Vidya Jyothi Institute of Technology (Autonomous)

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Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Humanities and Sciences

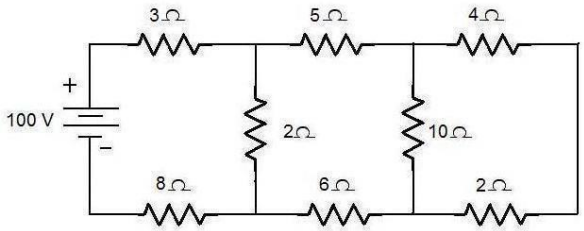
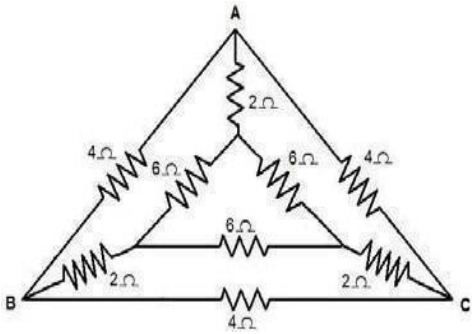
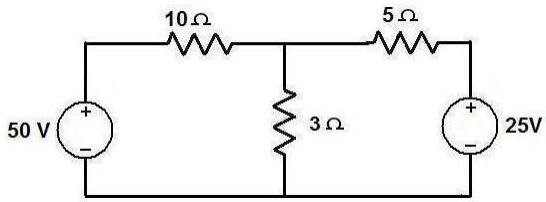
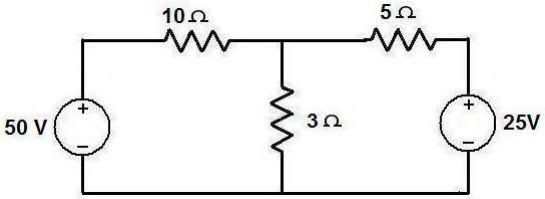
B.Tech First Year II Semester-2019-20

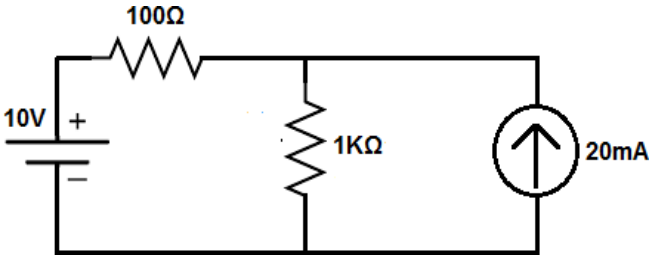
QUESTION BANK

Subject: BASIC ELECTRICAL ENGINEERING (BEE)

	UNIT-I Introduction to Electrical Engineering &DC Circuits SHORT ANSWER QUESTIONS
1	Define potential difference and current.
2	Define active and passive elements. Write the examples.
3	Define unilateral and bilateral elements. Write the examples.
4	Define linear and nonlinear elements. Write the examples.
5	State Ohm's law. Write the limitations of Ohm's law.
6	Write the difference between series and parallel resistive circuits.
7	Write voltage and current relationships for passive elements.
8	The voltage across 4Ω resistor is 8V.Find the current and power dissipated in theresistor.
9	A current $i(t)=10e^{-t}$ is applied to a 2H inductor. What is its respective voltage?
10	What are the ideal and practical voltage sources? Draw their V-I characteristics.
11	What are the ideal and practical current sources? Draw their V-I characteristics.
12	Write the types of dependent sources with representation.
13	Two resistors each of 4Ω and 12Ω are connected in parallel and this parallel combination is connected in series with a 2Ω resistor. What is the total resistance?
14	State Kirchhoff's laws.
15	Write the expressions for delta to star transformation.
16	Write the expressions for star to delta transformation.
17	Write the expressions for resistors, inductors, and capacitors connected in series and parallel.
18	If the resistors 2Ω and 3Ω are connected in parallel across a 10A source. Find the current flowing in the resistor 2Ω.
19	State superposition theorem. Write it's limitations.
20	State Thevenin's theorem. Write it's limitations.

	UNIT-I LONG ANSWER QUESTIONS
1	Explain (i) Basic circuit elements and (ii) Classification of network elements.
2	Explain the (i) Types of sources and (ii) Kirchhoff's laws.
3	Derive the expressions for delta to star and star to delta transformations.
4	Calculate the equivalent resistance across the terminals of the supply and total current for the following network.

	
5	Obtain the equivalent resistance between B and C for the following network by using Δ-Y and Y-Δ conversion. 
6	Find the current in 3Ω resistor for the following circuit by using superposition theorem. 
7	State Thevenin's theorem and write the procedure for finding the current in aload resistance by using Thevenin's theorem.
8	Find the current in 3Ω resistor for the following circuit by using Thevenin's theorem. 
9	Determine the current flowing through the 1KΩ resistor for the following circuit by using superposition theorem.

