

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

II B.Tech I Semester (SVEC-16) Regular/Supplementary Examinations November - 2019**ELECTRICAL TECHNOLOGY****[Electronics and Communication Engineering, Electronics and Instrumentation Engineering]****Time: 3 hours****Max. Marks: 70****Answer One Question from each Unit****All questions carry equal marks****UNIT-I**

- 1 a) A 4-pole, long-shunt lap-wound generator supplies 25kW at a terminal voltage of 500V. The armature resistance is 0.03Ω , series field resistance is 0.04Ω and shunt field resistance is 200Ω . The brush drop may be taken as 1.0V. Determine the E.M.F. generated. Also calculate number of conductors if the speed is 1200 r.p.m. and flux per pole is 0.02Wb. Neglect armature reaction. CO4 7 Marks
- b) How the DC generators are classified. Explain with neat circuit diagrams. CO1 7 Marks
- (OR)
- 2 a) Explain the flux and armature speed control methods of a DC motor and explain their merits and demerits. CO5 7 Marks
- b) Draw different types of characteristics of a DC shunt motor and explain. CO2 7 Marks

UNIT-II

- 3 A 7kVA 200/1000V, 50Hz, single-phase transformer gave the following test results: O.C Test (L.V. Side): 2000V, 1.2A, 90W S.C Test (H.V. Side): 50V, 5A, 110W. CO4 14 Marks
- i) Calculate the parameters of the equivalent circuit referred to the L.V side.
- ii) Calculate the output secondary voltage when delivering 3 kW at 0.8 p.f. lagging, the input primary voltage being 200V and also find the percentage regulation.
- (OR)
- 4 a) Derive the expression for induced E.M.F in a transformer in terms of frequency, maximum value of flux and number of turns on the windings. CO2 7 Marks
- b) In a 20kVA, 2000/200V, single-phase transformer, the iron and full-load copper losses are 350W and 400 W respectively. Calculate the efficiency at unity power factor on (i) full load (ii) half full-load. CO4 7 Marks

UNIT-III

- 5 a) Derive the expressions of phase and line quantities in delta connected network. CO2 7 Marks
- b) Three similar coils each having resistance of 10Ω and reactance 8Ω are connected in star across a 400V, 3 phase supply. Determine the line current, total power and reading of each wattmeters connected to measure power. CO4 7 Marks
- (OR)
- 6 a) A balanced delta-connected load of $(2+j3)\Omega$ per phase is connected to a balanced three phase 440V supply. The phase current is 10A. Find the: CO4 7 Marks
- i) Total active power. ii) Reactive power.
- iii) Apparent power in the circuit.
- b) The two wattmeter method is used to measure power in a three-phase load. The wattmeter readings are 400W and -35W. Calculate: CO4 7 Marks
- i) Total active power. ii) Power factor.
- iii) Reactive power.

UNIT-IV

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| 7 | a) | Explain the constructional details of the three phase induction motor. | CO1 | 7 Marks |
| | b) | Draw and explain the slip-torque characteristics of a 3-phase induction motor. | CO2 | 7 Marks |

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| 8 | a) | Discuss the constructional features of salient pole synchronous machines. | CO1 | 4 Marks |
| | b) | List out the applications of an alternator. | CO6 | 3 Marks |
| | c) | A 3-phase, 16-pole alternator has a star-connected winding with 144 slots and 10 conductors per slot. The flux per pole is 30mWb sinusoidally distributed. Find the frequency, the phase and line voltage if the speed is 375 r.p.m. | CO4 | 7 Marks |

UNIT-V

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| 9 | | Explain the construction features and principle of operation of a shaded pole Induction motor. | CO1 | 14 Marks |
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| 10 | | Explain the working of Split phase capacitor-start induction motor with a neat diagram. | CO1 | 14 Marks |
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