M

OR

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

UNIT–II

3. a) What is Sampling. Explain about it with neat diagrams. 7M

   b) What is mixing? Describe about it with neat diagrams. 7M

OR

4. What are the General characteristics of negative feedback amplifiers and Explain about them (Any Four) 14M

UNIT–III

5. a) Derive the expressions of frequency of oscillations of a Colpitts oscillator with relevant diagram. 10M

   b) A Wein bridge oscillator is used to operate at fo= 10 KHz. If the value of R is100 KΩ, find the value of the capacitor C. 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) What is the Max power dissipation per each transistor and derive the expression for it. 7M

   b) Distinguish between Class-A and Class-B Power amplifiers. 7M

OR

8. a) For a class-B Power Amplifier providing a 22V Peak signal to an 8Ω load and a power supply of VCC=25V. determine:(a)Input Power, Pi(dc) (b)Output Power, Po(ac) and (c)Circuit efficiency, %η. 8M

   b) Define the terms i) DC Power Input ii) AC Power Output iii) Efficiency 6M

UNIT–V

9. a) Define linear wave shaping? Write short notes on Integrator and Differentiator circuits. 8M

   b) What are the applications of Linear wave shaping. 6M

OR

10. a) Discuss the response of R-C High Pass circuit for square wave input, also sketch necessary waveforms. 7M

    b) Note about the negative reference value based clippers. 7M

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Hall Ticket Number :										

R-17

Code: 7G231

II B.Tech. I Semester Supplementary Examinations August 2021

DC 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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UNIT–I

1. a) What are the lap and wave windings and compare them. 7M

   b) An 8-pole lap wound DC. Generator has 120 slots having 4 conductors per slot. If flux per pole is 0.06Wb, calculate the speed of the generator for giving 240V on open circuit. 7M

OR

2. a) Derive the EMF equation of DC generator. 7M

   b) A 4-Pole, wave wound d.c. shunt generator has a useful flux per pole of 0.07Wb. Calculate the induced e.m.f. when running at 900 r.p.m 7M

UNIT–II

3. a) Write brief note on the losses in DC machines 6M

   b) A 4-pole wave wound dc machine has an armature of 25cm diameter and runs at 1200 rpm. If armature current is 160A, thickness of brush is 12mm and the self-inductance of each armature coil is 0.14mH, calculate the average emf induced in each coil during commutation. 8M

OR

4. a) Discuss the methods to minimize the effect of armature reaction. 7M

   b) A 4-pole, long shunt lap wound generator supplies 25KW at a terminal voltage of 500V. The armature resistance is 0.05 ohms and shunt field resistance is 180 ohms. The brush drop may be taken as 1V.Determine the EMF generated. Also calculate the number of conductors if the speed is 1200 r.p.m and flux per pole is 0.02weber. 7M

UNIT–III

5. The open-circuit characteristic of a separately-excited DC generator driven at 1000 rpm. is as follows:

Field current :	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
E.M.F. volts :	30.0	55.0	75.0	90.0	100.0	110.0	115.0	120.0

   If the machine is connected as shunt generator and driven at 1000 rpm. and has a field resistance of 100 Ω, find (a) Open-circuit voltage and exciting current (b) The critical resistance and speed. 14M

OR

6. a) State the requirements of voltage build up in self-excited DC generator. 7M

   b) Explain the use of equalizer bar and cross connection of field windings 7M

UNIT–IV

7. a) Derive the expression for torque developed by a DC motor. 7M

   b) What is back emf? Explain its significance. 7M

OR

8. A DC shunt motor runs at 1000rpm on 220V supply. Its armature and field resistances are 0.5ohm and 110ohm respectively and the total current taken from the supply is 26A. It is desired to reduce the speed to 750rpm keeping the armature and field currents same. What resistancce should be inserted in the armature circuit ? 14M

UNIT–V

9. Explain with a circuit diagram how efficiency is determined for machines by Hopkinson's test. 14M

OR

10. a) Explain with diagram the brake test on a DC motor 7M

    b) Mention the merits and demerits of Swinburne's test. Why this test cannot be perfumed on a series motor. 7M

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Hall Ticket Number :										

