VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203.

DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

II SEMESTER

BE8255 –BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

Regulation – 2017

Academic Year 2018 – 2019

Prepared by

Ms. K. S. Jaibhavani, Assistant Professor (Sl. G) /EEE

Mr. N. Sowrirajan, Assistant Professor (O.G) /EEE

Mr. K. Ragul Kumar, Assistant Professor (O.G)/EEE

Ms. R. Elavarasi, Assistant Professor (O.G)/EEE

VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

QUESTION BANK

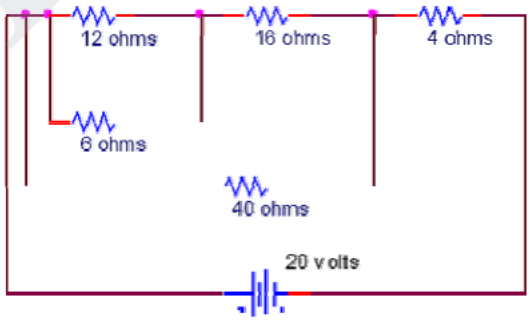
SUBJECT : BE8255 –BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

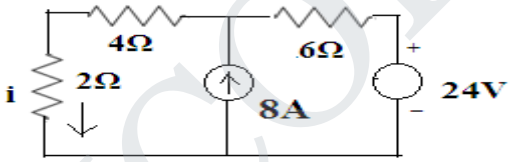
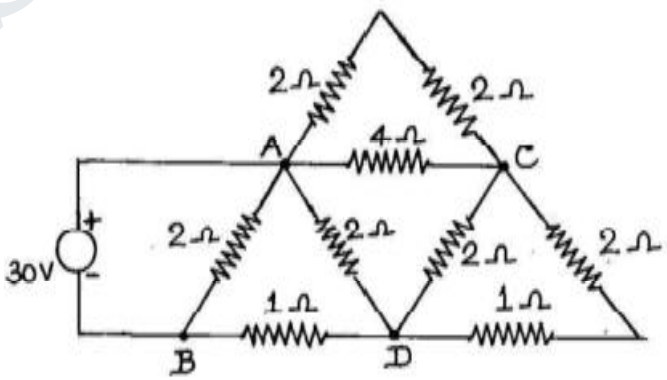
SEM / YEAR: II/ 1st Year CSE& IT

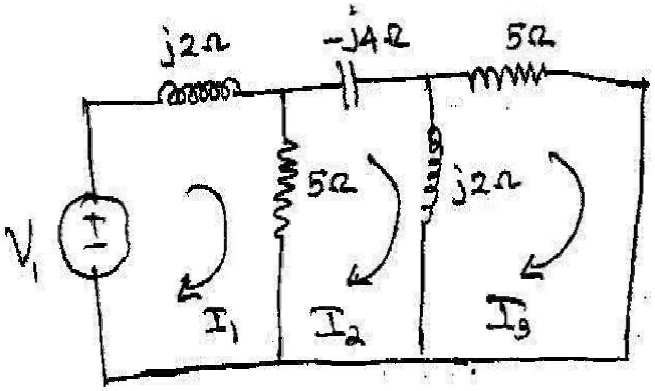
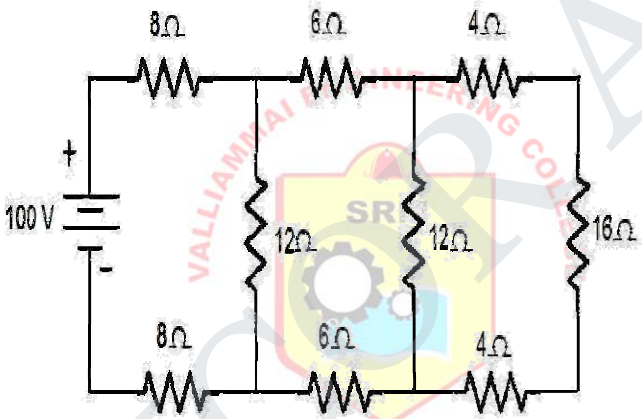
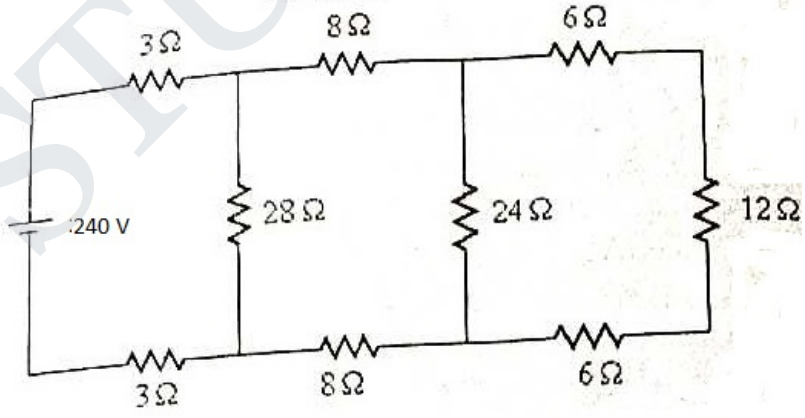
UNIT I - ELECTRICAL CIRCUITS ANALYSIS

