Hall Ticket Number :										

R-19

Code: 19A232T

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

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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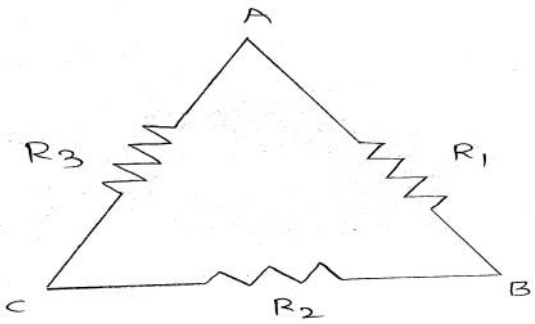
		Marks	CO	BL

UNIT–I

1. Apply Delta to Star conversion and derive the Star connection resistances.

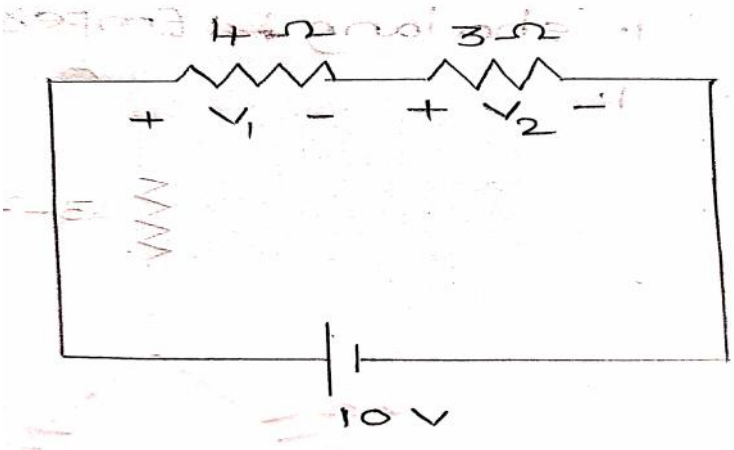


14M 1 3

OR

2. a) Describe Voltage and Current division rules with examples. 7M 1 1

   b) Apply Voltage division rule and find the Voltages.



7M 1 3

UNIT–II

3. a) Define i) cycle ii) time-period iii) frequency iv) peak 7M 2 1

   b) Determine the Average and RMS values of a sinusoidal voltage. 7M 2 3

OR

4. a) A coil having a resistance of 20 Ohms and an inductance of 0.2H is connected in series with a 50 µF capacitor across a 250 V, 50Hz supply. Calculate (i) the current (ii) the power (iii) the power factor (iv) the voltage across the coil and capacitor. Draw the phasor diagram showing the current and various voltages. 8M 2 3

   b) List out any five advantages of an AC supply. 6M 2 1

UNIT–III

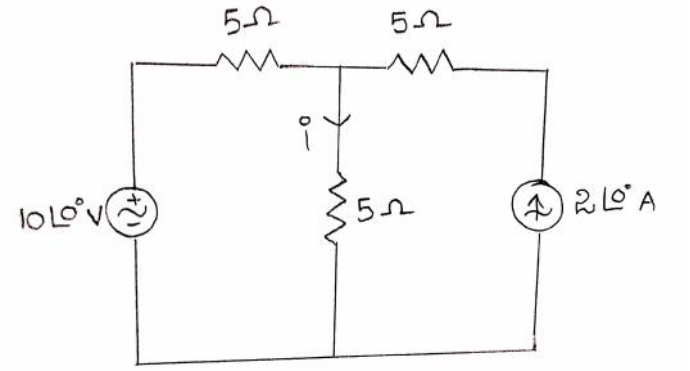
5. Determine the relationship between line currents and phase currents for a balanced 3-Ø delta connected system with suitable diagrams. 14M 3 3

OR

6. a) Define phase and phase sequence. 4M 3 1
   b) Two watt-meters are used to measure power in a 3-Ø, 3-wire load. Determine the total power& power factor, if two watt-meters reads 1000 watt each both positive. 10M 3 3

UNIT–IV

7. a) Explain Reciprocity theorem with an example. 7M 4 2
   b) Calculate current i using super-position theorem.



