

Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2019

Programme Name: B Tech-APE-Up , APE-Gas ,CE,ME

Semester : II sem

Course Name : Basic Electrical Engineering

Time : 03 hrs

Course Code : EPEG 1001

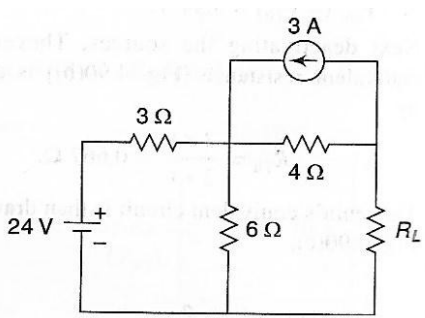
Max. Marks : 100

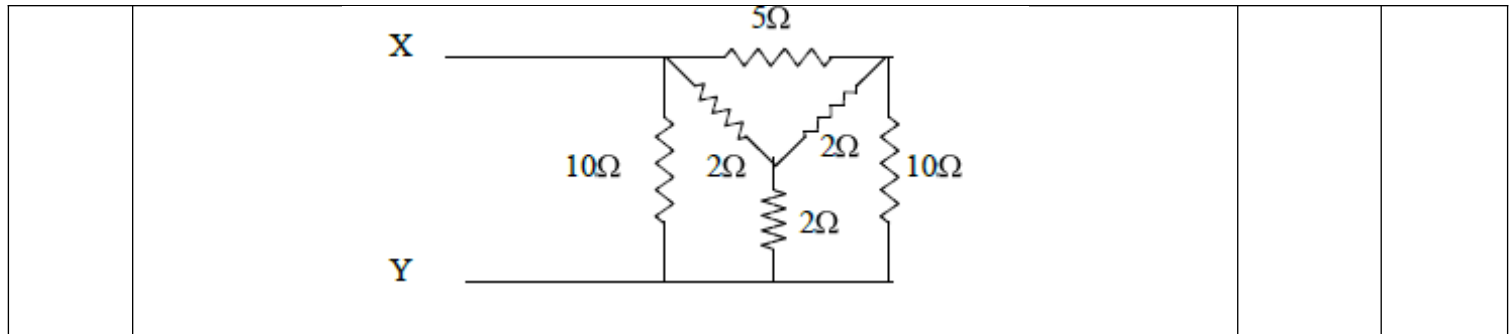
Nos. of page(s) : 02

SECTION A

S. No.	Question	Marks	CO
1	Explain Faraday's law of Electromagnetic induction	04	CO1
2	Define the following terms with respect to alternating quantity (a) RMS Value (b) Form Factor	04	CO1
3	Draw the electrical circuit of different types of DC motors with neat sketches based on the connection of windings	04	CO2
4	Write the features of Ideal Transformer.	04	CO2
5	Give the statement of Thevenin's theorem.	04	CO3

SECTION B

6	A 55 KVA single phase transformer has primary windings of 460 turns and secondary windings of 160 turns. The input side of transformer is supplied with voltage of 2500V, 50 Hz supply. Calculate (a) secondary voltage (b) primary full load current (c) secondary full load current and (d) maximum value of flux.	10	CO3
7	Derive the EMF equation of DC Generator	10	CO2
8	Calculate the value through R_L by using Superposition theorem. Consider the value of $R_L = 2$ ohms. <div style="text-align: center;">  </div>	10	CO2
9	Find the equivalent resistance between terminals X and Y using star-delta transformation	10	CO1



(OR)

9	<p>An alternating current is given by $i=15.15 \sin 377t$, then find</p> <p>(a) RMS value of current</p> <p>(b) Frequency</p> <p>(c) Instantaneous value of current, when $t=4\text{ms}$</p> <p>Time taken by current to reach 12 A for first time after passing through zero.</p>	10	CO1
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SECTION-C

10	<p>(a) Explain the winding arrangement in DC shunt Generator with neat sketch and write the expressions for armature current, field current, shunt resistance and load voltage.</p> <p>(b) A 4-pole lap wound DC shunt motor has a useful flux per pole of 0.06 Wb. The armature winding consists of 220 turns each of 0.004 ohm resistance. Calculate the back EMF and power developed by motor when it runs at 900 rpm. If the armature current is 50 A and field circuit resistance is 200 ohms.</p>	20 (10+10)	CO4
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(OR)

