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Code No. : 11023 S(B)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) I-Semester Supplementary (New/Old) Examinations, June/July-2019

Basic Electrical Engineering
 (CSE, ECE & IT)

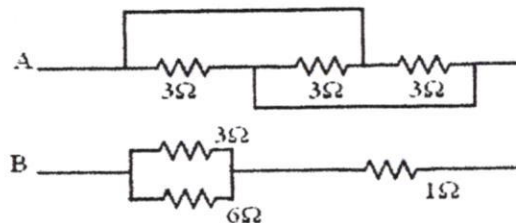
Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

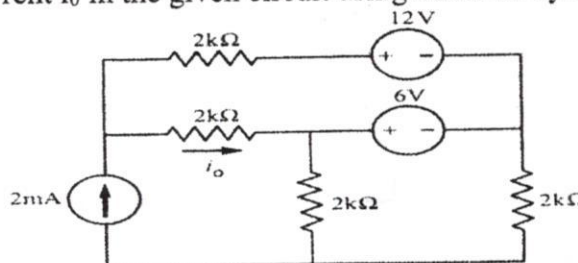
1. Determine the value of R_{AB} in the circuit shown in Fig below.



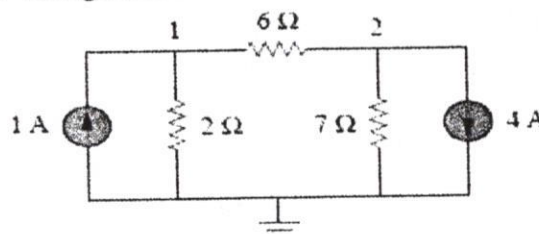
- State and explain Kirchoff's Voltage Law using suitable example.
- In a A.C series RLC circuit resistance, inductance and capacitances are 10Ω , $0.1H$ and $20\mu F$ respectively. It is supplied with a $220V$, $50Hz$ AC supply, Calculate the current in the circuit, active and reactive power in the network.
- Write the relationship between line and phase quantities of voltages and currents in a 3-phase star and delta connected systems.
- Explain how do you reverse the direction of rotation in a DC shunt motor.
- Name the speed control method for a DC shunt motor for getting speeds above rated rpm. Using the same method, can we get speeds below rated rpm? If not, give the reason.
- Draw the phasor diagram of practical transformer under no-load.
- Write the necessity for earthing.
- A three phase, 2 pole, 50 Hz induction motor is running at 2940 rpm. Determine the slip speed and %slip.
- Which type of rotor is preferred in the alternator used in Hydel power plants? Give reason.

Part-B (5 × 8 = 40 Marks)
 (All sub-questions carry equal marks)

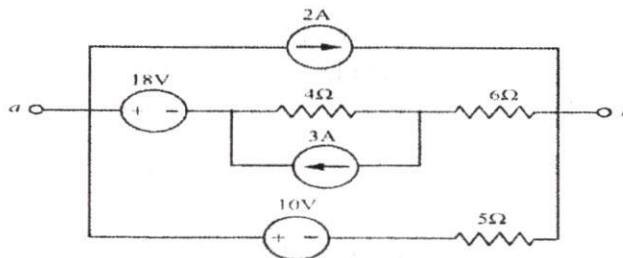
11. a) Calculate the current i_0 in the given circuit using Mesh analysis.



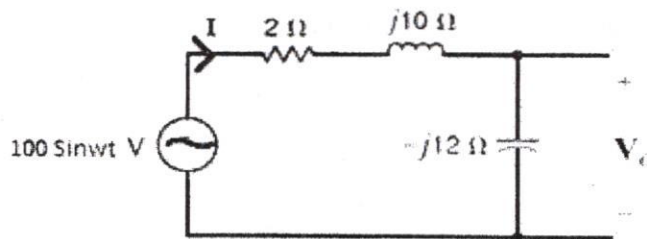
- b) Calculate the node voltage across the 6Ω resistor in the circuit using nodal analysis.



12. a) Define RMS value and determine Form Factor and Peak Factor of a sinusoidal waveform.
 b) Three identical coils each having a resistance and inductive reactance of 3Ω and 5Ω respectively are connected across 400V, three phase supply. Determine the active and reactive power consumed by the load when the load is connected in (i) Star (ii) Delta
13. a) Explain in brief, the construction and working principle of DC motor
 b) A 4-pole lap wound DC shunt motor has 400 conductors on its armature, each conductor having a resistance of 0.01Ω and the field resistance of 125Ω , armature current is 40A and back E.M.F is 240V. Find the (i) Source Voltage (ii) Field current and Line current.
14. a) Explain in detail about OC and SC tests on transformer. Also specify why these tests are called predetermination tests.
 b) A 20 kVA, 2000/200 V, single phase, 50 Hz transformer has a primary resistance of 2.5 ohms and reactance of 4.8 ohms. The secondary resistance and reactance are 0.01 ohms and 0.018 ohms respectively. Find: i) Equivalent resistance, reactance and impedance referred to primary ii) Equivalent resistance, reactance and impedance referred to secondary iii) Total copper loss of the transformer
15. a) Explain the construction of salient pole alternator and its working principle.
 b) A 3-phase 4-pole, 50Hz Induction motor running at 1440 rpm Find the (i) Frequency of rotor induced E.M.F at running condition (ii) Frequency of rotor induced E.M.F at standstill condition (iii) Draw the torque-slip characteristics.
16. a) Calculate the power consumed by the 5Ω resistor.



- b) Find the following in the given circuit
 (i) V_0, I (ii) Draw the phasor diagram (iii) Active and Reactive power.



17. Answer any **two** of the following:
 - a) Derive the expression for torque in a DC motor.
 - b) Draw the phasor diagram of practical transformer with R-L load and draw the equivalent circuit of transformer referred to secondary side.
 - c) Explain how rotating magnetic field is produced in 3 phase Induction motor either graphically or mathematically.