Code No: R161209 **R16** SET - 1

I B. Tech II Se mester Regular Examinations, April/May - 2 017
BASIC ELECTRICAL AND ELECTRONICS ENGINEERI NG
(Com. to ME, AE, AME, MM, MET)

Time: 3 hours Max. Marks: 70

Note: 1. Questio n 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**

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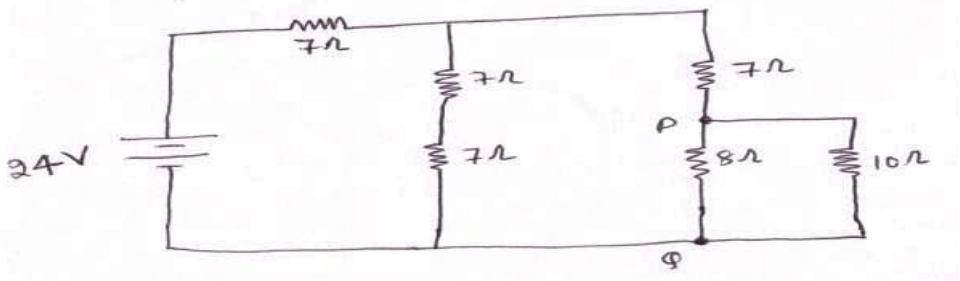
PART –A

1. a) A 100Ω resistance is directly switched on across a 10 V battery. W hat 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 te mperature on resistance. (2M)
   c) List and give the applications of different types of DC machines. (2M)
   d) Define voltage regulati on 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 ½ C V^2. (6M)
   b) Find the voltage drop a cross the 10 Ω resistor for the network shown b elow: (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. C alculate the useful flux per pole. (7M)

4. a) What are the losses th at occur in a transformer and how can these losses be reduced? (7M)
   b) Explain the necessity for conducting OC and SC tests on a sin gle 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 i nduction 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 runninng 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 pr inciple of an n-p-n transistor. (8M)
   b) Explaintheworkingofasingle-stagecommonemitterpracticalamplifier. (6M) Describe the importance of dynamic characteristics.

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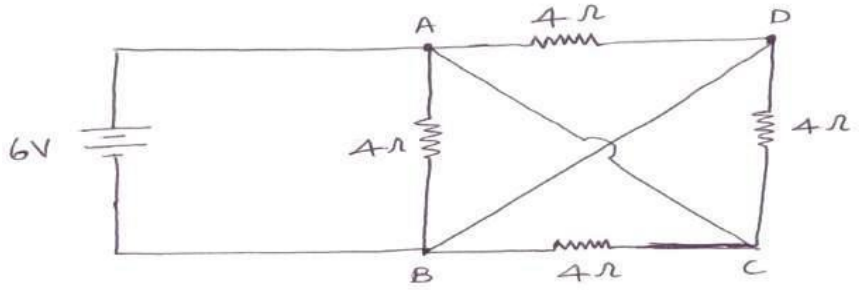
PART –A

1. a) Explain the basic proper ty of a capacitance. (2M)
   b) Explain the significance of Open circuit characteristics of a dc generator. (2M)
   c) List the different types o f losses that occur in a dc motor. (2M)
   d) What is eddy current los s 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 su pplied by the battery for the network shown bel ow: (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 d ensity 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 perr turn is 5.5 V. (7M)

5. a) What is meant by slip o f an Induction motor? What is the value of slipp at starting and at synchronous spee d? (7M)
   b) Explain the different typ es 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 ju nction diode. (7M)
   b) Explain in detail and giv e the realization of Op – Amp as an Integrator. (7M)

7. a) Draw and explain the co mmon –emitter transistor characteristics. (7M)
   b) Explain in detail about the frequency response of CE Amplifier. (7M)

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Note: 1. Questio n Paper consists of two parts (**Part-A** and **Part-B)**
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3. Answer any **FOUR** Questions from **Part-B**

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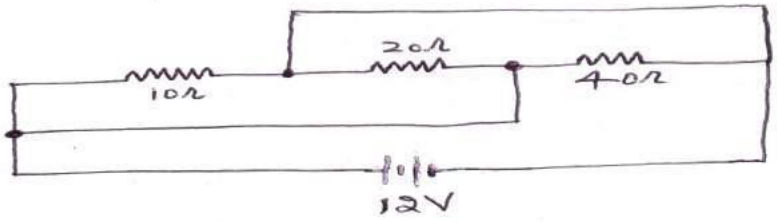
PART –A

1. a) State and explain ohms law. (2M)
   b) Explain the working pri nciple of a DC Motor. (2M)
   c) Explain the significance of a starter for a DC Motor. (2M)
   d) Why is the core of a tra nsformer made of magnetic material? (2M)
   e) List the applications of Induction Motors. (2M)
   f) What do you mean by f orward 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 su pplied 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 fro m this test. (7M)

4. a) Draw and explain the eq uivalent circuit of a transformer. (7M)
   b) Explain the procedure t o conduct short circuit test on a transformer. Wh at are the parameters that can be o btained from this test? (7M)

5. a) Explain with sketches th e constructional features of an alternator. (7M)
   b) Explain the working pri nciple 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 e ffect 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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3. Answer any **FOUR** Questions from **Part-B**

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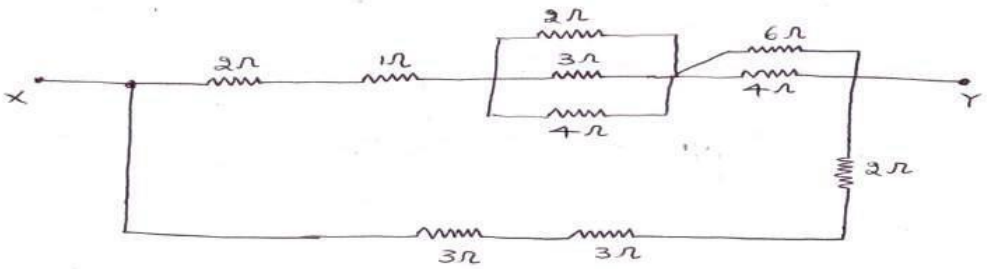
PART –A

1. a) Explain the basic property of an inductance. (2M)
   b) Explain the different spe ed control methods of DC Motors. (2M)
   c) Distinguish between core type and shell type transformers. (2M)
   d) Explain why the frequen cy 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 Intr insic and Extrinsic Semiconductors. Give exam ples. (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 sour ce. (6M)
   b) Find the equivalent resisttance 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 cal led the variable loss of 400 W. Calculate the efficiency of the transformer at full lo ad 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 To rque – Slip characteristics of a Three Phase Induction Motor. (7M)

6. a) List the specification parameters of a Diode. (5M)
   b) Explain the basic configu ration of a Non-Inverting amplifier with a neat diagram. (9M)

7. a) Show how a transistor ca n 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)

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