Hall Ticket Number :										

R-19

Code: 19A232T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Circuit Theory

(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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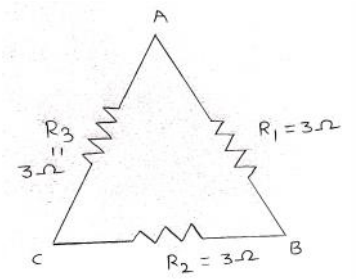
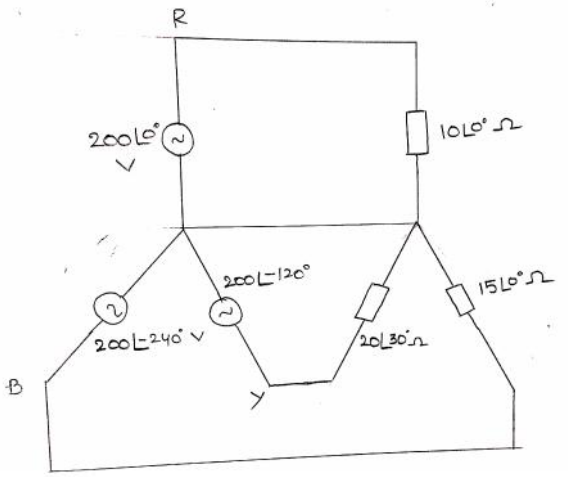
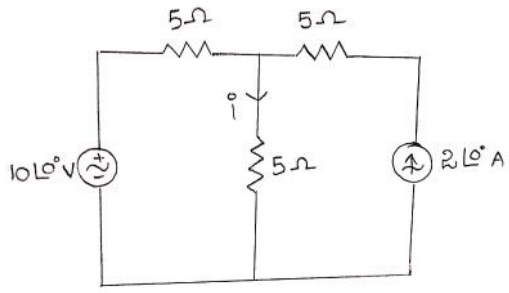
			Marks	CO	BL
		UNIT–I			
1.	a)	Apply Delta to Star conversion and calculate the Star connection resistances. 	7M	1	3
	b)	Recall the Voltage-Current relationship for Resistor, Inductor and Capacitor.	7M	1	1
		OR			
2.	a)	Explain Super-Mesh with an example.	7M	1	2
	b)	Explain super-node with an example.	7M	1	2
		UNIT–II			
3.	a)	List out different types of AC waveforms.	7M	2	1
	b)	Determine the expression for Resonant frequency of a series RLC circuit.	7M	2	3
		OR			
4.	a)	Define i) resonant frequency ii) quality factor iii) Band width	6M	2	1
	b)	Explain the parallel Resonance and derive expressions for Resonant frequency and Band width.	8M	2	2
		UNIT–III			
5.		Three impedances of 10+j10 Ω are connected in star to a 240 V, 3- Ø 50 Hz supply. Calculate the line currents and phase voltages at the load.	14M	3	3
		OR			
6.	a)	Define phase and phase sequence.	4M	3	1
	b)	Calculate the line currents and phase currents for the following network. 	10M	3	3

UNIT–IV

7. a) Explain Super-position theorem with an example and mention the limitations. 7M 4 2

   b) Calculate current i using Thevenin's theorem.

