Aliah University
Department of Electrical Engineering, B-Tech
End-Semester Examination, Spring-2021
Subject: Basic Electrical Engineering [**EENUGES01**]

Full Marks: 80   Time: 3 Hours
Year: I   Semester: II

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1. a) Distinguish between mesh and loop of a network.   10x2=**20** Marks
    b) An Electric iron is rated 1000W, 240V. Find the current drawn & resistance of the heating element.
    c) Define i) charge ii) electric current iii) power & iv) network.
    d) Write some applications of maximum power transfer theorem.
    e) Why a single phase induction motor does not self start?
    f) Give two basic speed control scheme of DC shunt motor?
    g) Define power factor. State the conditions under which it is (i) maximum and (ii) minimum.
    h) Can DC be applied to transformers?
    i) Give some application of D.C motor?
    j) Determine the power factor of a RLC series circuit with **R=5ohm, X$_L$=8ohm** and **X$_C$=12ohm.**

Answer any five questions   5x12=**60 M**arks

2. a) Determine current in 5 ohm resistor by any one method (**Ref. 1**)   2x6=**12 M**arks

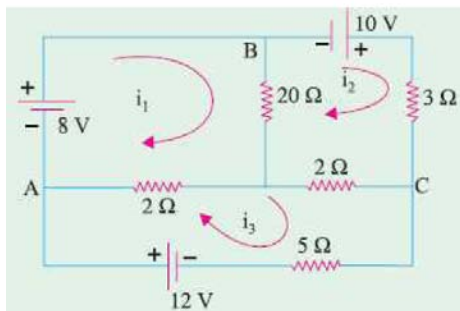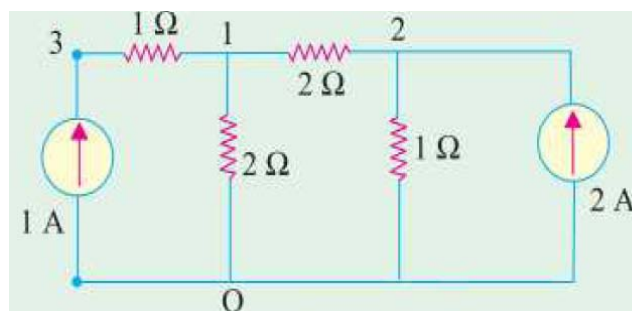Fig. 1   Fig.2

    b) Determine the voltages 1 and 2 of the network in **Fig. 2** by nodal analysis.

3. a) Derive the emf equation of a single phase transformer.   **5 M**arks
    b) A 200/50V, 50 Hz single phase transformer is connected to a 200V, 50 Hz supply with secondary winding open. (i) What is the value of maximum flux through the core, if the primary winding has 400 turns? (ii) What is the peak value of flux if the primary voltage is 200V, 25 Hz and what happens to no-load current?
                                                                                                  7 Marks

4. a) Sketch the O.C.C of DC shunt generator.   **5 M**arks
    b) A series RLC circuit has 30Ω resistance, 2m H inductance and 25.1µF capacitance and is connected to a 220V, 60Hz supply. Find (i) the current, (ii) the power factor and (iii) the voltage drop across each element.
                                                                                                  7 Marks

5. a) Draw the circuit for various types of D.C motor .   2x6=**12 M**arks
    b) A DC long shunt compound generator delivers a load current of 200A at 450V. The resistance of the armature, series field and shunt field are 0.03 Ω, 0.015 Ω and 150 Ω. Calculate the emf induced in the armature. Allow a brush drop of 1V/brush.

6. a) Derive the condition for obtaining maximum power from a source to resistive load.   2x6=**12 M**arks
    b) What is an ideal transformer? Draw phasor diagram at different loads for an ideal transformer.

7. a) Write short notes on RMS Value of AC waveforms.   2x6=**12 M**arks
    b) An alternating voltage is given by V=230sin314t. Calculate i) frequency, ii) maximum value iii) average value, iv) RMS value.