	
10	Derive the equivalent resistance and inductance for series and parallel circuit.

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Department of Humanities and Sciences

B. Tech I Year II Semester-2019-20

QUESTION BANK

Subject: BASIC ELECTRICAL ENGINEERING (BEE)

	UNIT-II A.C.Circuits SHORT ANSWER QUESTIONS
1	Differentiate D.C and A.C. quantities.
2	Define time period and frequency.
3	Define peak value and instantaneous value.
4	Define R.M.S and average values of an alternating quantity.
5	Define form factor and peak factor .Write the values of same for sinusoidal waveform.
6	What is phase and phase difference.
7	What is the significance of j operator?
8	Define inductive and capacitive reactances. Write the expressions.
9	Draw the waveforms and phasor diagram for pure R circuit to sinusoidal excitation.
10	Draw the waveforms and phasor diagram for pure L circuit to sinusoidal excitation.
11	Draw the waveforms and phasor diagram for pure C circuit to sinusoidal excitation.
12	Draw the phasor diagrams of series RL and RC circuit to sinusoidal excitation.
13	Draw the impedance and power triangles for series RL and RCcircuits
14	Define apparent, active and reactive powers.
15	Define power factor. Write the importance.
16	Define admittance and susceptance.
17	What is the reactance of a 1Henry inductor for (i)D.C and (ii)50Hz
18	The impedance of an electrical circuit is (30-j50) Ω. Determine the resistance and capacitance, when the circuit is connected to a 230V, 50Hz supply.
19	Define resonance and write the expression for resonant frequency of series resonant circuit.
20	Write the voltage and current relations in star and delta connections for three phase balanced circuits.

	UNIT-II LONG ANSWER QUESTIONS
1	Derive the RMS value and average value for sinusoidal waveform. Find form factor.
2	Explain the concept of phase, phase difference and j-notation in A.C. circuits.
3	Explain the steady state analysis of series RL circuit for sinusoidal excitation.
4	Derive the steady state analysis of series RC circuit for sinusoidal excitation.
5	Explain the steady state analysis of series RLC for sinusoidal excitation.

6	A resistance of 10Ω is connected in series with a 50mH inductor across a 230V, 50Hz supply. Calculate (i) current flowing in the circuit (ii) Phase angle of current (iii) Voltage across resistor and inductor and (iv) Active and reactive powers.
7	A resistance of 10Ω is connected in series with a 20μF capacitor across a 230V, 50Hz supply. Calculate (i) Current flowing in the circuit (ii) Power factor (iii) Voltage across resistor and capacitor and (iv) Active and reactive powers.
8	A resistance of 10Ω, inductance of 0.5H and capacitance of 10μF are connected in series to the supply of 50V, 50Hz supply. Calculate the voltage across each element and active power.
9	The impedances of a parallel circuit are Z1=6+j8Ω and Z2=8-j6Ω.If the applied voltage is 120V.Find (i)Current and power factor of each branch and (ii) Total current and overall power factor.
10	Obtain the resonance condition for series RLC circuit. If elements R=8kΩ, L=20mH and C=80nF are connected in series and circuit is in resonant condition, find resonant frequency.

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QUESTION BANK

Subject: BASIC ELECTRICAL ENGINEERING (BEE)

UNIT-III Magnetic Circuits &Transformers SHORT ANSWER QUESTIONS	
1	Define magnetic flux density and magnetic field intensity.
2	Define absolute and relative permeability.
3	Write the differences between electric circuit and magnetic circuit.
4	Write the types of magnetic materials.
5	State Faraday's laws of electromagnetic induction.
6	Draw the B-H curve for magnetic materials.
7	Define self inductance? Write the expression for self inductance.
8	Define mutual inductance? Write the expression for mutual inductance.
9	Define the transformer. Write the main parts of a transformer.
10	Why the rating of transformer given in KVA?
11	Write the e.m.f. equation of a transformer. Define transformation ratio.
12	What are the conditions for an ideal transformer?
13	Draw the no load phasor diagram of an ideal transformer.
14	Draw the approximate equivalent circuit of transformer referred to primary side.
15	Define voltage regulation of a transformer. Write the expression.
16	Write the various losses in a transformer.
17	Define efficiency of a transformer? Write the condition for maximum efficiency?
18	Write the expression of efficiency at full load and half load condition?
19	In OC test L.V winding is used as primary and H.V winding is used as secondary, why?
20	In SC test H.V winding is used as primary and L.V winding is used as secondary, why

UNIT-III LONG ANSWER QUESTIONS	
1	Explain the B-H characteristics of magnetic materials.
2	Explain the (i) Different types of magnetic materials and (ii) Faraday's laws of electromagnetic induction.
3	With neat diagram explain the principle of working of single phase transformer.
4	With neat sketch explain the constructional details of core and shell type transformers?
5	Derive the EMF equation of a transformer?
6	Explain the various losses in a transformer?