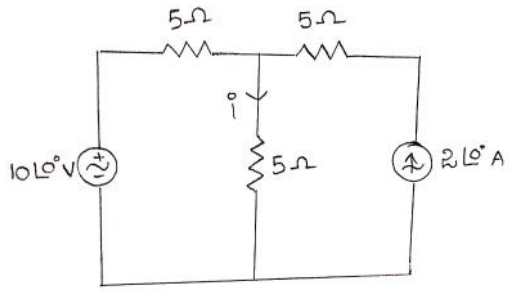


7M 4 3

OR

8. a) Explain the compensation theorem 7M 4 2

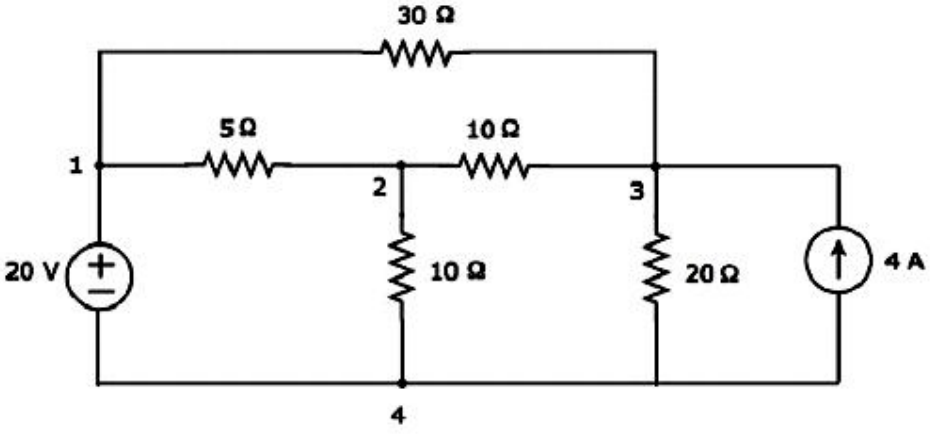
   b) Calculate current i using Norton's theorem.



7M 4 3

UNIT–V

9. a) Define Graph and Develop the Graph for the following network.

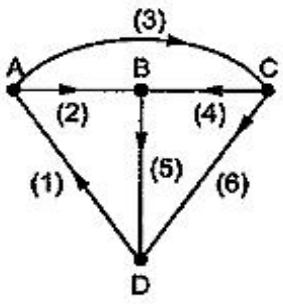


7M 6 3

   b) Define i) link ii) Twig iii) tree iv) co-tree with a suitable diagram 7M 6 1

OR

10. Develop the fundamental cut-set and fundamental tie-set matrices for the following graph.



14M 6 3

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Hall Ticket Number :										

R-19

Code: 19A233T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Electrical Machines-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	CO	BL
		UNIT–I			
1.	a)	Derive the EMF equation of DC generator.	8M	1	2
	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.	6M	1	2
		OR			
2.	a)	Comment on the use of inter poles and compensating winding in a DC machine	6M	1	1
	b)	In a 200 V compound generator, the armature, series and shunt windings have resistances of 0.25 Ω, 0.15 Ω and 50 Ω respectively, the load consists of 100lamps, each rated at 60 W, 220 V. Find the total emf and armature current when the machine is connected for long shunt.	8M	1	3
		UNIT–II			
3.		An 8-pole DC generator with 778 wave-connected armature conductors and running at 500rpm supplies a load of 12.5Ω resistance at terminal voltage of 250V. The armature resistance is 0.24Ω and the field resistance is 250Ω. Find the armature current, induced emf and the flux/pole.	14M	2	2
		OR			
4.	a)	Mention the applications of DC generators.	6M	2	1
	b)	A DC shunt genertor delivers 450A at 230V and resistance of shunt field and armature are 50Ω and 0.03Ω respectively. Calculate the generated emf.	8M	2	3
		UNIT–III			
5.	a)	Explain with diagram the brake test on a DC motor.	8M	3	2
	b)	Mention the advantages and demerits of Swinburne's test. Why this test cannot be perfumed on a series motor.	6M	3	1
		OR			
6.		Hopkinson's test was conducted on two shunt motors. The supply current was 15A at 200V. The generator output current was 85A. The field currents of motor and generator were 2.5A and 3A respectively. The armature resistance of each machine was 0.05Ω. Find the efficiency of each machine under the above loading conditions.	14M	3	3
		UNIT–IV			
7.	a)	Describe the experimental test procedure to separate the core losses of a transformer.	7M	4	1
	b)	A 10 KVA, 500/250 V single phase transformer has its maximum efficiency of 94% when delivering 90% of its rated output at unity pf. Estimate its efficiency when delivering its full load output at pf of 0.8 lagging.	7M	4	3
		OR			
8.		Outline the purpose of Sumpner's test and explain how it is conducted on two identical single phase transformers.	14M	4	2
		UNIT–V			
9.	a)	Explain open Δ connection of transformer with necessary diagram. Also, point out its advantages and disadvantages.	6M	5	2
	b)	Two 1-Ph transformers A and B are rated at 250KVA each are operated in parallel on both sides. The impedances of transformer A and B are (1+j6)Ω and (1.2+j4.8)Ω respectively. Compute the load shared by each when the total load is 500KVA at 0.8p.f lagging. Comment on the result.	8M	5	3
		OR			
10.		A 1100/400V, 1-phase transformer gave the following test results: Open circuit test: 1100V, 2A, 180W on l.v. side Short circuit test 20V, 25A, 20W on h.v. side Calculate the equivalent circuit constants. Also draw the equivalent circuit.	14M	5	3

