Code No: **R201214** **R20** **SET - 1**

I B. Tech II Semester Regular/Supplementary Examinations, July/August-2023

BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT -I

1	a)	Explain the construction and working of DC generator.	[7M]
	b)	The armature resistance of a 200V shunt motor is 0.4Ω and no load current is 2A. When loaded and taking an armature current of 50A, the speed is 12000 rpm. Find approximately the no load speed.	[7M]

(OR)

2	a)	With a suitable diagram, explain the working of 3 point starter.	[7M]
	b)	A 4 pole wave connected armature of a dc generator has 120 conductors and runs at 1200 rpm. If the flux per pole is 0.015 Wb, find the emf generated.	[7M]

UNIT-II

3		With neat diagrams, discuss the open circuit and short circuits tests to be conducted on transformer.	[14M]

(OR)

4	a)	Derive the emf equation of the Transformer.	[7M]
	b)	A 230/2300V transformer takes a no load current of 6.5A and absorbs 187W. If the resistance of primary is 0.06Ω, find (i) Core loss (ii) no load power factor (iii) active component of current and (iv) magnetizing current	[7M]

UNIT-III

5	a)	Explain the principle of operation of a synchronous generator.	[7M]
	b)	What is synchronous impedance? How can it be measured in laboratory?	[7M]

(OR)

6		Explain the construction and principle of a synchronous motor. What are the advantages of it?	[14M]

UNIT-IV

7	a)	Explain the principle of operation of Induction motor.	[7M]
	b)	A 4 pole, 3-phase induction motor operates from a supply whose frequency is 50Hz. Calculate. The speed at which the magnetic field of the stator is rotating. The speed of the rotor when the slip is 0.04 The frequency of the rotor currents when the slip is 0.03 The frequency of the rotor currents at standstill	[7M]

(OR)

8	a)	Draw and explain the torque – slip characteristics of a three – phase induction motor	[7M]
	b)	A 3-φ 4 pole induction motor is supplied from 3φ 50Hz ac supply. Find synchronous speed rotor speed when slip is 4% the rotor frequency when runs at 600r.p.m.	[7M]

UNIT-V

9		Give the classification of single phase motors. Explain any two types of single phase induction motors.	[14M]

(OR)

10	a)	Discuss about making single phase induction motor self starting.	[7M]
	b)	Explain the construction and working of a shaded pole induction motor.	[7M]

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Code No: **R201214** **R20** **SET - 2**

I B. Tech II Semester Regular/Supplementary Examinations, July/August-2023

BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT –I

1 a) Explain the different losses occur in dc machine. How the magnetic losses are minimized in dc machine? [7M]

b) A 440 V DC Motor takes an armature current of 60A when its speed is 750 rpm. If the armature resistance is 0.25Ω, calculate the torque produced [7M]

(OR)

2 a) Derive the torque equation of a DC Motor [7M]

b) A four pole wave connected armature has 1000 conductors and flux per pole is 0.05wb. Calculate the emf generated when the generator is running at a speed of 1200rpm. [7M]

UNIT-II

3 a) Explain the working and principle of operation of single phase transformer. [7M]

b) The maximum value of flux density in the core of a 250/3000V, 50Hz single phase transformer is 1.5Wb/m^2. If the emf /turn is 8V, determine i) primary and secondary number of turns ii) area of the core. [7M]

(OR)

4 a) With a neat sketch discuss the construction of transformer. [7M]

b) The EMF per turn of a 1- φ, 2200/220 V, 50 Hz transformer is approximately 12V. Calculate i) The number of primary and secondary turns, and ii) The net cross-sectional area of core for a maximum flux density of 1.5 T. [7M]

UNIT-III

5 a) From the fundamentals, derive the emf equation of an alternator. [7M]

b) A 3 phase, 50 Hz , 8 pole alternator has a star connected winding with 120 slots and 8 conductors per slot. The flux per pole is 0.05 wb, sinusoidal distributed. Determine the phase and line voltages. [7M]

(OR)

6 A 6600V alternator gave the following test results: [14M]

Field Current(A)	16	25	37.5	50	70
Open circuit Voltage (Volts)	3100	4900	6600	7500	8300

A field current of 22A is found necessary to circulate full-load current on short-circuit of the armature. Calculate the full-load regulation at 0.8 power factor lagging by synchronous impedance method

UNIT-IV

7 a) Explain the procedure for the Brake test for 3- Phase Induction Motor. [7M]

b) The input power to a 6-pole, 3-phase, 50HZ induction motor is 42KW and the speed is 970rpm. The Stator losses are 1.2KW and the friction and windage losses are 1.8KW. Find (i) rotor cu loss and (ii) the efficiency of the motor [7M]

(OR)

