Department of Electronics & Communication Engineering

MID QUESTION BANK

Course Title	**ELECTRICAL TECHNOLOGY**			
Course Code	**EC303ES**			
Regulation	**R15**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	1	-	4
Course Coordinator	**S.KAVITHA CHAVAN**		**E.SERRNIVASULU**	
Team of Instructors				

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

Group-A: Short Answer Questions

S.No.	QUESTION	BLOOMS TAXONAMY	COs	POs
	UNIT-I			
1	Explain the concept of residual magnetism in a generator	Understand	a	1
2	List the applications of dc motors	Understand	a	2
3	Discuss the function of armature and field system	Apply	a	1
4	Identify the various parts of Dc motor	Understand	a	2
5	What is back emf in d.c. motor?	Understand	c	1
6	Draw the circuit diagram of a Dc series motor Write down faraday's law of electromagnetic induction	Remember	a	2
7	Give the alternate name for shunt and series motor	Remember	d	1
8	What is the function of commutator	Understanding	a	2
9	Discuss the faradays laws of electromagnetic induction	Remember	b	1
10	What do you mean by residual EMF in a generator?	Evaluate	a	1
11	Summarize the applications of Dc motors	Understand	f	2
12	Distinguish between separately excited and self excited machines	Remember	a	1

13	Explain the function of three point starter	Knowledge	a	1
14	Relate armature torque with shaft torque	Knowledge	a	2
15	Discuss Fleming's Right Hand Rule.	Understand	a	1
16	Discuss Fleming's Left Hand Rule.	Knowledge	a	2
17	Summarize the types of Dc generators	Knowledge	b	1
18	Obtain the emf equation of a DC generator	Understand	b	2
19	Formulate the torque equation of generator	Knowledge	c	1
20	List the applications of DC generator	Applying	a	2
Unit II				
1	Define transformer.	Understand	3	b,l
2	List the types of transformers based on supply systems and construction.	Understand	3	b,l
3	Discuss the working principle of a single phase transformer with the help of relevant diagrams	Understand	3	b,l
4	Why the transformer measured in KVA	Understand	3	b,l
5	Summarize the various parts in a transformer	Understand	3	b,l
6	What is the difference between ideal transformer and practical transformer	Analyze	3	b,l
7	Draw the equivalent circuit diagram of transformer.	Analyze	3	b,l
8	List the types of losses and its remedies	Analyze	3	b,l
9	What are the types of test to be conducted to calculate the efficiency	Apply	3	b,l
10	Interpret the relation between transformation ratio and current	Understand	3	b,l
11	Explain core type transformer with a neat diagram	Understand	3	b,l
12	Explain shell type transformer with a neat diagram	Understand	3	b,l
13	Define step up and step down transformer with a neat diagram	Understand	3	b,l
14	Why the core of the transformer is laminated	Analyze	3	b,l
15	Explain the basic difference between the ideal and practical transformer	Evaluate	3	b,l
16	Give the formula for voltage regulation	Understand	3	b,l
17	Define transformer and explain its working	Understand	3	b,l
18	Draw the phasor diagram for unity power factor	Understand	3	b,l
19	Draw the phasor diagram for inductive load	Understand	3	b,l
20	Draw the phasor diagram for capacitive load	Analyze	3	b,l
Unit III				
1	What is slip of an induction motor?	Remember	2	c,d,l
2	State the principle of 3 phase IM?	Remember	2	c,d,l
3	An induction motor is generally analogous to?	Understand	2	c,d,l
4	What is meant by synchronous impedance of an Alternator?	Understand	2	c,d,l

5	Explain why synchronous motor is not self starting	Analyze	2	c,d,l
6	What are types of 3- phase induction motor**?**	Analyze	2	c,d,l
7	What are the types of rotors in an induction motor	Understand	2	c,d,l
8	Explain the behavior of an induction motor during open circuited rotor	Understand	2	c,d,l
9	Compare slip ring induction motor and squirrel cage induction motor	Understand	2	c,d,l
10	Draw the slip torque characteristics of induction motor	Understand	2	c,d,l

