

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**



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QUESTION BANK (DESCRIPTIVE)

Subject with Code : ELECTRICAL MACHINES-I (20EE0202)

Course & Branch : B. Tech -EEE

Year & Semester : II - B. Tech. & I-Semester

Regulation :R20

UNIT -I

DC GENERATORS - I

1	a)	Explain the basic principle of operation of a DC Generator with a simple loop generator?	[L3][CO1][12M]
2		Deduce an expression for E.M.F equation of DC Generator?	[L3][CO1][12M]
3	a)	Explain the Types of DC Generators	[L2][CO1][6M]
	b)	A 4 pole generator have a wave-wound armature winding has 51 slots each slots containing 20 conductors. What will be the voltage generated in the machines when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb	[L3][CO1][6M]
4		Explain the effects of armature reaction in a DC Generator	[L3][CO1][12M]
5	a)	A 4 pole generator has a wave wound armature with 722 conductors and it delivers 100A on full load. If the brush leads is 8 degree. Calculate the armature demagnetizing and cross magnetizing ampere turns per pole	[L3] [CO1] [6M]
	b)	A 8 pole dc shunt generator with 778 wave connected armature conductors and running at 500 rpm supplies a load of 12.5 ohm resistance at terminal voltage of 50v. The armature resistance is 0.24 ohm and the field resistance is 250 ohm. Find the armature current, the induced e.m.f and the flux per pole.	[L3] [CO1] [6M]
6	a)	Explain the uses of compensating winding.	[L3][CO1][6M]
	b)	A 400V 1000A lap wound dc machines has 10 poles and 860 armatures conductors. calculate the number of conductors in the pole face to give full compensation if the pole face covers 70% pole span	[L3][CO1][6M]
7	a)	Distinguish between Lap and Wave windings?	[L2][CO1][6M]
	b)	What are the causes for the failure of self-excitation?	[L3][CO1][6M]
8	a)	Explain commutation with relevant sketch	[L3][CO1][6M]
	b)	Explain the methods of improving commutation	[L3][CO1][6M]
9	a)	A shunt generator delivers 450A at 230V and the resistance of the shunt field and armature are 50ohm and 0.03 ohm respectively . Calculate the generated e.m.f.	[L3][CO1][6M]
	b)	Explain the term reactance voltage in DC generator	[L3][CO1][6M]
10		a) What is the purpose of yoke? b) Write the purpose of the commutator?	[L1][CO1][3M] [L1][CO1][3M]

	c) What is meant by armature reaction? d) What is the purpose of inter poles?	[L1][CO1][3M] [L1][CO1][3M]
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UNIT –II

D.C GENERATORS II

1		Explain concept of EMF build-up of self-excited DC generator	[L3][CO2][12M]
2	a)	Explain the effect of variation of field resistance of DC Shunt Generator in its Voltage Build up	[L2][CO2][6M]
	b)	What are the conditions for voltage build-up of a shunt generator	[L3][CO2][6M]
3	a)	Explain the no-load characteristics for self-excited generator	[L2][CO2][6M]
	b)	Explain the no-load characteristics for separately-excited generator	[L2][CO2][6M]
4		Explain the external characteristics of DC generator with neat sketch	[L3][CO2][12M]
5	a)	What are the causes for failure of self-excitation of DC generator	[L3][CO2][6M]
	b)	Explain the remedial Measures for the failure of self-excitation of DC generator	[L3][CO2][6M]
6	a)	What is the necessity of parallel operation of DC generators	[L3][CO3][6M]
	b)	Explain the procedure for parallel operation of DC generators	[L2][CO2][6M]
7	a)	Explain the parallel operation of DC generator with neat sketch	[L3][CO3][12M]
8	a)	Explain the uses of equalizer bar	[L3][CO3][6M]
	b)	What are the applications of DC generator	[L2][CO3][6M]
9		Two 220 V dc generators each have linear external characteristic operation in parallel. One machine has a terminal voltage of 270 V on no load and 220 at a load current of 35A while the other has a voltage of 280V at no load and 22V at 50A. Calculate the output current of each machine and the bus bar voltage when the total load is 60A. what is the kW output of each machine under this condition	[L4][CO3][12M]
10	a)	What is the significance of critical resistance in DC generator	[L2][CO2][6M]
	b)	Explain the term voltage regulation	[L1][CO2][6M]