8 a) Explain the classification of induction motor according to its rotor construction [7M]

b) Obtain the relation between torque and rotor power factor. [7M]

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Code No: **R201214** **R20** **SET - 2**

UNIT-V

9 a) Explain the construction details and operation AC Sevomotor. [7M]

b) Explain construction, working principle and applications of shaded pole motor. [7M]

(OR)

10 Describe the following single phase Induction motors: [14M]
(a) Capacitor start type and (b) Split phase type

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Code No: **R201214** **R20** **SET - 3**

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BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT –I

1	a)	From the fundamentals, derive the emf equation of a DC generator.	[7M]
	b)	A 250V shunt motor on no load runs at 1000rpm and takes 5A. The load armature and shunt field resistances are respectively 0.2Ω and 250Ω. Calculate the speed when loaded and taking current of 50A.	[7M]

(OR)

2		With the help of a neat diagram, explain the Swinburne's test to find out the efficiency of a DC machine. Also mention the advantages and disadvantages of the test.	[14M]

UNIT-II

3	a)	Explain the constructional details of single phase transformer.	[7M]
	b)	A single phase transformer has 400 primary turns and 1200 secondary turns. Primary winding is connected with 500V, 50Hz supply. Find the flux density in the core and emf induced in the secondary winding. Cross sectional area of the core is $50cm^2$. Also calculate the turns ratio of the transformer.	[7M]

(OR)

4	a)	Explain the principle of operation of a transformer.	[7M]
	b)	A 200 kVA rated transformer has a full-load copper loss of 1.5 kW and an iron loss of 1 kW. Determine the transformer efficiency at full load and 0.85 power factor.	[7M]

UNIT-III

5		What is an alternator? Explain its principle of operation. With a neat diagram, explain the constructional features of a three-phase alternator	[14M]

(OR)

6		Develop the equivalent circuit of synchronous motor. And explain it.	[14M]

UNIT-IV

7	a)	Discuss the working principle of three phase induction motors.	[7M]
	b)	A 6 pole 3phase induction motor operates from a supply whose frequency is 50Hz. Calculate The speed at which the magnetic field of the stator is rotating. The speed of the rotor when the slip is 0.03	[7M]

(OR)

8	a)	Explain the constructional details of squirrel cage and slip ring induction motor.	[10M]
	b)	Define the terms: i) synchronous speed ii) slip iii) slip speed iv) rotor speed.	[4M]

UNIT-V

9		Give the significance of Capacitor Start and Run motor. And explain about single value capacitor run motor and Two value capacitor run motor.	[14M]

(OR)

10		Mention the types of capacitor start motors. And explain them briefly.	[14M]

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BASIC ELECTRICAL ENGINEERING

(Common To ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT –I

1	a)	With connection diagrams, explain the different types of DC generators.	[7M]
	b)	Explain the significance of back EMF in DC Motor.	[7M]

(OR)

2	a)	Discuss the different methods of speed control of DC Motor.	[7M]
	b)	A four pole wave connected armature has 51 slots each having 48 conductors and flux per pole is 0.075wb. At what speed must the armature be driven to generate 400V.	[7M]

UNIT-II

3	a)	What are the various losses occur in single phase transformer? Explain.	[7M]
	b)	A Single-phase transformer is connected to a 230 V, 50 Hz supply. The net cross-sectional area of the core is 60 cm^2. The number of turns in the primary is 500 and in the secondary 100. Determine: i) Transformation ratio. ii) E. m. f. induced in secondary winding. iii) Maximum value of flux density in the core.	[7M]

(OR)

4		Explain in detail about sumpner's test on single phase transformer.	[14M]

UNIT-III

5		Describe with neat sketch the constructional details of a salient pole type alternator.	[14M]

(OR)

6		What is regulation? Explain the predetermination of regulation of an alternator by Synchronous Impedance Method.	[14M]

UNIT-IV

7	a)	What are the different types of three phase induction motors? Mention their advantages and disadvantages.	[7M]
	b)	A 4 pole, 50Hz squirrel cage induction motors runs at a speed of 970 rpm. Calculate (i) Slip (ii) Frequency of induced current in the rotor.	[7M]

(OR)

8	a)	Explain how the rotating magnetic field is created in three phase induction motor.	[7M]
	b)	In case of an 8-pole induction motor the supply frequency was 50 Hz and the shaft speed was 735 rpm. Compute (i) Synchronous speed (ii) Slip speed per unit slip (iii) Percentage slip.	[7M]

UNIT-V

9	a)	Explain the double field revolving theory for operation of single phase induction motor.	[7M]
	b)	Write down the constructional details and working of capacitor start induction motor.	[7M]

(OR)

10	a)	Explain the operation of a single phase induction motor using split phase technique	[7M]
	b)	Explain the construction, working principle of shaded pole motor.	[7M]

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