Group-B: Long Answer Questions

S.No.	QUESTION	BLOOMS TAXONAMY	COs	POs
	Unit I			
1.	Explain the principle of operation of DC generator.	Remember	1	a,l
2.	Give the classification of DC generator and explain	Understand	1	a,l
4.	Derive the equation for induced EMF of a DC machine.	Understand	1	a,l
5.	Derive the torque equation of DC motor.	Remember	1	a,l
7.	Explain the principle of operation of DC Motor.	Understand	2	a,l
8.	Give the classification of DC Motor and explain	Understand	2	a,l
9.	Give the significance of back emf in a DC motor.	Evaluate	3	a,l
10.	Explain about Swinburne's test of Dc shunt machine	Evaluate	3	a,l
11.	Draw and Explain the magnetization characteristics of dc generator	Evaluate	3	a,l
12.	Draw and Explain the load characteristics of dc generator	Evaluate	3	a,l
13.	Derive the EMF equation of DC generator.	Evaluate	3	a,l
14	Explain the methods of speed control of a dc motor	Rememb er		
15	What are the losses varies losses in a dc machine	Underst and		3
16	Draw diagram and explain the 3-point starter	Analyze		
17	Deduce the condition for maximum efficiency of a dc generator	evaluate		
18	Explain the internal and external characteristics of dc shunt motor	Underst and		
19	Explain the internal and external characteristics of dc series motor	Analyze		
20	Explain the internal and external characteristics of dc compound motor	evaluate		
	Unit II			
1.	Describe the construction details of transformer.	Evaluate		
2.	Explain the principle of operation of transformer	Understand		
3.	Explain the principle of operation of transformer.	Understand		
4.	Explain the core and shell type of a single phase transformer	Evaluate		
5.	Derive the EMF equation of a transformer.	Evaluate	3	b,l
6.	Explain the principle of operation of single phase 2-winding transformer	Understand	3	b,l
7.	Explain the No load condition of a transformer	Analyze	3	b,l

8.	Explain the ON load condition of a transformer	Analyze	3	b,l
9.	Explain the losses in a Transformer	Understand	3	b,l
10.	Obtain the condition for maximum efficiency of a transformer	Evaluate		b,l
11.	Explain the OC test of a single phase transformer	Evaluate	3	b,l
12.	Explain the SC test of a single phase transformer	Apply	3	b,l
13.	Draw the equivalent circuit diagram 1-phase transformer	Understand	3	b,l
14.	Explain the regulation of single phase transformer	Apply	3	b,l
15.	Draw the phasor diagrams of lagging and leading power factors	Apply	3	b,l
	UNIT-3			
1	Draw the slip torque characteristics of induction motor	Understand	2	c,d,l
2	Explain the principle of operation of induction motor	Analyze	2	c,d,l
3	Compare slip ring induction motor and squirrel cage induction motor	Analyze	2	c,d,l
4	Describe the construction details of induction motor.	Evaluate	2	c,d,l
5	Explain the methods of induction motor	Evaluate	2	c,d,l
6	Define slip	Evaluate	2	c,d,l
7	How many parts in induction motor and explain	Evaluate	2	c,d,l
8	Define synchronous impedance and derive the equation	Apply	2	c,d,l
9	Derive rotor toque running equation	Apply	2	c,d,l
10	In induction motor how many rotor parts	Evaluate	2	c,d,l
	Unit I			
1.	Calculate the e.m.f by 4 pole wave wound generator having 65 slots with 12 conductors per slot when driven at 1200 rpm the flux per pole is 0.02 wb		4	a,b,l
2.	A dynamo has a rated armature current at 250 amps what is the current per Path of the armature if the armature winding is lap or wave wound? The machine has 12 poles		**4**	a,b,l
3.	A 6 pole lap wound dc generator has 600 conductors on its armature flux per pole is 0.02 wb. Calculate 1) emf induced per pole 2) current in each parallel path		4	a,b,l
4.	An 8-pole , lap wound armature rotated at 350 rpm is required to generate 260v. the use ful flux per pole is 0.05 wb if the armature has 120 slots calculate the number of conductors per slot.		4	a,b,l
5.	The armature of a 6-pole ,600 rpm lap-wound generator has 90 slots, if each coil has 4 turns , calculate the flux per pole is required to generate an e.mf of 288 slots		4	a,b,l
6.	A 440v Dc shunt generator has Ra=0.25 ohms and Rsh= 220 ohms while delivering a load current of 50 amps ,it has a terminal voltage of 440v determined the generated e.m.f and power developed		4	a,b,l
7.	A Dc series generator has armature resistance of 0.5 ohms and series field resistance of 0.03 ohms it drives a load of 50 amps. if it has 6 turns/coil and total 540 coils on the armature and is driven at 1500 rpm calculate the terminal voltage at the load. Assume 4-poles, lap type winding, flux pole?		4	a,b,l
8.	A30 kw, 300v dc shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Calculate the total power developed by the armature when it is delivered full load o/p		4	a,b,l
9	A compound generator is to supply a load of 250 lamps each rated at		4	a,b,l