R-17

Code: 7G233

II B.Tech. I Semester Supplementary Examinations August 2021

Electrical Circuits-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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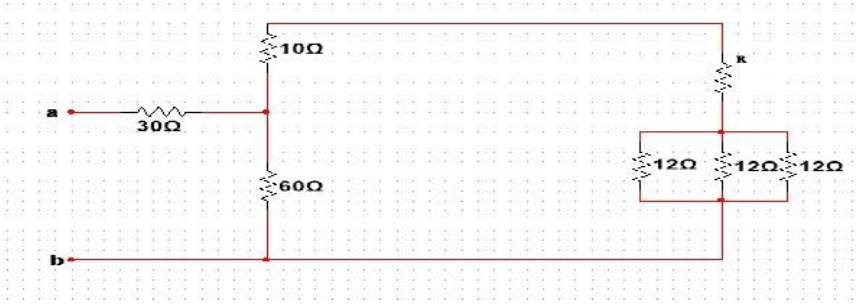
UNIT–I

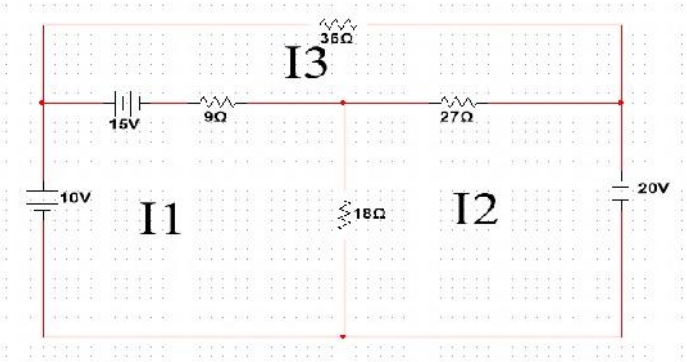
1. a) Define duality and describe the procedure to draw the dual network.

   b) If R_{eq}=50 ohms between a and b in the circuit find R.



OR

2. Find I_1,I_2 and I_3 for the given network shown in figure below.



UNIT–II

3. a) Define the Q factor and derive the necessary expression showing the relation between Q-factor, band width and selectivity of frequencies at resonance.

   b) Derive the expression for resonant frequency for a series RLC circuit.

OR

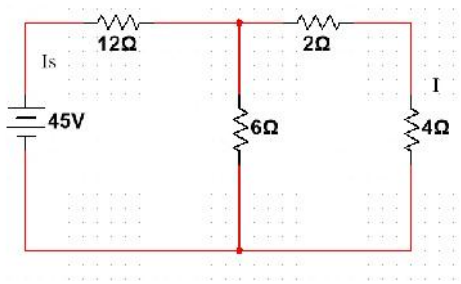
4. a) Show that current lags voltage in RL series circuit

   b) Define and determine the average and RMS values of a sinusoidal voltage.

UNIT–III

5. a) State and explain Tellegens theorem with an example.

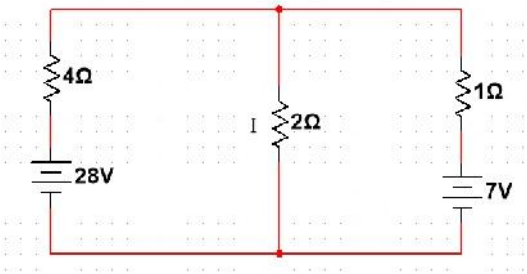
   b) Verify reciprocity theorem for the given circuit.



OR

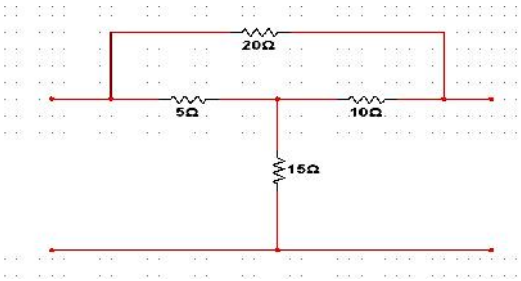
6. a) State and explain Millimans theorem

   b) Find I through 2 ohms resistor using MIllimans theorem



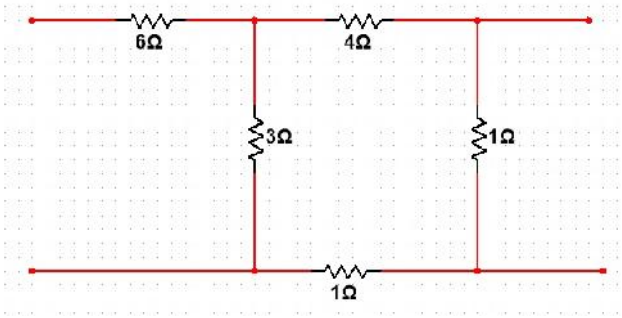
UNIT–IV

7. a) Find ABCD and h parameters for the following network



OR

8. Find Z and Y parameters for the following network.



UNIT–V

9. a) Develop an expression for equivalent inductance of two coupled coils connected in parallel with mutual inductance.

   b) Explain the importance of dot convention in coupled circuits.

