

Code No: R161209

R16

SET - 1

I B. Tech II Semester Regular Examinations, April/May - 2017
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to ME, AE, AME, MM, MET)

Time: 3 hours

Max. Marks: 70

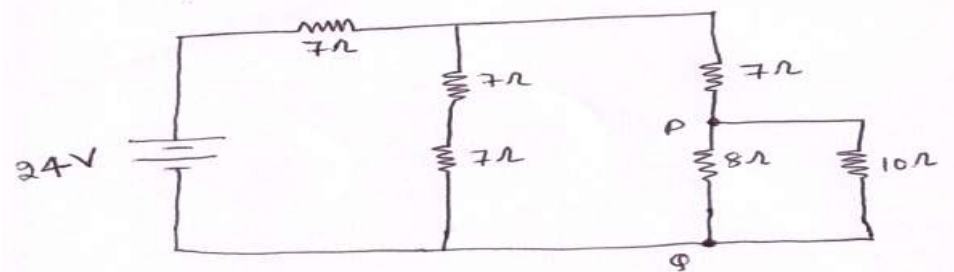
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

PART - A

1. a) A 100Ω resistance is directly switched on across a 10 V battery. What is the current through resistor? How much is the power loss? Also find the energy consumed in 5 Sec. (2M)
- b) Explain the effect of temperature on resistance. (2M)
- c) List and give the applications of different types of DC machines. (2M)
- d) Define voltage regulation of a transformer. (2M)
- e) In an Induction motor, slip is always Positive, Why? (2M)
- f) What is an Ideal diode? Draw its characteristics. (2M)
- g) Explain in brief about feedback amplifier. (2M)

PART - B

2. a) Prove that the energy stored in a capacitor is $\frac{1}{2} C V^2$. (6M)
- b) Find the voltage drop across the 10Ω resistor for the network shown below: (8M)



3. a) Explain the constructional features of a DC machine. (7M)
- b) The wave connected armature of a two-pole 200 V generator has 400 conductors and runs at 300 rpm. Calculate the useful flux per pole. (7M)
4. a) What are the losses that occur in a transformer and how can these losses be reduced? (7M)
- b) Explain the necessity for conducting OC and SC tests on a single phase transformer and give its outcome. (7M)
5. a) Derive the expression for torque developed by an Induction motor. (7M)
- b) A 4 pole, three phase induction motor is connected to a 50 Hz supply. Calculate the synchronous speed, the rotor speed when slip is 4 %, and the rotor frequency when the rotor is running at 1425 rpm. (7M)
6. Explain with a neat diagram the operation of a Full wave rectifier and also draw its output wave forms. (14M)
7. a) Explain the working principle of an n-p-n transistor. (8M)
- b) Explain the working of a single-stage common emitter practical amplifier. (6M)

Describe the importance of dynamic characteristics.



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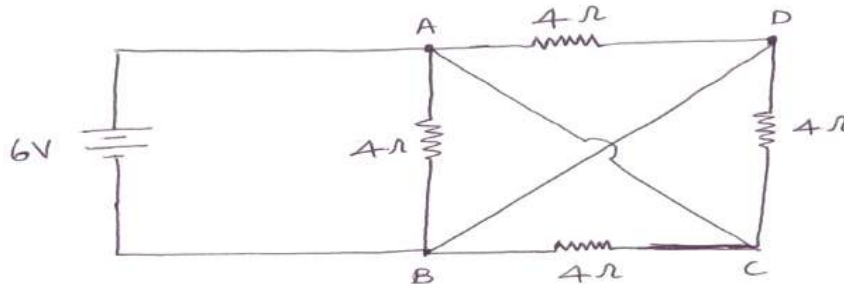
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3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Explain the basic property of a capacitance. (2M)
- b) Explain the significance of Open circuit characteristics of a dc generator. (2M)
- c) List the different types of losses that occur in a dc motor. (2M)
- d) What is eddy current loss and how it can be reduced? (2M)
- e) List the applications of Synchronous motor. (2M)
- f) Describe the characteristics of an ideal Op Amp. (2M)
- g) What is forward bias of a PN junction? (2M)

PART -B

2. a) Explain in detail about Kirchhoff's Current and Voltage Law. (6M)
- b) Calculate the current supplied by the battery for the network shown below: (8M)



3. a) Explain the principle of operation of a DC Generator. (7M)
- b) A 500 V shunt motor takes a current of 5A on no-load. Calculate the efficiency of the motor when it takes 100 A. Take $R_a = 0.5\Omega$ and $R_f = 250\Omega$. (7M)
4. a) Derive the emf equation of a transformer. (7M)
- b) The maximum flux density in the core of a 1100/220V, 50 Hz, 100 KVA transformer is 3.5 Wb/m^2 . Calculate the area of cross section of the core and the number of turns of the primary and secondary windings if the EMF per turn is 5.5 V. (7M)
5. a) What is meant by slip of an Induction motor? What is the value of slip at starting and at synchronous speed? (7M)
- b) Explain the different types of losses that occur in an Induction motor. (7M)
6. a) What are P-type and n-type semiconductors? Draw and explain the V-I characteristic of a p-n junction diode. (7M)
- b) Explain in detail and give the realization of Op – Amp as an Integrator. (7M)
7. a) Draw and explain the common –emitter transistor characteristics. (7M)
- b) Explain in detail about the frequency response of CE Amplifier. (7M)