10	<p>(a) Draw Speed Vs Armature current and Torque Vs armature current characteristics of DC Shunt and Series motor.</p> <p>(b) An 8-pole generator has 500 armature conductors and has a useful flux per pole of 0.065 Wb. What will be the emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same EMF if it is wave wound?</p>	20 (10+10)	CO4
11	<p>(a) Explain the series R-L circuit along with phasor diagram when single phase alternating supply is given.</p> <p>(b) An inductive coil of an inductance is 20.4 mH and its resistance of 5 ohms is connected to 230 V, 50Hz supply. Calculate (a) current (b) phase angle (c) power factor and (d) power consumed.</p>	20 (10+10)	CO4

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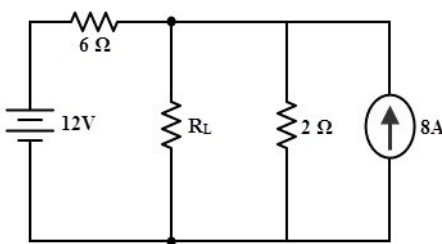
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SECTION A

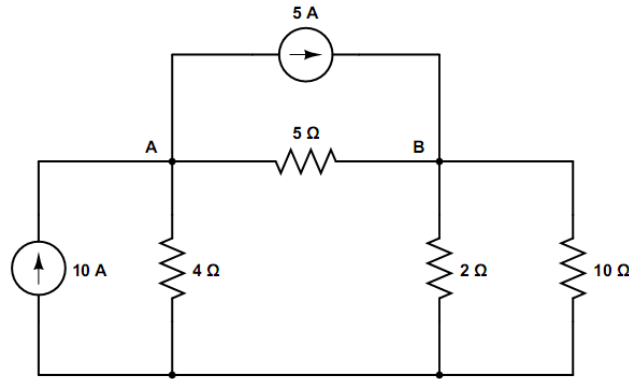
S. No.	Question	Marks	CO
1	Give the 4-4 practical application of DC shunt and DC series motor.	04	CO1
2	Discuss the impact of DC input on working of transformer.	04	CO1
3	A 220 V shunt motor takes a total current of 20 A. the shunt field resistance is 250 ohms while armature resistance is 0.3 ohms. Calculate the back EMF.	04	CO2
4	Ratings of most of the home appliances are in watts whereas transformer ratings in volt-ampere, Why? Justify your answer.	04	CO2
5	State the theorem to transfer the 50% of power from source to load.	04	CO1

SECTION B

6	Explain and draw the equivalent circuit diagram of single phase practical transformer	10	CO3
7	Calculate the current through R_L using source transformation technique by considering $R_L = 5$ ohms. <div style="text-align: center; margin: 10px 0;">  </div>	10	CO2
8	Derive the expression for induced EMF in primary and secondary windings of single phase transformer.	10	CO2
9	An alternating current is given by $i = 15.15 \sin 377t$, then find <ol style="list-style-type: none"> RMS value of current Frequency Instantaneous value of current, when $t = 4$ms Time taken by current to reach 12 A for first time after passing through zero. 	10	CO3

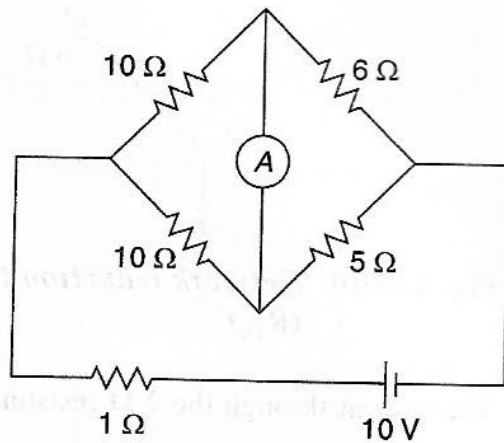
(OR)

9	Apply nodal analysis to the network to determine the Node voltage V_A and V_B for the network shown below	10	CO1
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SECTION-C

10 (a) Calculate the value of current measured by ammeter in the given circuit using Thevenin's theorem. Assume the resistance of ammeter is 01 ohm.



(b) Derive the quality factor for series resonance circuit.

(OR)

10 (a) Explain the series R-C circuit along with phasor diagram when single phase alternating supply is given.
 (b) A capacitor of 280 micro farads is connected to single phase ac circuit across 230 V having frequency 50 Hz. Find (a) capacitive reactance (b) current and (c) equations of current and voltage.

11 (a) Explain the construction of DC generator.
 (b) A DC shunt generator supplies 110 amp at 440 V. the resistance of the armature circuit is 0.2 ohms and that of field circuit is 220 ohms. The machine has 6 poles and armature is lap connected with 864 conductors. The flux per pole is 0.06Wb. Calculate the speed.

20
(14+6)

CO2

20
(10+10)

CO2

20
(10+10)

CO4