UNIT –III
D.C MOTORS

1		Explain the principle of operation of a D.C motor	[L3][CO4][12M]
2	a)	What is the significance of Back E.M.F	[L2][CO4][6M]
	b)	A 440 v shunt generator has armature resistance of 0.8ohm and field resistance of 200. Determine the back emf when giving an output of 7.46kW at 80% efficiency	[L3][CO4][6M]
3	a)	Derive the equation for the torque Developed by a D.C. motor?	[L3][CO5][6M]
	b)	Deduce the voltage equation of DC motor	[L3][CO5][6M]
4	a)	Explain the characteristic of DC shunt motor	[L3][CO4][6M]
	b)	A 25kW 250 V dc shunt generator has armature and field resistance of 0.06 ohm and 100 ohm respectively. Determine the total armature power developed when working (i) as a generator delivering 25kW output and (ii) as a motor taking 25kw input	[L3][CO5][6M]
5	a)	Explain the characteristic of DC series motor	[L4][CO4][6M]
	b)	What are the applications of DC motors	[L1][CO5][6M]
6		A dc motor takes an armature current of 110A at 480V. The armature circuit resistant is 0.2ohm. The machine has 6 poles and the armature is lap connected with 864 conductors. The flux per pole is 0.05Wb. calculate the speed and gross torque developed by the armature	[L4][CO5][12M]
7		Explain Ward- Leonard method of speed control	[L4][CO5][12M]
8	a)	Explain the armature voltage control method for the Speed control of a DC Motor	[L2][CO3][6M]
	b)	A 200 V dc shunt motor running at 1000 rpm takes an armature current of 17.5A.it is required to reduce the speed to 600 rpm. What must be the value of resistance to be inserted in the armature circuit if the original armature resistance is 0.4 ohm. Take armature current to be constant during this process.	[L3][CO4][6M]
9	a)	Explain the field flux control method for the Speed control of a DC Motor	[L3][CO4][6M]
	b)	A 250 v dc shunt motor has armature resistance of 0.25 ohm on load it takes an armature current of 50A and runs at 750rpm. If the flux of motor is reduced by 10% without changing the load torque. Find the new speed of the motor	[L2][CO4][6M]
10		Explain the characteristics of compound motor in detail	[L4][CO5][12M]

UNIT –IV

STARTING & TESTING METHODS OF DC MACHINES

1	a)	What is the necessity of starter for DC machines	[L1][CO5][6M]
	b)	What are the types of DC motor starters	[L2][CO5][6M]
2		Explain 3 point starter in detail	[L3][CO5][12M]
3		Explain 4 point starter in detail	[L3][CO5][12M]
4	a)	What are the losses in DC machines	[L2][CO5][6M]
	b)	The armature winding of a 4 pole, 250V D shunt motor is lap connected. There are 120 slots. Each slot containing 8 conductors. The flux per pole is 20 mWb and current taken by the motor is 25A. The resistance of armature and field circuit is 0.1 and 125ohm respectively. If the rotational losses amount to 810 w. find (i) gross torque (ii) useful torque and (iii) efficiency	[L3][CO5][6M]
5		Explain brake test of DC machine	[L4][CO5][12M]
6		Explain swinburne's test of DC machine and state the advantage and disadvantages	[L4][CO5][12M]
7		A 250V 14.92 kW shunt motor has a maximum efficiency of 88% and a speed of 700 rpm. When delivering 80% of its rated output. The resistance of its shunt field is 100 ohm. Determine the efficiency and speed when the motor draws a current of 78A from the mains	[L4][CO5][12M]
8		Explain Hopkinson's test for DC machine and state the merits and demerits	[L4][CO5][12M]
9	a)	Explain retardation test for DC machine in detail	[L3][CO5][6M]
	b)	In retardation test on a separately excited motor the induced emf in the armature falls from 220V to 190V in 30 seconds on disconnecting the armature from the supply. The same fall takes place in 20 seconds if immediately after disconnection, armature is connected to a resistance which takes 10A during this fall. Find stray losses of the motor	[L3][CO5][6M]
10		Explain field's test for DC machine in detail	[L4][CO5][12M]

UNIT –V

SPECIAL MOTORS

1		Explain the construction and working Principle of PMBLDC motor	[L4][CO6][12M]
2	a)	What are the merits and demerits of PMBLDC	[L1][CO6][6M]
	b)	What are the applications of PMBLDC motor	[L2][CO6][6M]
3	a)	Explain the torque- speed characteristics of PMBLDC motor	[L2][CO6][6M]
	b)	Compare PMBLDC with DC motor	[L2][CO6][6M]
4		Explain the working principle of AC series motor with neat sketch	[L4][CO6][12M]

5	a)	Explain the construction and operation of universal motor	[L4][CO6][6M]
	b)	Draw the speed / load characteristics of universal motor	[L3][CO6][6M]
6	a)	Explain the method of speed control of universal motor	[L4][CO6][6M]
	b)	Mention the applications of universal motors	[L2][CO6][6M]
7		Explain variable reluctance stepper motor in detail	[L4][CO6][12M]
8	a)	Describe permanent magnet stepper motor with neat sketch	[L3][CO6][6M]
	b)	Describe the advantage and disadvantages of permanent magnet stepper motor	[L3][CO6][6M]
9		Explain construction and working principles of SRM	[L4][CO6][12M]
10	a)	Compare VR stepper motor and SR motor	[L2][CO6][6M]
	b)	Explain the advantage and disadvantages of SRM	[L1][CO6][6M]

Prepared by: Dr.RAJAN.V.R