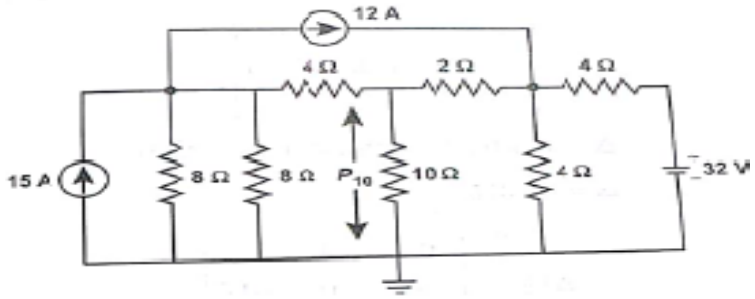
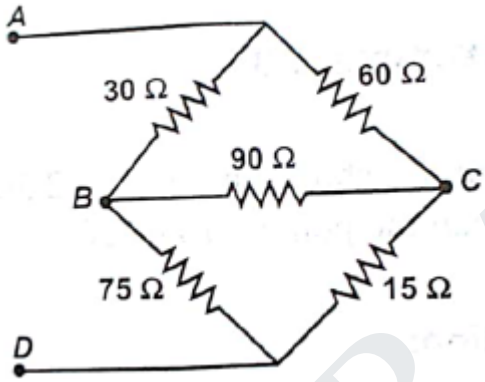
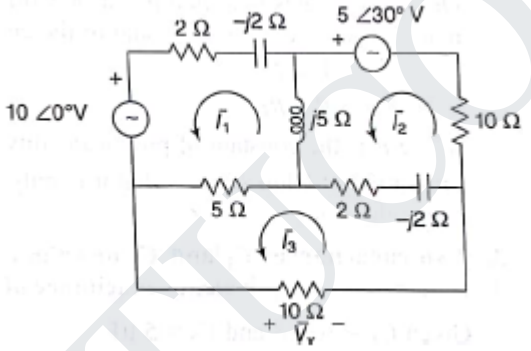
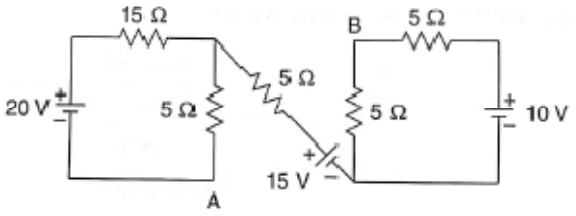
Ohms Law, Kirchhoff's Law-Instantaneous power- series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis- network theorems – Thevenin's theorem, Norton theorem, maximum power transfer theorem and superposition theorem, three phase supply-Instantaneous, Reactive and apparent power-star delta conversion.

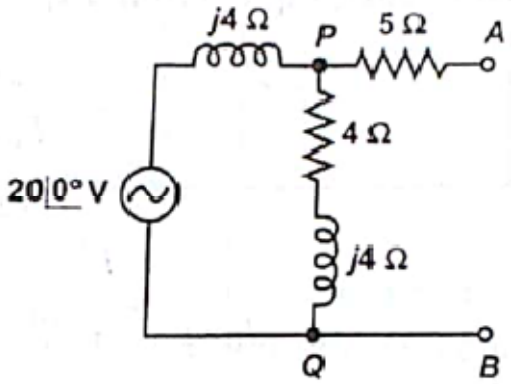
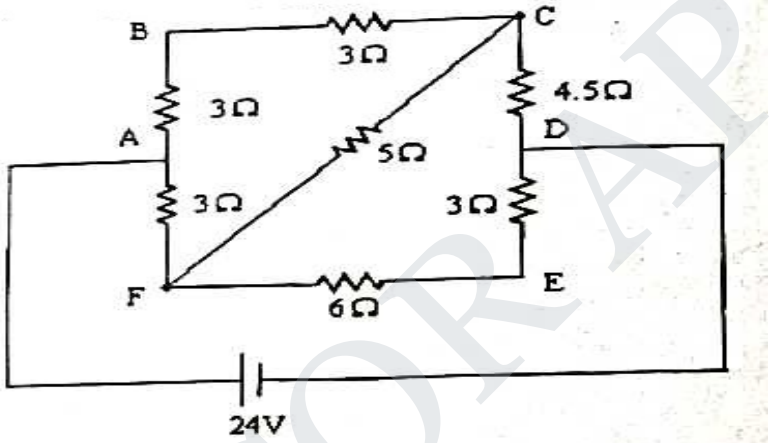
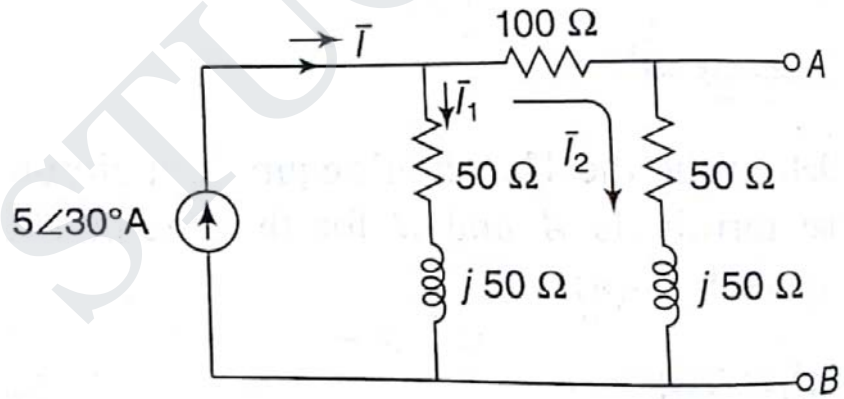
PART – A

