

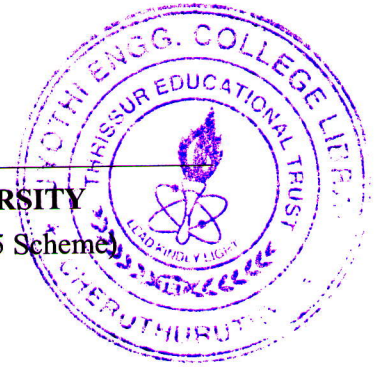
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1,S2 (S,FE) Examination May 2021 (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*

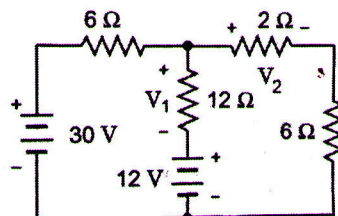
Marks

- 1 With the sketch of a simple two mesh circuit, explain Kirchhoff's laws. (4)
- 2 Three resistances  $1\Omega$ ,  $2\Omega$ ,  $3\Omega$  are connected in delta. Determine the resistances for an equivalent star connection. (4)
- 3 Define the following i) statically induced emf ii) mmf iii) mutual inductance and iv) coefficient of coupling (4)
- 4 Explain the terms - RMS value and average value of AC and their relevance. (4)
- 5 What is the significance of using star or delta connection in three phase applications? (4)
- 6 Draw the schematic of a typical electrical power transmission system. (4)
- 7 Explain the theory behind the working of a DC motor. (4)
- 8 What are the different losses in a transformer? How can the losses be reduced? (4)
- 9 Differentiate between slip ring and squirrel cage induction motor in construction and application points of view. (4)
- 10 How can a capacitor make a single phase induction motor self-starting? (4)

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

*Answer any four questions, each carries 10 marks*

- 11 a) Find the voltages  $V_1$  and  $V_2$  across  $12\Omega$  and  $2\Omega$  resistances in the following circuit using mesh analysis. (7)



- b) Differentiate Constant voltage sources and constant current sources. (3)

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- 12 a) A coil consists of 600 turns and current 10 A in the coil gives rise to a magnetic flux of 1mWb. Calculate (i) self-inductance (ii) induced emf (iii) energy stored when the current is reversed in 0.01 second. (6)
- b) State Faradays Laws of electromagnetic induction. (4)
- 13 a) List the similarities and differences between electric and magnetic circuits. (5)
- b) A circular iron ring wound with 100 turns of coil develop a magnetic flux of 10 mWb when coil carries a current of 1 A. Find the mmf of the source and reluctance of the ring? (5)
- 14 a) Derive the value of the form factor of sinusoidal AC. (5)
- b) A series circuit has  $R=10\Omega$ ,  $L=50\text{mH}$  and  $C=100\mu\text{F}$  and is supplied with 200V, 50Hz. Find impedance, current and power factor. (5)
- 15 a) In a 2 wattmeter method power measured was 30kW at 0.7 pf lagging. Find the reading of each wattmeter. (5)
- b) Explain the function of any five substation equipment. (5)
- 16 a) Draw the schematic of a hydroelectric power plant explain the working. (8)
- b) Mention two advantages and disadvantages of solar power generation. (2)

**MODULE 5**

*Answer any one full question*

- 17 a) Compare the characteristics and applications of DC Shunt and DC Series motors. (6)
- b) A 230V DC series motor is taking 50 A. Resistance of armature and series field winding are  $0.2\Omega$  and  $0.1\Omega$  respectively. Calculate the back emf. (4)

**OR**

- 18 a) Explain the working principle of a single phase transformer? (5)
- b) A single phase transformer, rated at 100kVA, is working at full load and 0.8 power factor. If the copper loss and core loss are found 1400W and 940W respectively, calculate the efficiency of the transformer. (5)

**MODULE 6**

*Answer any one full question*

- 19 a) Explain the working of a three phase induction motor. (6)
- b) Calculate the synchronous speed and %slip of a 3 phase 50 Hz 4 pole induction motor running at 1400 rpm. (4)

**OR**

- 20 a) A single phase induction motor is not self-starting. Why? (4)
- b) Explain the working of a split phase induction motor with necessary sketches. (6)

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