OR

10. a) Write the procedure to analyze a parallel magnetic circuit.

    b) Two coupled coils with L_1=0.02 H, L_2=0.01 H and k=0.5 are connected in four ways series aiding, series opposing, parallel aiding and parallel opposing. What are the four equivalent inductances?

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Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations August 2021

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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UNIT–I

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

   b) 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

OR

2. Find the real root of the equation $xe^x = 3$ by Regular-falsi method. 14M

UNIT–II

3. Using Lagrange formula find $f(4)$. Given

x	0	2	3	6
y	-4	2	14	158

14M

OR

4. Evaluate $\int_0^1 \sqrt{1+x^3}\,dx$ taking h = 0.1 Using (i) Simpson's 1/3 rd rule (ii) Trapezoidal rule. 14M

UNIT–III

5. Fit a second degree parabola to the following data by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

14M

OR

6. Form a partial differential equation from $z = f(x+y)$. 14M

UNIT–IV

7. Obtain the Fourier series for $f(x) = x - x^2$ in the interval $[-®, ®]$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \frac{1}{6^2} + \ldots = \frac{®^2}{12}$$

14M

OR

8. Find the half range cosine series for the function $f(t) = t - t^2$, in $0 < t < 1$ 14M

UNIT–V

9. Find the Fourier cosine transform of $f(x) = e^{-ax}\,(x > 0, a > 0)$. 14M

OR

10. Find the Fourier transform of $f(x)$ given by $f(x) = \begin{cases} 1, & for\ |x| < 1 \\ 0, & for\ |x| > 1 \end{cases}$ hence evaluate $\int_0^\infty \frac{\sin x}{x}\,dx$ 14M

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Hall Ticket Number :										

R-17

Code: 7G536

II B.Tech. I Semester Supplementary Examinations August 2021

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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UNIT–I

1. a) Define the following,
   i) Steam Line ii) Streak Line iii) stream Tube 6M
   b) Define the rate of flow and derive the equation of continuity for one dimensional flow. 8M

OR

2. a) Explain the various types of fluid flows. 8M
   b) The diameters of a pipe at sections 1 and 2 are 10cm and 15cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/sec. Determine also the velocity at section 2. 6M

UNIT–II

3. Define the following with suitable examples.
   i) Body forces ii) Surface forces iii) Line forces. 14M

OR

4. A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Tale C_d=0.98. 14M

UNIT–III

5. Derive the expression for a force exerted by jet of water on a stationary inclined plate. 14M

OR

6. A nozzle of 50 mm diameter delivers a stream of water at 20 m/sec perpendicular to the plate that moves away from the jet at 5m/sec. Find i) the force on the plate ii) the work done ii) the efficiency of the jet. 14M

UNIT–IV

7. a) Explain the classification of turbines. 8M
   b) Define the various types of efficiencies of hydraulic turbines. 6M

OR

8. A Pelton wheel has a mean bucket speed of 10m/sec with a jet water flowing at the rate of 700 liters per second under a head of 30 meters. The bucket deflects the jet at angle of 160^0. Calculate the power given by the water to the runner and the hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98. 14M

UNIT–V

9. a) Explain the working principle of single acting reciprocating pump with neat sketch. 7M
   b) A single acting reciprocating pump running at 50 r.p.m., delivers 0.01 m^3/sec of water. The diameter of the piston is 200 mm and stroke length 400 mm. Determine: i) The theoretical discharge of pump ii) coefficient of discharge iii) slip and percentage of slip of the pump. 7M

OR

10. a) Describe the meaning of NPSH and derive an expression for it. 7M
    b) Explain about the multistage centrifugal pumps with neat sketches 7M

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Hall Ticket Number :										

R-17

Code: 7G232

II B.Tech. I Semester Supplementary Examinations August 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 (5x14 = 70 Marks)

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UNIT–I

1. 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.

OR

2. The two binary numbers X=1010100 and Y=1000011, perform the subtraction
   i) X-Y ii) Y-X. by using 2's complement.

UNIT–II

3. 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.

OR

4. 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.

UNIT–III

5. a) Draw and explain the block diagram of n-bit parallel adder.
   b) What is programmable logic array? How it differs from PROM.

OR

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

UNIT–IV

7. a) Draw the logic symbols and truth tables of JK and T flip flop
   b) Draw the logic Diagram truth table of SR Latch.

OR

8. Explain the operation of D Flip-Flop in detail

UNIT–V

9. a) Compare ASM Chart and the State Diagram.
   b) Discuss mealy and Moore machine models of sequential machines.

OR

10. Convert the following Mealy machine into a corresponding Moore machine

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

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