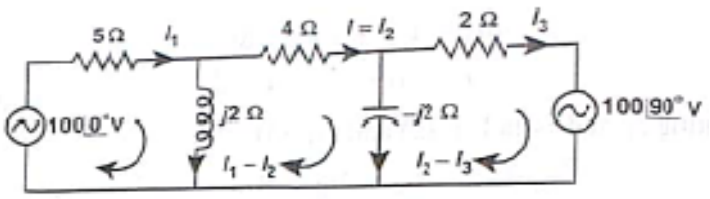
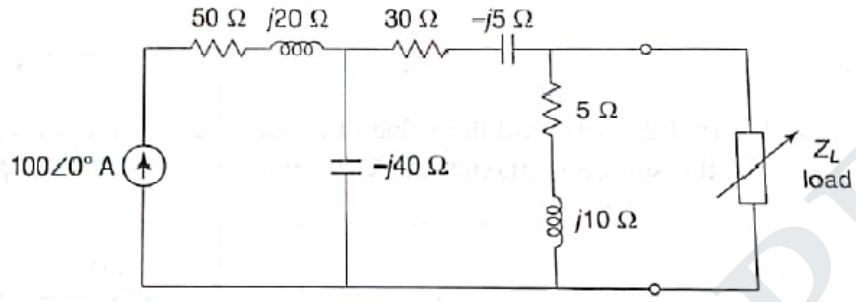
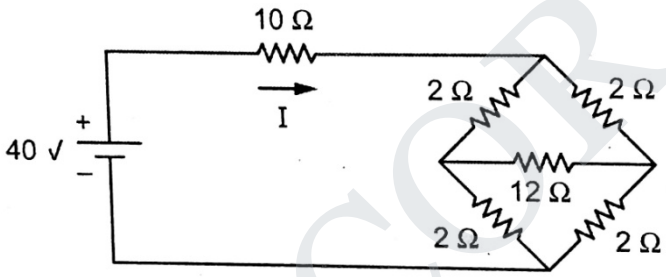
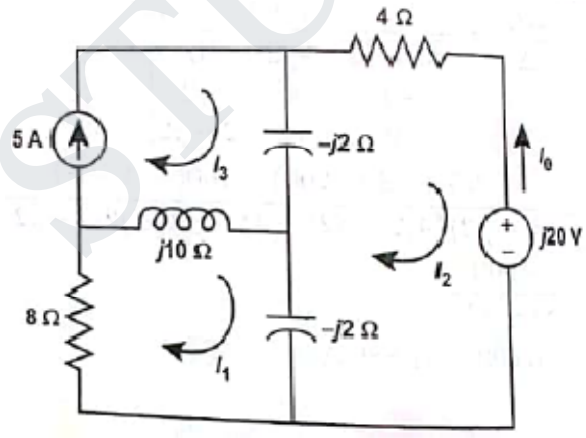
Q.No	Questions	BT Level	Competence
1.	Define Ohm's Law	BTL 1	Remember
2.	Define Kirchhoff's Laws for electric circuits.	BTL 1	Remember
3.	A 1Φ 50 Hz ac supply system has the RMS values of 100V, 10 A. Examine the instantaneous value of voltage and current.	BTL 3	Apply
4.	Distinguish between series and parallel circuit	BTL 2	Understand
5.	Select the value of R1 and R2 when they are parallel with the following conditions. The current in R1 is twice the current flowing through R2 and the equivalent resistance of the parallel combination is 10/3Ω.	BTL 5	Evaluate
6.	Two inductances L1=3mH and L2=6mH are connected in parallel. Analyse and infer Leq.	BTL 4	Analyze
7.	Compose the equivalent resistance for the following combination of resistor and source current. 	BTL 6	Create
8.	Generalize the expressions for mesh current equations in matrix form.	BTL 3	Create