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Hall Ticket Number :										

R-19

Code: 19A337T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Fluid Mechanics and 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) Calculate the Density, Specific weight and Specific gravity of One liter of liquid, which weighs 7N. 7M

   b) Define the following
   i) Steam Line ii) Streak Line iii) stream Tube 7M

OR

2. a) Explain the property viscosity of a fluid. Also describe its variation with temperature. 7M

   b) Explain the various types of fluid flows. 7M

UNIT–II

3. a) Describe the Reynolds's experiment with neat sketch 7M

   b) Explain the minor losses in pipes briefly. 7M

OR

4. a) 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. 7M

   b) State the momentum equation and derive an expression for the force exerted by a flowing fluid on a pipe bend. 7M

UNIT–III

5. A jet of water having a velocity of 35 m/sec impinges on a series of vanes moving with a velocity of 20 m/sec. The jet makes an angle of 30^0 to the direction of motion of vanes when entering and leaves at an angle of 120^0. Draw the triangles of velocities at inlet and outlet and find i) the angles of vane tips so that water enters and leaves without shock ii) the work done per unit weight of water entering the vanes iii) the efficiency. 14M

OR

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

UNIT–IV

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

   b) Define the unit quantities and describe them with expressions 7M

OR

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

   b) Explain the classification of turbines. 7M

UNIT–V

9. a) Define centrifugal pump. Explain the working of single stage centrifugal pump with neat sketch. 7M

   b) Define slip, percentage of slip and negative slip of the reciprocating pump 7M

OR

10. a) Derive an expression for the work done by the impellor of a centrifugal pump. 7M

    b) Explain the characteristic curves of the centrifugal pumps. 7M

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Hall Ticket Number :										

R-19

Code: 19AC31T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Partial Differential Equations and Complex Variables

(Common to CE, EEE, ME & ECE)

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	CO	BL
	UNIT–I			
1. a)	Find the L.T of $e^{-3t}\left(2\cos 5t - 3\sin 5t\right)$	7M	1	L1
b)	Find $L\left\{e^{3t}\sin^2 t\right\}$	7M	1	L1
	OR			
2.	Find $L\left\{f(t)\right\}$, where $f(t)$ is aperiodic function of the period $2®$ and it is given by $f(t)=\begin{cases}\sin t, & 0<t<®\\ 0 \ , & ®<t<2®\end{cases}$	14M	1	L3
	UNIT–II			
3. a)	Find $L^{-1}\left\{\dfrac{s+3}{s^2-10s+29}\right\}$	7M	2	L1
b)	Find $L^{-1}\left\{\dfrac{2s+12}{s^2+6s+13}\right\}$	7M	2	L1
	OR			
4.	Using convolution theorem , find $L^{-1}\left\{\dfrac{1}{\left(s^2+a^2\right)^2}\right\}$	14M	2	L3
	UNIT–III			
5.	Express $f(x)=x-®$ as Fourier series in the interval $-® < x < ®$	14M	3	L2
	OR			
6.	Find the Fourier Series to represent $f(x)=x^2-2$ when $-2 \le x \le 2.$	14M	3	L1

UNIT–IV

7. Solve by the method of separation of variables $\frac{\partial^2 z}{\partial x^2} = \frac{\partial z}{\partial y} + 2z$ 14M 4 L3

OR

8. Solve the one dimensional heat equation $\frac{\partial u}{\partial t} = C^2 \frac{\partial^2 u}{\partial x^2}$ subject to the condition

$u(0,t) = 0,\ u(L,t) = 0, t > 0$ *and* $u(x,0) = 3\sin\left(\frac{®x}{L}\right), 0 < x < L.$ 14M 4 L3