.	100w,250v. the armature, series and shunt windings have resistances of 0.06 respectively. Determine the generated e.m.f when machine is connected in i) long shunt ii) short shunt. Take drop per brush as 1v			
10.	A 4-pole lap wound dc shunt generator has a useful flux per pole of 0.07 wb.The armature winding consists of 220 turns, each of 004 ohms resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50 amps.		4	a,b,l
	UNIT-2			
1.	A transformer supplied a load of 32A at 415V. If the primary voltage is 3320V, find the following (a) Secondary volt ampere (b) Primary current (c) Primary volt ampere. Neglect losses and magnetizing current.	Analyze	5	a,b,l
2.	A 125 KVA transformer having primary voltage of 2000V at 50 Hz has 182 primary and 40 secondary turns. Neglecting losses, calculate i) The full load primary and secondary currents ii) The no-load secondary induced emf.	Evaluate	5	a,b,l
3.	A single phase transformer has 50 primary and 1000 secondary turns. Net cross sectional area of the core is 500 cm2. If the primary winding is connected to 50 Hz supply at 400 V, Calculate the value of Maximum flux density on core and the emf induced in the secondary.	Analyze	5	a,b,l
4.	A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V. Find the number of turns in the low voltage winding. Open circuit and short circuit tests on a 5 KVA, 220/400V, 50 Hz single phase transformer gave the following results: OC Test: 220V, 2A, 100W (lv side), SC Test: 40V, 11.4A, 200W (hv side) Obtain the equivalent circuit	Apply	5	a,b,l
5.	A single phase 50Hz transformer has 80 turns on the primary winding and 280 in the secondary winding . The voltage applied across the primary winding is 240 V. Calculate (i) the maximum flux density in the core (ii) induced emf in the secondary winding. The net cross sectional area of the core can be taken 200cm^2.	Understand	5	a,b,l
6.	Open Circuit and shrot circuit tests on a single phase transformer gave the following results V0=200V, I0=0.7A, WO=20W ---------- test from primary side , VS =10V, IS =10A, WS =40W ---------- test from primary side Determine the equivalent circuit referred to primary side.	Evaluate	5	a,b,l
7.	A 15kVA 2400-240-V, 60 Hz transformer has a magnetic core of 50-cm^2 cross section and a mean length of 66.7 cm. The application of 2400 V causes magnetic field intensity of 450 AT/m (RMS) and a maximum flux density of 1.5 T . Determine i.)The turn's ratio ii.)The number of turns in each winding iii.)The magnetizing current	Understand	5	a,b,l
8.	A transformer supplied a load of 12A at 215V. If the primary voltage is 320V, find the following (a) Secondary volt ampere (b) Primary current (c) Primary volt ampere. Neglect losses and magnetizing current.	Analyze	5	a,b,l
9.	A transformer supplied a load of 10A at 415V. If the primary voltage is 320V, find the following (a) Secondary volt ampere (b) Primary current (c) Primary volt ampere. Neglect losses and magnetizing current.	Understand	5	a,b,l
10.	A 125 KVA transformer having primary voltage of 2000V at 50 Hz has 182 primary and 40 secondary turns. Neglecting losses, calculate i) The full load primary and secondary currents ii) The no-load secondary induced emf.	Understand	5	a,b,l