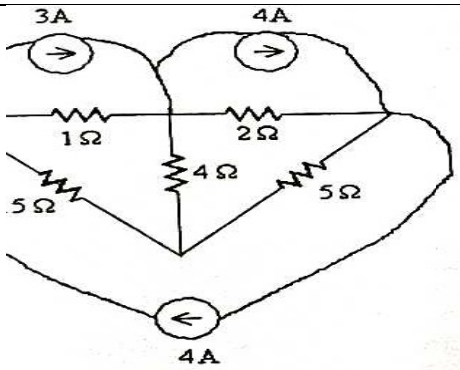
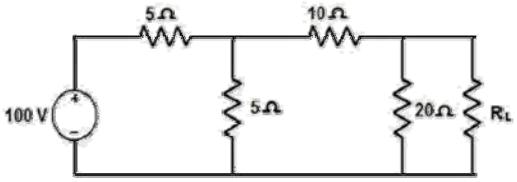
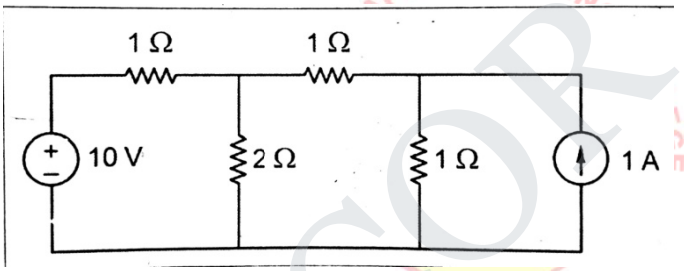
9.	Differentiate active and reactive power in electrical circuits.	**BTL 2**	**Understand**
10.	Explain how voltage source with a source resistance can be converted into an equivalent current source.	**BTL 5**	**Analyze**
11.	Given that the resistors Ra, Rb and Rc are connected electrically in star. Formulate the equations for resistors in equivalent delta.	**BTL 6**	**Create**
12.	Three resistors Rab, Rbc and Rca are connected in delta. Re-write the expression for resistors in equivalent star.	**BTL 4**	**Create**
13.	How will you express the Norton's equivalent circuit from Thevenin's equivalent circuit?	**BTL 2**	**Understand**
14.	State Superposition theorem.	**BTL 1**	**Remember**
15.	State the theorem used in converting an electrical circuit into one equivalent resistance in series with voltage source.	**BTL 1**	**Remember**
16.	Identify the theorem used in converting an electrical circuit into one equivalent resistance in parallel with current source.	**BTL 1**	**Remember**
17.	State Maximum power transfer theorem.	**BTL 1**	**Remember**
18.	Using superposition theorem, calculate current in the circuit. 	**BTL 3**	**Apply**
19.	Discuss some applications of maximum power transfer theorem	**BTL 2**	**Understand**
20.	Point out the limitations of superposition theorem.	**BTL 4**	**Analyze**
	PART – B		
1.	Interpret the current delivered by the source shown in the circuit below. **(13)** 	**BTL 2**	**Understand**

2.	For the network shown below, label the current ratio (I_1/I_3) by applying mesh analysis. **(13)** 	**BTL 1**	**Remember**
3.	Tabulate a) the equivalent resistances across the terminals of the supply, b) total current supplied by the source and c) power delivered to 16 ohm resistor in the circuit shown in figure. **(13)** 	**BTL 1**	**Remember**
4.	Analyze and determine the current in 12 ohm resistor I the give circuit using mesh method. **(13)** 	**BTL 4**	**Analyze**

5.	Use Nodal Voltage method and estimate the power dissipated in the 10 Ω resistance on the circuit shown in the fig. **(13)** 	**BTL 2**	**Understand**
6.	Using star-delta transformation, in the following circuit find the equivalent resistance. **(13)** 	**BTL 3**	**Apply**
7.	Calculate loop currents by mesh analysis. **(13)** 	**BTL 3**	**Apply**
8.	Deduce the expressions for star connected arms in terms of delta connected arms and delta connected arms in terms of star connected arms. **(13)**	**BTL 5**	**Evaluate**
9.	Give Thevenin's equivalent across the terminals AB for the circuit shown in figure below. **(13)** 	**BTL 2**	**Understand**
10.	Analyze the given circuit and obtain Norton's equivalent circuit .	**BTL 4**	**Analyze**

	(13) 		
11.	Calculate the current through the branch FC using Thevenin's theorem. **(13)** 	**BTL 1** **BTL 1**	**Remember** **Remember**
12.	Determine the Thevenin's equivalent for the figure at terminal AB. **(13)** 	**BTL 6**	**Create**
13.	Using superposition theorem, Identify the current through (2+j3) ohm impedance branch of the circuit shown. **(13)**	**BTL 4**	**Remember**

			
14.	Examine and identify the maximum power delivered to the load in the circuit. **(13 marks)** 	**BTL 1**	**Remember**
	PART – C		
1.	Simplify the circuit and point out the current flowing through the 10Ω resistor, for the circuit diagram shown in figure **(15)** 	**BTL 5**	**Analyze**
2.	Simplify and point out the current I in the network, Using the principle of super position theorem. **(15)** 	**BTL 6**	**Analyze**
3.	i. Examine and identify the node voltage for the give circuit by nodal method **(15)**	**BTL 5**	**Apply**

			
4.	i Examine the value of RL so that maximum power is delivered to the load resistance shown in figure. **(8)**  ii.Give the current through the 2Ω resistor in the circuit shown in figure using superposition theorem. **(7)** 	**BTL 6** **BTL 6**	**Analyze** **Analyze**

UNIT 2 ELECTRICAL MACHINES

DC and AC ROTATING MACHINES: Types, Construction, principle, Emf and torque equation, application Speed Control - Basics of Stepper Motor – Brushless DC motors- Transformers-Introduction- types and construction, working principle of Ideal transformer- Emf equation- All day efficiency calculation.