UNIT–V

9. a) Find all values of k, such that $f(z) = e^x(\cos ky + i \sin ky)$ is analytic. 7M 5 L1

b) Show that the function $f(z) = z\bar{z}$ is differentiable but not analytic at $z = 0.$ 7M 5 L2

OR

10. Evaluate using Cauchy's theorem $\int_c \frac{z^3 e^{-z}}{(z-1)^3} dz$ where c is $|z-1| = \frac{1}{2}$. Using Cauchy's integral formula. 14M 5 L5

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Hall Ticket Number :										

R-19

Code: 19A234T

II B.Tech. I Semester Supplementary Examinations March/April 2023

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) Solve the Following
   i) (446.25)10 = (_____)16 ii) (1010111.001)2 = (_____)8
   iii) (11C.DC)16 = (_____)2 9M
   b) A 7 bit hamming code is transmitted through a noisy channel. Find the error assuming a single error has occurred. The given message is 1010101 5M

OR

2. a) State and prove Demorgan's theorem for three variables 7M
   b) What are Universal gates? Realize AND and OR gates using NAND gates. 7M

UNIT–II

3. a) Show that ABC + A B C^1 + AB^1C+A^1B^1C+A^1BC^1=B^1C+AB+A^1BC^1 7M
   b) Expand Y = A + B^1C in SOP form 7M

OR

4. a) Simplify using K map F(A, B, C, D) = Σ(0, 2, 4, 5, 6, 7, 8, 10, 13, 15) and design using NAND gates. 7M
   b) Simplify F = Σm (0, 1, 4, 5, 6, 9, 11, 12, 13, 14, 15) +Σd (7, 8) using tabular method and implement using NOR gates only 7M

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. 7M
   b) Design a BCD to Excess- 3 code converter using PAL. 7M

UNIT–IV

7. a) Design a four bit ring counter. Explain with example. 7M
   b) Write the excitation table of SR & D Flip-Flops 7M

OR

8. a) Convert JK Flip-Flop into SR Flip-Flop. 6M
   b) Design Mod-12 synchronous counter using J-K flip -flops. 8M

UNIT–V

9. a) Draw the ASM chart and state diagram for the following state transitions, start from the initial state T_1, then if XY=00 go to T2, if XY=01 go to T3, if XY=10 go to T1, otherwise go to T3. 7M
   b) Discuss the various blocks of ASM chart. 7M

OR

10. Find the equivalence partition and a corresponding reduced machine in standard form for the machine given in the table

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

14M

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Hall Ticket Number :										

R-19

Code: 19A231T

II B.Tech. I Semester Supplementary Examinations March/April 2023

Analog Electronics

(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	CO	BL
		UNIT–I			
1.		With neat circuit diagram, Explain the operation of Colpitts oscillator using BJT and derive the expression for its frequency of oscillations.	14M	*CO1*	L2
		OR			
2.	a)	With neat sketch, Explain the block diagram representation of a feedback amplifier.	9M	CO1	L2
	b)	List out the advantages and disadvantages of negative feedback amplifier.	5M	CO1	L1
		UNIT–II			
3.		Examine the principle operation of a practical integrator circuit with its frequency response for an applied sine input signal	14M	CO2	L2
		OR			
4.	a)	With neat diagram explain the operation of V-I convertor.	7M	CO2	L2
	b)	Design Op-amp Differentiator that differentiate an input signal with f_{max}=100Hz.	7M	CO2	L6
		UNIT–III			
5.		Explain the working principle and operation of Astable Multi-vibrator using Op-Amp with relevant sketch.	14M	CO3	L2
		OR			
6.		Discuss the working principle of Sample and Hold circuits with relevant sketch.	14M	CO3	L2
		UNIT–IV			
7.		Explain the working principle of Monostable Multivibrator using IC555 timer with relevant sketch.	14M	CO4	L2
		OR			
8.		Explain the first order High-pass RC Active filter with its relevant expression.	14M	CO4	L2
		UNIT–V			
9.		Explain the working principle Servo Tracking ADC and Dual Slope ADC with a neat block diagram.	14M	CO5	L2
		OR			
10.		Explain the working principle parallel Comparator A/D converter with a neat block diagram.	14M	CO5	L2

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