7M 4 3

OR

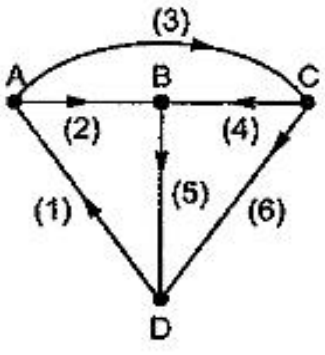
8. a) Explain Maximum Power transfer theorem with an example 7M 4 2
   b) Explain Telligen's theorem with an example. 7M 4 2

UNIT–V

9. a) Develop an expression for equivalent inductance of two coupled coils connected in parallel aiding with mutual inductance. 7M 5 3
   b) Two coupled coils with L1=0.02 H, L2=0.01 H and k=0.5 are connected in two ways series aiding and series opposing. What are the two equivalent inductances? 7M 5 3

OR

10. Sketch any six possible tress 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 Nov/Dec 2022

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	Blooms Level
		UNIT–I			
1.	a)	A 4-pole, long shunt lap wound generator supplies 25KW at a terminal voltage of 500V. The armature resistance is 0.05Ω and shunt field resistance is 180Ω. The brush drop may be taken as 1V. Determine the EMF generated. Also calculate the number of conductors if the speed is 1200 rpm and flux per pole is 0.02wb.	8M	1	2
	b)	Discuss any two methods to minimize the effect of armature reaction.	6M	1	2
		OR			
2.	a)	A DC machine is to be designed for a low voltage but high current requirements. Suggest the best suitable winding for this requirement and justify your answer.	6M	1	2
	b)	A 410V, 6-pole D.C. generator as 720 lap wound conductors. It is given a brush lead of 2.5 degrees (Mech.) from the geometric neutral. The current through the armature is 600A. Calculate the cross and demagnetizing turns per pole.	8M	1	3
		UNIT–II			
3.		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
EMF	30	55	75	90	100	110	115	120

If the machine is connected as shunt generator and driven at 1000 rpm and has a field resistance of 100 Ω, find the critical resistance and speed. 14M 2 3

OR

4.	a)	Define critical resistance and critical speed.	6M	2	1
	b)	What is open circuit characteristic? Discuss how you can obtain the critical resistance and critical speed from the characteristic.	8M	2	2
		UNIT–III			
5.	a)	Explain the various possible reasons for failure of voltage build-up process.	6M	3	2
	b)	Explain the voltage build-up process in DC shunt generators with neat diagram.	8M	3	2
		OR			
6.		What is the necessity of testing DC machines? Describe the method of testing DC Series machines. Bring out the advantages and disadvantages of the test.	14M	3	2
		UNIT–IV			
7.		A 25 kVA, 1-Φ transformer, 2200/220 V, has a primary resistance of 1Ω and secondary resistance of 0.01Ω. Find the equivalent secondary resistance and the full load efficiency at 0.8 power factor. If the iron loss of the transformer is 80% of the full load copper loss.	14M	4	3
		OR			
8.	a)	What are the hysteresis and eddy current losses and how they are minimized?	7M	4	1
	b)	What is ideal transformer? Explain how to draw the vector diagram of an ideal transformer under NO load condition.	7M	4	2
		UNIT–V			
9.		Briefly explain various type 3-Ph transformer connections with neat diagrams.	14M	5	2
		OR			
10.		Describe about four possible connections of 3-Ph transformers with relevant relations amongst voltages and currents on both H.v. and L.v. sides.	14M	5	2

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Hall Ticket Number :										

R-19

Code: 19A337T

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-19

Code: 19AC34T

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

Life Sciences for Engineers

(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	CO	Blooms Level
		UNIT–I			
1.		Describe the types of cells and write the differences between prokaryotes and eukaryotes cells?	14M	1	2
		OR			
2.	a)	Explain the differences between Plant cell and Animal cell?	7M	1	2
	b)	Describe is mitochondrion? Write their structure and important functions and draw the labelled diagram?	7M	1	2
		UNIT–II			
3.		Define the proteins? Write the structure and functions of proteins?	14M	2	1
		OR			
4.		Define the antibodies and Write the types and functions of antibodies?	14M	2	1
		UNIT–III			
5.		Explain the Glycolysis pathway and importance?	14M	3	2
		OR			
6.		Discuss the Clavin cycle/C_3 cycle?	14M	3	2
		UNIT–IV			
7.	a)	Explain the three laws of inheritance with examples?	7M	3	2
	b)	Briefly describe the transcription and translation?	7M	3	2
		OR			
8.		Explain the Process of DNA Replication in prokaryotic and eukaryotic animals?	14M	4	2
		UNIT–V			
9.	a)	Write short notes on restriction enzymes?	7M	5	1
	b)	Explain the Importance of DNA Cloning?	7M	5	2
		OR			
10.	a)	Explain the applications of transgenic animals?	7M	5	2
	b)	Discuss the tools of Recombinant DNA Technology?	7M	5	2