PART A

1.	Define Electrical Machine and classify them.	**BTL 3**	**Apply**
2.	List the factors affecting the EMF generated in DC machine.	**BTL 6**	**Understand**
3.	What are the major parts of a DC generator?	**BTL 1**	**Remember**
4.	What is a commutator?	**BTL 1**	**Remember**
5.	Is a single phase induction motor self starting? Why?	**BTL 2**	**Understand**
6.	Define back emf.	**BTL 1**	**Remember**
7.	Mention the speed control methods of DC shunt motors.	**BTL 3**	**Apply**
8.	What is meant by synchronous speed?	**BTL 1**	**Remember**
9.	Explain rotating magnetic field.	**BTL 5**	**Evaluate**
10.	Define slip and rotor frequency.	**BTL 2**	**Understand**
11.	State double field revolving field theory.	**BTL 3**	**Apply**

12.	Define stepper motor.	**BTL 1**	**Remember**
13.	List the merits and demerits of stepper motor.	**BTL 4**	**Analyze**
14.	Give the basic principle of BLDC motor.	**BTL 4**	**Apply**
15.	Comparison of Brushed DC motors and BLDC.	**BTL 2**	**Understand**
16.	Define transformer.	**BTL 2**	**Understand**
17.	Mention the application of DC Series and Shunt motor.	**BTL 5**	**Evaluate**
18.	Enumerate the voltage transformation ratio.	**BTL 4**	**Analyze**
19.	What are the properties of ideal transformer?	**BTL 6**	**Remember**
20.	Define all day efficiency of a transformer.	**BTL 1**	**Remember**
	PART B		
1.	Explain with the help of a sketch, the constructional features of a dc machine and briefly describe the functions of armature core, commutator and brushes. **(13)**	**BTL 1**	**Understand**
2.	**(i)** Briefly explain about the principle of operation of DC generator. **(6)** **(ii)** Derive an Emf equation of DC generator. **(7)**	**BTL 3**	**Apply**
3.	A six-pole, lap-connected generator is driven at 600rpm. It has 100 slots with 24 conductors per slot. What is the magnitude of the generated emf? If the number of conductors per slot is changed to 20. At what speed should the generator be run for the same voltage to be generated? The flux per pole is 0.02Wb. **(13)**	**BTL 5**	**Analyze**
4.	**(i)** Explain the principle of operation of DC motor. **(7)** **(ii)** Derive an expression for the torque developed by a dc motor. **(6)**	**BTL 4**	**Analyze**
5.	Discuss the various methods of speed control of DC motors. **(13)**	**BTL 1**	**Understand**
6.	A 300V, four-pole dc motor draws a current of 50A when supplying a certain load. The armature is wave-wound and has 600 conductors. If the flux per pole is 40mwb and the armature resistance 0.2Ω, calculate the speed of the motor. **(13)**	**BTL 4**	**Analyze**
7.	Explain with sketches the constructional features of a synchronous machine. **(13)**	**BTL 2**	**Understand**
8.	Explain the Principle of operation of a three phase induction motor and distinguish between slip and rotor frequency. **(13)**	**BTL 1**	**Remember**
9.	Derive an expression for the torque developed by a three-phase induction motor. **(13)**	**BTL 4**	**Analyze**
10.	Explain the principle of operation of stepper motors with their merits and demerits. (**13**)	**BTL 2**	**Understand**
11.	Write detailed note on how rotation occurs in a BLDC motor and mention a few of its applications. (**13**)	**BTL 3**	**Apply**
12.	Discuss the various methods of speed control of AC motors. (**13**)	**BTL 1**	**Remember**
13.	**(i)** Explain the working principle of a single phase transformer. **(7)** **(ii)** Derive the expression for EMF induced in a single phase transformer. (**6**)	**BTL 2**	**Apply**
14.	Derive an expression for emf equation of the transformer and discuss about transformation ratio. (**13**)	**BTL 6**	**Evaluate**