<table>
<tr><td></td><td></td></tr>
<tr><td>7</td><td>Explain the operation of an ideal transformer at no load condition. Draw the equivalent circuit and phasor diagram.</td></tr>
<tr><td>8</td><td>Explain the working of practical transformer on no load. Draw the equivalent circuit and phasor diagram.</td></tr>
<tr><td>9</td><td>A single phase 2200/250 V, 50 Hz transformer has a net core area of 36 sq.cm and a maximum flux density of 0.6Wb/m^2.Calculate the number of turns of primary and secondary winding?</td></tr>
<tr><td>10</td><td>The following readings were obtained from O.C and S.C tests on 8KVA, 400/120 V, 50 Hz Transformer.

<table><tr><td>OC test on LV side</td><td>120 V</td><td>4 A</td><td>75 W</td></tr><tr><td>SC test on HV side</td><td>9.5 V</td><td>20 A</td><td>110 W</td></tr></table>
Calculate the voltage regulation and efficiency at full load, 0.8 power factor lagging.</td></tr>
</table>

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QUESTION BANK

Subject: BASIC ELECTRICAL ENGINEERING (BEE)

UNIT-IV DC Machines & Induction Motors SHORT ANSWER QUESTIONS	
1	What is Fleming's right hand rule?
2	List the main parts of a D.C.machine.
3	What are the functions of yoke in D.C machines?
4	What are the functions of pole core and pole shoe in D.C machines?
5	What are the functions of commutator in D.C machines?
6	What is Fleming's left hand rule?
7	What is an electric motor? State it's principle of working.
8	Define back e.m.f. Write the significance of back e.m.f in D.C.motor.
9	List the types of D.C motors.
10	Write the voltage and torque equation of a D.C Motor.
11	A three phase induction motor does not run at synchronous speed. Why?
12	Write about types of rotors in three phase induction motor.
13	Define synchronous speed and slip.
14	Write the torque equation of the three phase induction motor
15	Draw the torque-slip characteristics of three phase induction motor.
16	Write the working principle of single phase induction motor.
17	Why single phase induction motors are not self start induction motors?
18	What is the function of capacitor in a single phase induction motor?
19	Why the starting torque of a capacitor start induction motor is high?
20	Write the applications of capacitor start induction motor.

UNIT-IV LONG ANSWER QUESTIONS	
1	With neat diagram explain the construction of a D.C machine.
2	Explain the principle and operation of D.C motor.
3	Derive the expression for the armature torque of a D.C motor?
4	With neat diagram explain the construction of three phase induction motor.
5	Explain the principle and working of a three phase induction motor.
6	Explain the torque –slip characteristics of three phase induction motor.
7	Explain the working principle of capacitor start single phase induction motor?
8	A 230 volts dc shunt motor takes 51 A at full load. Resistances of armature and field windings are 0.1Ω and 230Ω respectively. Determine (i) Field current (ii) Armature current and (iii) Back e.m.f.

9	A 200V, 4 pole, lap wound DC Shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5Ω and that of shunt field winding is 200 Ω. The motor takes a current of 21A, the flux /pole is 30mWb. Find the speed and the torque developed in the motor.
10	A 4- pole ,3-phase induction motor fed from 50Hz supply and has a rotor speed of 1425 r.p.m .Calculate i) Synchronous speed and ii) %slip and iii)Rotor frequency

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QUESTION BANK

Subject: BASIC ELECTRICAL ENGINEERING (BEE)

	UNIT-V AC Generator & Electrical Installation SHORT ANSWER QUESTIONS
1	Why A.C.Generator is called synchronous generator?
2	Write the principle of operation of synchronous generator.
3	Write the advantages of rotating field and stationary armature.
4	Write about the types of rotors in three phase alternator.
5	Why a 3-phase synchronous machine will always run at synchronous speed?
6	Write the equation for frequency of e.m.f induced in an alternator.
7	Write the EMF equation of an alternator.
8	Why the stator core of alternator is laminated?
9	Define pole pitch.
10	Define pitch factor or coil span factor.
11	Define distribution factor or winding factor.
12	Write the formula for distribution factor and pitch factor.
13	What is a fuse and circuit breaker?
14	What does the battery consists of?
15	How many types of batteries are there? Name them.
16	What are the advantages of lithium ion battery?
17	What is the difference between a fuse and circuit breaker?
18	Differentiate primary and secondary batteries.
19	What is battery backup?
20	What are the desirable characteristics of fuse element materials?

	UNIT-V LONG ANSWER QUESTIONS
1	With neat diagram explain the construction and principle of operation of synchronous generator or three phase alternator.
2	Derive the EMF equation of three phase alternator.
3	Define pitch factor and derive the expression of pitch factor for a short pitch coil.
4	Write the differences between fuse and circuit breaker.
5	Explain the types of batteries.
6	Write the advantages, disadvantages and applications of Li-ion battery.

7	Explain the battery backup and its applications.
8	Calculate the distribution factor for a 36 slots, 4 pole, three phase winding of an alternator.
9	A 4-pole 3 phase star connected alternator has 48slots.The coil span is 150^0.Determine the pitch factor and distribution factor.
10	A 3-phase, 10 pole, star connected alternator runs at 600r.p.m.it has 120 stator slots with 8 conductors per slot and the conductors of each phase are connected in series. Determine the phase and line emfs, if the flux /pole is 56mWb.Assume full pitched coil.