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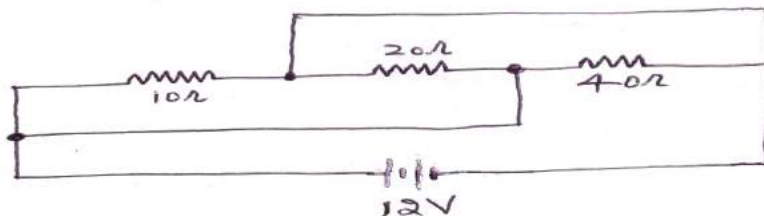
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3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) State and explain ohms law. (2M)
- b) Explain the working principle of a DC Motor. (2M)
- c) Explain the significance of a starter for a DC Motor. (2M)
- d) Why is the core of a transformer made of magnetic material? (2M)
- e) List the applications of Induction Motors. (2M)
- f) What do you mean by forward biasing and reverse biasing of a p-n junction? (2M)
- g) Explain the significance of saturation current in a p – n junction. (2M)

PART -B

2. a) Prove that in series combination of resistances the equivalent resistance in the d.c circuit is the simple sum of individual resistances. (6M)
- b) Calculate the current supplied by the battery for the circuit shown below: (8M)



3. a) Derive the emf equation of a dc machine. (7M)
- b) Explain the significance of Swinburne test and What you can attain from this test. (7M)
4. a) Draw and explain the equivalent circuit of a transformer. (7M)
- b) Explain the procedure to conduct short circuit test on a transformer. What are the parameters that can be obtained from this test? (7M)
5. a) Explain with sketches the constructional features of an alternator. (7M)
- b) Explain the working principle of a synchronous motor. (7M)
6. a) Explain the formation of depletion region in a p-n junction. What is barrier voltage? (7M)
- b) Explain the avalanche effect in a semiconductor device. (7M)
7. a) Discuss the advantages of negative feedback in amplifiers. (7M)
- b) Compare between PNP and NPN transistors. (7M)

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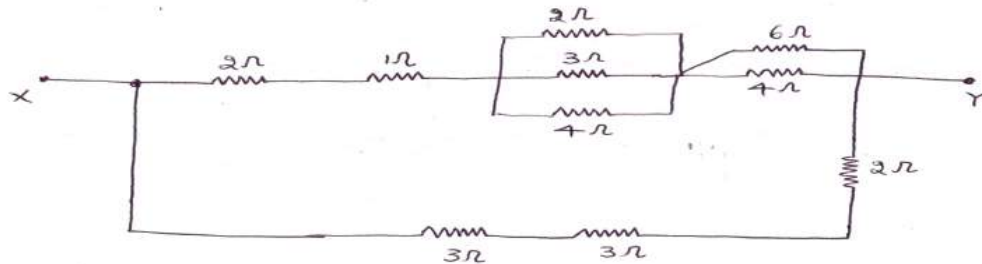
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PART -A

1. a) Explain the basic property of an inductance. (2M)
- b) Explain the different speed control methods of DC Motors. (2M)
- c) Distinguish between core type and shell type transformers. (2M)
- d) Explain why the frequency of output voltage is the same as input voltage in a transformer. (2M)
- e) What is rotor frequency and how come it is different from stator frequency in a Three phase Induction motor? (2M)
- f) Distinguish between Intrinsic and Extrinsic Semiconductors. Give examples. (2M)
- g) Explain the significance of current gain in Transistors. (2M)

PART -B

2. a) Distinguish between an ideal voltage source and a practical Voltage source. (6M)
- b) Find the equivalent resistance across X – Y for the circuit shown below (8M)



3. a) Derive the Torque equation for a DC Motor. (7M)
- b) Explain the working of a Three Point starter with a neat diagram. (7M)
4. a) Explain the principle of operation of a transformer in detail. (7M)
- b) A 25 KVA, 2000/200 V transformer has constant loss i.e., iron loss of 350 W and full-load copper loss called the variable loss of 400 W. Calculate the efficiency of the transformer at full load and at half load 0.8 power factor lagging. (7M)
5. a) What is meant by synchronous speed? Establish the relation $N_s = 120f/P$, where N_s is the synchronous speed, f is the frequency, and P is the number of poles. (7M)
- b) Draw and Explain the Torque – Slip characteristics of a Three Phase Induction Motor. (7M)
6. a) List the specification parameters of a Diode. (5M)
- b) Explain the basic configuration of a Non-Inverting amplifier with a neat diagram. (9M)
7. a) Show how a transistor can be used as a static Switch. (7M)
- b) Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor. (7M)