PART C

1.	Classify generators according to their connections and draw the equivalent circuit for each category. **(15)**	**BTL 6**	**Create**
2.	A four-pole, wave connected shunt generator has 900 conductors. If the flux per pole is 0.03wb and the speed of the generator is 700rpm, what is the magnitude of the armature voltage? If the armature current is 40A, determine (a) the terminal voltage, (b) the field current, and (c) the load supplied. The armature and field resistances are 0.25Ω and 100Ω respectively. If the generator is now lap-wound, what is the flux per pole required to supply the same load? **(15)**	**BTL5**	**Evaluate**
3.	**(i)** Describe with a help of connection diagram, the operation of a split-phase induction motor**. (7)**	**BTL5**	**Evaluate**
	(ii) Draw the connection diagram of shaded-pole induction motor and explain. **(8)**		
4.	Find the all-day efficiency of 500 KVA distribution transformer whose copper loss and iron loss at full load are 4.5KW and 3.5KW respectively. During a day of 24 hours, it is loaded as under**. (15)**	**BTL5**	**Evaluate**

Number of hours	Loading in KW	Power factor
6	400	0.8
10	300	0.75
4	100	0.8
4	0	-

UNIT 3 UTILIZATION OF ELECTRICAL POWER

Renewable energy sources-wind and solar panels. Illumination by lamps- Sodium Vapour, Mercury vapour, Fluorescent tube. Domestic refrigerator and air conditioner-Electric circuit, construction and working principle. Batteries-NiCd, Pb Acid and Li ion–Charge and Discharge Characteristics. Protection-need for earthing, fuses and circuit breakers. Energy Tariff calculation for domestic loads.

PART A

1.	What is the importance of renewable energy source?	**BTL 1**	**Remember**
2.	Explain and sketch the fluorescent lamp connection arrangement.	**BTL 2**	**Understand**
3.	Explain the function of starter.	**BTL 4**	**Analyze**
4.	Explain the function of choke.	**BTL 4**	**Analyze**
5.	Write short notes on mercury vapour lamp.	**BTL 2**	**Understand**
6.	What is the purpose of domestic refrigerator.	**BTL 3**	**Apply**
7.	Point out the requirements of domestic refrigerator.	**BTL 1**	**Remember**
8.	State the function of battery.	**BTL 3**	**Understand**
9.	Draw the discharge characteristics of NiCd battery.	**BTL 6**	**Create**
10.	List out the advantages and disadvantages of lead acid battery.	**BTL 1**	**Remember**

11.	Show the chemical reaction takes place in the NiCd battery.	**BTL 5**	**Evaluate**
12.	State the application of Li ion battery.	**BTL 4**	**Analyze**
13.	Show the need for protective schemes in power system.	**BTL 2**	**Understand**
14.	State the main objective of air conditioning.	**BTL 1**	**Remember**
15.	Define the function of circuit breaker and its types.	**BTL 2**	**Understand**
16.	Explain the function of fuse? Name the types of fuses.	**BTL 5**	**Analyze**
17.	Classify the different types of earthing.	**BTL 1**	**Remember**
18.	What is the necessity for earthing?	**BTL 3**	**Understand**
19.	Explain pipe earthing.	**BTL 6**	**Analyze**
20.	List the different types of tariff calculation in electrical system.	**BTL 1**	**Remember**
	PART B		
1.	Write a short note on electricity generation using renewable energy source solar. **(13)**	**BTL 1**	**Remember**
2.	Write a technical note on the following: i) Wind energy generating system ii) Solar panel (any two types) **(13)**	**BTL 1**	**Remember**
3.	Describe the working and operation of mercury vapour lamp with neat sketch. What is the role of capacitor? **(13)**	**BTL 1**	**Remember**
4.	Describe the working and operation of sodium vapour lamp with relevant sketch. **(13)**	**BTL 1**	**Remember**
5.	Draw a schematic diagram of a fluorescent tube and discuss the role of (a) choke (b) tube light (c) starter **(13)**	**BTL 4**	**Analyze**
6.	Draw the electric circuit of a domestic refrigerator and explain the role of each components and its working. **(13)**	**BTL 4**	**Analyze**
7.	Discuss the working of electric circuit for a air conditioning with relevant sketch. **(13)**	**BTL 2**	**Understand**
8.	Describe the construction and working of a lead acid battery. **(13)**	**BTL 2**	**Understand**
9.	Describe the construction and working of a Li ion battery. **(13)**	**BTL 2**	**Understand**
10.	What is meant by protective devices. Explain any one of protective device in detail. **(13)**	**BTL 4**	**Analyze**
11.	Describe the construction and working of a NiCd battery. **(13)**	**BTL 3**	**Apply**
12.	Write short notes on the characteristics of NiCd and Li ion battery. **(13)**	**BTL 3**	**Apply**
13.	Write a detailed note on electricity tariffs for domestic consumers.	**BTL 5**	**Evaluate**
14.	**(i)** Summarize the importance of protective schemes employed in power system. **(6)**	**BTL 6**	**Create**
	(ii) Show the essential quantities of protection. **(7)**		**Create**
	PART C		
1.	Draw a single line diagram of an ac power system and clearly show the various sub systems and the range of voltages at which they operate. **(15)**	**BTL 6**	**Analyze**
2.	Enumerate the different types of renewable energy source of generating electrical power and explain its working operation. **(15)**	**BTL 5**	**Evaluate**

3.	Categorize the different types of batteries and distinguish between various types of storage batteries. **(15)**	**BTL 6**	**Analyze**
4.	What is the need for Earthing? Also explain the different types of earthing. **(15)**	**BTL 5**	**Evaluate**

UNIT 4 ELECTRONIC CIRCUITS

PN Junction-VI Characteristics of Diode, zener diode, Transistors configurations - amplifiers. Op amps- Amplifiers, oscillator, rectifiers, differentiator, integrator, ADC, DAC. Multi vibrator using 555 Timer IC. Voltage regulator IC using LM 723, LM 317.

