

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (S, FE) S2 (S, FE) Examination December 2023 (2015 Scheme)



Course Code: EE100

Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

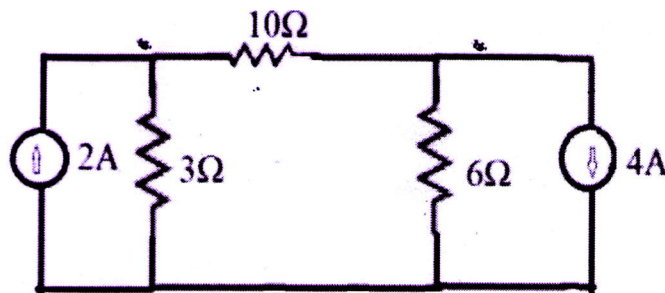
Answer all questions, each question carries 4 marks

- | | Marks |
|--|-------|
| 1 State and explain Kirchoff's laws for an electric circuit. | (4) |
| 2 Three resistors $R_1=10\Omega$, $R_2=20\Omega$ and $R_3=30\Omega$ are connected in delta .Obtain the Equivalent star circuit. | (4) |
| 3 Compare Electric and Magnetic circuits. | (4) |
| 4 Derive the relation between line and phase current in three phase delta connected system. | (4) |
| 5 What are the advantages of a hydroelectric power plant? | (4) |
| 6 Explain any two renewable energy sources. | (4) |
| 7 Derive the EMF equation of a dc generator. | (4) |
| 8 What are the losses occurring in a transformer. How they can be eliminated or Minimised. | (4) |
| 9 Define synchronous speed and slip of a three phase induction motor. | (4) |
| 10 Explain the working of a capacitor start single phase induction motor with the help of a neat diagram | (4) |

**PART B
MODULE (1-4)**

Answer any four questions, each carries 10 marks

- 11 a) Find current through the resistor 3Ω in the following network using nodal analysis (7)



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- b) Differentiate between Constant voltage and constant current sources. (3)
- 12 a) A circular magnetic circuit has a mean length of iron 50cm and an airgap of 1mm. It is wound with a coil of 500turns carrying a current of 3A. The cross-sectional area of the core is 10cm^2 . The mmf required for the airgap is 60% of the total mmf. Find the magnetic flux and total reluctance. Relative permeability of iron is 750. (6)
- b) Derive the expression for energy stored in a magnetic field. (4)
- 13 a) Show that for a sinusoidal voltage, RMS value is 0.707 times its maximum value. (5)
- b) A coil with resistance 10Ω and inductance 50mH are connected in series across a 100V, 50Hz supply. Calculate the impedance and current through the coil. Also draw the vector diagram. (5)
- 14 a) A three phase load consists of three similar impedances $(8+j6)\Omega$ connected in star across a 3 phase, 230V, 50Hz supply. Calculate the line current, power factor and power consumed. (7)
- b) Define active, reactive and apparent power in an ac circuit with the help of a power triangle. (3)
- 15 a) Draw and explain the single line diagram of a typical power transmission system (5)
- b) Explain the need for high voltage transmission. (5)
- 16 Draw a neat schematic diagram of a Thermal power plant and explain its Operation. (10)

MODULE 5

Answer any one full question

- 17 a) Explain the construction and working of DC generator. (5)
- b) A dc motor draws an armature current of 110V at 480V. The armature circuit resistance is 0.2Ω . The machine has 6 poles and the armature is lap-connected with 864 conductors. The flux per pole is 0.05Wb. Calculate the speed developed by the armature. (5)
- OR**
- 18 The iron loss of 230/115V, 5KVA transformer is 200W. The copper loss at full load is 250W. Find the efficiency of the transformer when delivering (i)full load power at u.p.f (ii)half full load power at u.p.f. (10)

MODULE 6

Answer any one full question

19 Explain the constructional details of squirrel cage and slip ring induction motor (10)

OR

20 a) Explain why single phase induction motors are not self-starting. (4)

b) Explain the principle of operation of a three phase induction motor. (3)

c) A 3Φ , 4pole, 50Hz induction motor runs at a speed of 1460rpm. Determine the synchronous speed and percentage slip. (3)