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Hall Ticket Number :											R-19

Code: 19AC31T

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

Partial Differential Equations and Complex Variables

(Common to CE, EEE, ME and 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 $f(t)=\begin{cases}\sin t, & 0<t<\pi\\ 0, & t>\pi\end{cases}$	7M	CO1	L1
b)	Find the L.T of $\sin(wt+\alpha)$	7M	CO1	L1
	OR			
2.	Using L.T, Evaluate $\int_0^\infty \frac{e^{-t}-e^{-2t}}{t}dt$	14M	CO1	L3
	UNIT–II			
3. a)	Find $L^{-1}\left\{\frac{3(s^2-2)^2}{2s^5}\right\}$	7M	CO2	L1
b)	Find the inverse L.T of $\frac{4}{(s+1)(s+2)}$	7M	CO2	L1
	OR			
4.	Using convolution theorem , find $L^{-1}\left\{\frac{1}{s^2(s+1)^2}\right\}$	14M	CO2	L3
	UNIT–III			
5.	Obtain the Fourier series expansion of $f(x)$ given that $f(x)=k\,x(\pi-x)$ in $0<x<2\pi$ where k is a constant.	14M	CO3	L3

OR

6. Find the half range Cosine and Sine series for the function $f(x) = x$ in the range $0 < x <$ ® — 14M CO3 L1

UNIT–IV

7. Using the method of separation of variables, solve $\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$ — 14M CO4 L3

OR

8. A string is stretched and fastened to two points at a distance $"l"$ apart. Motion is started by displacing the string in the form $y = k(lx - x^2)$ from which it is released at time $t = 0$. Find the displacement at any point on the string at a distance x from one end at time t. — 14M CO4 L3

UNIT–V

9. a) Prove that

$$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)\left|\text{Real } f(z)\right|^2 = 2\left|f'(z)\right|^2$$

where $w = f(z)$ is analytic. — 10M CO5 L5

b) Show that $f(z) = z + 2\bar{z}$ is not analytic anywhere in the complex plane. — 4M CO5 L1

OR

10. Evaluate $\int_c (y^2 + 2xy)dx + (x^2 - 2xy)dy$ where c is the boundary of the region by $y = x^2$ and $x = y^2$. — 14M CO5 L5

END

Hall Ticket Number :										

R-19

Code: 19A234T

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-19

Code: 19A231T

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

Analog Electonics

(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	Blooms Level
		UNIT–I			
1.		Derive the expression to obtain feedback input resistance, voltage gain and output resistance for a current series feedback amplifier with neat sketches.	14M	CO1	L2
		OR			
2.		With neat circuit diagram, Explain the operation of Wein bridge oscillator and derive the expression for its frequency of oscillations.	14M	CO1	L2
		UNIT–II			
3.	a)	Explain the internal block diagram of an Op-amp and explain each block in detail.	9M	CO2	L2
	b)	What is an IC Classifications? List out the IC Classifications and Explain	5M	CO2	L1
		OR			
4.		With neat circuit diagram explain the inverting and non-inverting amplifier with its relevant expression.	14M	CO2	L2
		UNIT–III			
5.		Design a circuit for generating Triangular wave by using Op-Amp and derive necessary equations?	14M	CO3	L6
		OR			
6.		With a neat sketch explain the operation of clipper and clamper and its types	14M	CO3	L2
		UNIT–IV			
7.		Explain the basic principle and operation of PLL with individual blocks.	14M	CO4	L2
		OR			
8.		Discuss RC Active filter and its types with its frequency response curve.	14M	CO4	L2
		UNIT–V			
9.		Construct and explain the Weighted Resistor DAC with a neat block diagram	14M	CO5	L2
		OR			
10.		Construct and explain the inverted R-2R Ladder DAC with a neat block diagram	14M	CO5	L2

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