PART A

1.	Define Semiconductor	**BTL 1**	**Remember**
2.	What you mean by depletion layer in PN junction diode?	**BTL 3**	**Apply**
3.	Summarize the types of biasing a PN junction.	**BTL 2**	**Understand**
4.	Define Knee voltage of a Diode	**BTL 1**	**Remember**
5.	Explain forward bias and reverse bias in a PN junction.	**BTL 4**	**Analyze**
6.	Draw its V-I Characteristics of Zener diode	**BTL 2**	**Understand**
7.	Differentiate between Zener Breakdown and Avalanche	**BTL 2**	**Understand**
8.	When does a transistor act as a switch?	**BTL 4**	**Analyze**
9.	What is biasing?	**BTL 3**	**Apply**
10.	Classify the different configurations of transistor.	**BTL 3**	**Apply**
11.	Summarize the advantages of Push pull amplifier.	**BTL 6**	**Create**
12.	Explain the concept of oscillator.	**BTL 4**	**Analyze**
13.	Define Rectifiers. List the types of Rectifiers.	**BTL 1**	**Remember**
14.	Draw the circuit arrangement of op-amp based differentiator.	**BTL 6**	**Remember**
15.	Define differentiator and integrator.	**BTL 1**	**Remember**
16.	List the types of ADC.	**BTL 1**	**Remember**
17.	List the types of DAC.	**BTL 1**	**Remember**
18.	Classify the different types of Multivibrator.	**BTL 2**	**Apply**
19.	Draw the pin diagram of LM 723.	**BTL 5**	**Evaluate**
20.	Draw the pin diagram of LM 317.	**BTL 5**	**Evaluate**

PART B

1.	With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effect of temperature on its V-I characteristics. **(13)**	**BTL 4**	**Analyze**
2.	i) Why the Zener diode is called as regulator. **(6)** ii) Explain V-I characteristics of Zener diode and Compare Zener Diode with ordinary diode. **(7)**	**BTL 4**	**Analyze**
3.	Discuss the switching characteristics of a transistor with neat sketch. **(13)**	**BTL 2**	**Understand**
4.	Describe the static input and output characteristics of CB configuration of a transistor with neat circuit diagram. **(13)**	**BTL 1**	**Remember**
5.	Explain the construction and working of Bipolar Junction Transistor (BJT). Also draw the input and output characteristics of Common	**BTL 6**	**Create**

	Emitter configuration. **(13)**		
6.	Discuss the most commonly used transistor configuration? Why? And Explain the configuration? **(13)**	**BTL 2**	**Understand**
7.	(i) Describe the working principle of Full wave Rectifier with necessary waveforms. **(8)**	**BTL 3**	**Apply**
	(ii) Explain the operation of OP-amp integrator circuit. **(5)**		
8.	Discuss the different oscillator circuit to produce sustained oscillations? **(13)**	**BTL 2**	**Understand**
9.	Draw the circuit diagram and explain the working of full wave bridge rectifier and derive the expression for average output current and rectification efficiency**.** **(13)**	**BTL 1**	**Evaluate**
10.	With neat sketch, describe principle operation of any one type of ADC in detail. **(13)**	**BTL 1**	**Remember**
11.	Describe any one type of DAC in detail. **(13)**	**BTL 1**	**Remember**
12.	Illustrate in detail about different types of Multivibrator using 555 timers. **(13)**	**BTL 3**	**Apply**
13.	Explain the operation of a Voltage regulator using LM 723. **(13)**	**BTL 4**	**Analyze**
14.	Explain the operation of a Voltage regulator using LM 317 with neat sketches**.** **(13)**	**BTL 5**	**Evaluate**
	PART C		
1.	Explain the hall wave and full wave rectifiers with relevant diagram. **(15)**	**BTL 5**	**Evaluate**
2.	Illustrate the requirements for producing sustained oscillations in feedback circuits? Discuss any two audio frequency oscillators. **(15)**	**BTL 5**	**Apply**
3.	Design an integrator and differentiator using operational amplifier. **(15)**	**BTL 6**	**Create**
4.	Explain the operation of switching regulators. Give its advantages. **(15)**	**BTL 5**	**Evaluate**

UNIT 5 ELECTRICAL MEASUREMENT

Characteristic of measurement-errors in measurement, torque in indicating instruments-moving coil and moving iron meters, Energy meter and watt meter. Transducers-classification-thermo electric, RTD, Strain gauge, LVDT, LDR and piezoelectric. Oscilloscope-CRO.

