Code No: RT21045 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
ELECTRICAL TECHNOLOGY
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

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

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PART –A

1	a)	Explain the principle of a Dc Generator	[4]
	b)	What is the function of a commutator in Dc Generator	[3]
	c)	Draw the characteristics of Dc Shunt motor	[4]
	d)	Explain the equivalent circuit of a single phase transformer	[4]
	e)	Define slip and give its expression.	[4]
	f)	List the different applications of Single phase induction motors.	[3]

PART –B

2		Explain Multiply – excited magnetic field system with a neat diagram and derive the expression for the magnetic force developed	[16]
3	a)	Explain how the voltage is developed in a self excited DC shunt generator.	[8]
	b)	A 4 – pole lap wound Dc shunt generator has a useful flux/pole 0.07 Wb. The armature winding consists of 220 turns, each turn having a resistance of 0.004Ω. Calculate the terminal voltage when running at 900 rpm. If the armature current is 50A.	[8]
4	a)	Explain the construction and operation of a Dc Motor	[8]
	b)	A 440 V Dc shunt motor takes a 4 A at no – load. Its armature and field resistances are 0.4 ohm and 220 ohms respectively. Estimate the KW output and efficiency when the motor takes 60 A on full load.	[8]
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5 a) Derive the emf equation of a transformer [8]

b) A 25 KVA,2200/220 V, 50 Hz distribution transformer is tested for efficiency and regulation as follows: [8]

OC test (l.v side) : 220V, 4A, 150 W

SC test (h.v side) : 90 V, 10 A, 350 W

Calculate the i) Efficiency at full load and half load at 0.8 power factor lagging current and, ii) Regulation of transformer at 0.8 power factor lagging current.

6 a) Explain how rotating magnetic field in developed in three phase induction motors. [8]

b) Explain the different methods of starting Three phase induction motor. [8]

7 Explain with a neat diagram the working of start single phase induction motor and its principle of operation. [16]

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PART –A

1 a) Classify the types of windings in DC machines and number of parallel paths [3]

b) Explain the commutation process in DC machines [4]

c) Explain the principle of operation of Dc Motor [4]

d) Define regulation of a transformer [3]

e) Draw the torque slip characteristics of Three phase induction motor. [4]

f) Explain the concept of Double revolving field theory in single phase motors. [4]

PART –B

2 Explain singly – excited magnetic field system with a neat schematic diagram and also list the necessary assumptions made. [16]

3 a) Explain the constructional details of a Dc Machine [8]

b) An 6 – pole wave connected DC Generator has 1000 armature conductors and flux / pole 0.029 Wb.At what speed must it be driven to generate 500V? [8]

4 a) Derive the torque developed in a Dc motor [8]

b) A 230 V dc shunt motor takes 32 A at full load. Find the back emf on full load if the resistances of motor armature and shunt field windings are 0.2 ohm and 115 ohms respectively. [8]

5 a) Explain about core type and shell type transformers [8]

b) Explain in detail about the Open circuit and short circuit test that is performed on single phase transformer and comment up on the outcome. [8]

6 a) Explain how a rotating magnetic field is produced in a three phase induction motor. [8]

b) The power input to the rotor of a 3-phase, 50 Hz, 6 pole, slip ring induction motor is 38 KW and the motor runs at 950 rpm. The rotor resistance per phase is 0.22 Ω. Determine the value of the rotor current per phase. [8]

7 Explain with a neat diagram the working of Split phase capacitor – start induction motor. [16]
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Code No: RT21045 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, June - 2015
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(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

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

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PART –A

1	a)	Explain the function of armature in Dc Generator	[3]
	b)	Discuss the function of inter poles in dc Machines	[3]
	c)	Explain the term Back emf with respect to dc motor.	[4]
	d)	Derive the condition for maximum efficiency of a transformer.	[4]
	e)	Explain the differences between the squirrel cage and Phase wound induction motor.	[4]
	f)	Explain the constructional features of Single phase induction motor	[4]

PART –B

2	a)	Explain the principles of electromechanical energy conversion	[8]
	b)	Explain in detail about the Electromechanical energy conversion device with the help of the necessary Block diagram	[8]
3	a)	Derive the emf equation of a DC Generator	[8]
	b)	Define the terms critical resistance and critical speed and bring out their roles in the process of self excitation of DC machines.	[8]
4	a)	Derive the condition for maximum power in a dc motor.	[8]
	b)	A 4 pole lap wound, 240 V motor has the following particulars: number of armature conductors 740; resistance of armature = 0.3 ohm; useful flux per pole = 0.035 Wb. If the total torque developed by the motor is 140 Nm, find the armature current taken and the speed.	[8]
5	a)	Explain the working principle and construction of a transformer	[8]
	b)	A 3300/300 V single phase 300 KVA transformer has 1100 primary turns. Find i) Transformation ratio ii) Secondary turns iii)Voltage / turn iv) Secondary current when it supplies a load of 200 KW at 0.8 power factor lagging.	[8]
6	a)	Explain the constructional details of the Three phase induction motor.	[8]
	b)	Explain the different power stages in a Three phase induction motor	[8]
7		Explain the construction features and principle of operation of a shaded pole Induction motor.	[16]

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Code No: RT21045 **R13** SET - 4

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Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) Explain role of back empf in a dc machine [3]

b) Explain the function of field poles in a dc machine [4]

c) List the different types of Dc Motor. [4]

d) Explain the function of a transformer and give its applications [4]

e) Explain the principle of operation of an Induction motor. [4]

f) List the applications of AC servomotors. [3]

PART -B

2 a) Discuss about S.I. units [8]

b) Derive the relation for the magnetic stored energy of a singly excited magnetic field system [8]

3 a) Explain the different methods of Excitation of a DC Generators with suitable diagrams [8]

b) A short shunt compound generator has armature, series field and shunt field resitances of 0.06Ω, 0.03Ωand 110Ω respectively. It supplies 100 lamps rated at 250V, 40 W. Find the generated emf. Assume that contact drop/brush = 1V. [8]

4 a) Explain the terms armature reaction and commutation in dc generator [8]

b) Explain the different speed control methods on Dc Motors [8]
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5 a) Explain the behavior transformer on load and draw the phasor diagram for Lagging loads [8]

b) A 220 KVA transformer has an efficiency of 97 % at full load. If the maximum efficiency occurs at three quarters of full load, calculate the efficiency at half load. Assume negligible magnetizing current and power factor of 0.8 at all loads. [8]

6 a) Prove that the frequency of the rotor current is equal to the slip times the supply frequency in a three phase induction motor. [8]

b) A 3-phase, 6 pole , 50 Hz induction motor has a slip of 1 % at no load and 3% at full load. Find: i)Synchronous speed ii) No – load speed iii) Full load speed iv) Frequency of rotor current at standstill and v) Frequency of rotor current at full load. [8]

7 a) Explain with a neat diagram the working of a AC servomotor [10]

b) List the differences between Single phase induction motor and three phase induction motor. [6]