PART A

1.	Mention the different types of storage oscilloscope.	**BTL 1**	**Remember**
2.	Demonstrate the block diagram of digital storage CRO.	**BTL 3**	**Apply**
3.	Define gross and random errors.	**BTL 1**	**Remember**
4.	Name the different types of errors in measurement system.	**BTL 3**	**Apply**
5.	Describe the measuring lag and fidelity of dynamic characteristics of instrument.	**BTL 2**	**Understand**
6.	The true value of a voltage is 100V. The values indicated by a measuring instrument are 104, 103,105,103 and 105V. Calculate the accuracy and precision of the measurement.	**BTL 3**	**Apply**
7.	Define dynamic characteristics of an instrument.	**BTL 2**	**Remember**
8.	Define the static characteristics of an instrument.	**BTL 2**	**Remember**

9.	How are the absolute and relative errors expressed	**BTL 2**	**Understand**
10.	Compare moving coil with moving iron instruments.	**BTL 4**	**Analyze**
11.	Define limiting error. Derive the expression for relative limiting error.	**BTL 4**	**Analyze**
12.	Why the ordinary wattmeters are not suitable for low power factor circuits?	**BTL 6**	**Analyze**
13.	Define primary transducer.	**BTL 1**	**Remember**
14.	Quote the principle of operation of optical transducer.	**BTL 5**	**Remember**
15.	Compare sensor and transducer.	**BTL 5**	**Evaluate**
16.	Describe inverse transducers with example	**BTL 1**	**Remember**
17.	Estimate the output expected out of an LVDT provided with unidirectional excitation, while measuring a displacement of 3cm?	**BTL 6**	**Understand**
18.	Write the functions of LDR.	**BTL 1**	**Remember**
19.	Explain in brief about gauge factor. Give its expression.	**BTL 4**	**Analyze**
20.	Quote piezoelectric effect.	**BTL 1**	**Remember**
	PART B		
1.	List and discuss the various types of error in measurement? **(13)**	**BTL 1**	**Understand**
2.	**(i)** Classify the different types of measuring instruments. **(6)**	**BTL 1**	**Remember**
	(ii) List the important features of measuring instruments? **(7)**		**Understand**
3.	Describe briefly the working of Permanent Magnet Moving Coil (PMMC) measuring instrument with neat construction arrangement. Also derive the torque developed in PMMC instrument. **(13)**	**BTL 2**	**Understand**
4.	Describe briefly the working of moving iron instrument with a neat diagram. **(13)**	**BTL 2**	**Understand**
5.	Describe briefly the working of moving coil Dynamometer instrument with a neat diagram. **(13)**	**BTL 2**	**Analyze**
6.	Explain in detail the different types of instruments used for measurement of power. **(13)**	**BTL 4**	**Evaluate**
7.	Derive the torque equation for energy meter and explain the principle operation. **(13)**	**BTL 4**	**Evaluate**
8.	With the neat block diagram explain the working and operation principle of CRO. **(13)**	**BTL 4**	**Create**
9.	**(i)** What is a sensor? Distinguish between active and passive sensor. **(6)**	**BTL 6**	**Create**
	(ii) Based on output, how are sensors categorized? Compare the different types of sensors. **(7)**		**Evaluate**
10.	**(i)** List out the various properties of a good transducers. **(6)**	**BTL 1**	**Remember**
	(ii) Draw the block diagram of a basic measuring system. Discuss the role of each component. **(7)**		**Remember**
11.	Categorize the different types of resistance transducers. With the neat diagram explain the working of resistance thermometer. (RTD) **(13)**	**BTL 5**	**Evaluate**

12.		Explain with the neat diagram the working principle and operation of different types of strain gauge. **(13)**	**BTL 3**	**Apply**
13.	**(i)**	With suitable circuit diagram, explain how the strain gauge is used to measure pressure? **(8)**	**BTL 1**	**Remember**
	(ii)	Explain the working of Linear Variable Differentiator Transformer (LVDT) with relevant circuit diagram. **(5)**		
14.	**(i)**	How do piezoelectric transducers work? State their advantages and disadvantages. Enumerate the application of piezoelectric transducers. **(8)**	**BTL 3**	**Apply**
	(ii)	Explain with the help of a sketch the working of a photoelectric transducer. **(5)**		**Analyze**
PART C				
1.		With neat sketch, explain the construction of energy meter. **(15)**	**BTL 5**	**Evaluate**
2.		Derive the expressions for deflection and controlling torques for (i) Attraction and (ii) Repulsion types of MI instruments. **(15)**	**BTL 6**	**Create**
3.		Enumerate the various types of transducer categories based on the functions they perform. Distinguish clearly, with examples, between active and passive devices. **(15)**	**BTL 5**	**Evaluate**
4.		(i) Draw the block diagram of a basic measuring system. Discuss the role of each component. **(8)** (ii) Enumerate in detail about the LDR. **(7)**	**BTL 6**	**Create**