

2056

B.E. (Mechanical Engineering), Second Semester
ESC-X05: Basic of Electrical and Electronics Engineering

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

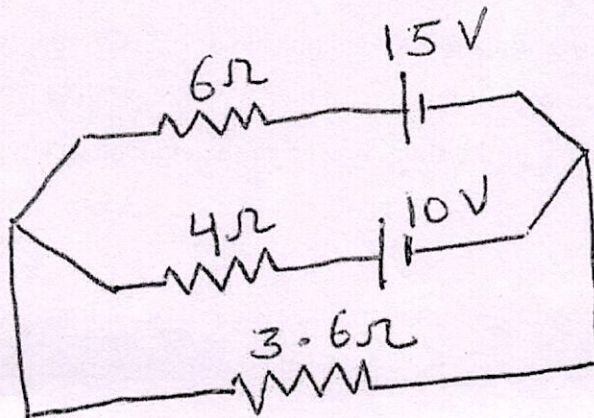
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I. Attempt the following:-

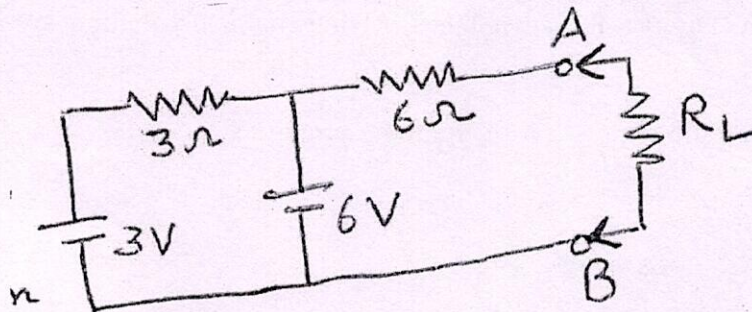
- What is the difference between ideal and practical voltage source? Define linear circuit element.
- Define peak factor and form factor. Differentiate between inductive and capacitive reactance.
- What is reverse saturation current? Name three regions of a transistor?
- Define rotating magnetic field. What is a squirrel cage rotor?
- Why are NAND and NOR called universal gates? (5x2)

UNIT - I

- II. a) Apply Norton's theorem to find current flowing through the 3.6Ω resistor of the circuit shown in the figure given below:-



- b) Calculate the value of R_L which will draw maximum power from the circuit shown below. Also find the value of maximum power. (2x5)



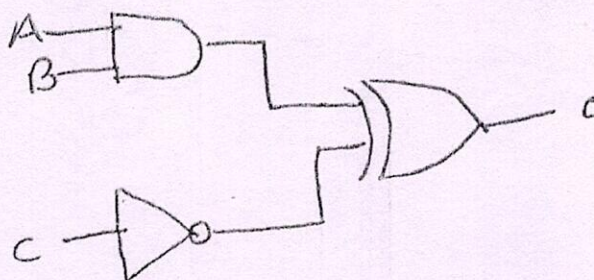
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(2)

- III. a) Show by phasor diagram that when three-phase balanced voltage sources are connected in delta, no current will flow round the loop. Explain why delta source is not used in practice?
- b) The power input to a load was measured by two wattmeter method. The readings were 800w and 400w, the latter reading being obtained after reversing the potential coil connections. Find the power and p.f. of the load. (2x5)
- IV. a) Explain what is depletion region in a P-N junction diode? Also explain threshold voltage of a diode.
- b) Explain the meaning of a field effect transistor? How is it different for a BJT? Why is the input resistance is MOSFET layer than that of JFET depletion type? (2x5)

UNIT - II

- V. a) Explain magnetomotive force and compare it with electromotive force. Also write the expression for energy stored magnetic field.
- b) A 50 kVA, 2200/110 V transformer is connected to 110V supply with metering with the 2200V side open-circuited, the meter readings are 110V, 10A, 400W. Compute the parameters of the shunt branch of the equivalent circuit as seen from LV and HV sides. (2x5)
- VI. a) State and prove the condition for maximum efficiency of a transformer.
- b) Write the expression relating the electrical power converted to the mechanical form in a dc motor. How are the electrical power and mechanical power output different from these powers? (2x5)
- VII. a) Draw a single line diagram of a power system. Label all the major components of the system. Discuss the advantages of ring main distribution system over radial system.
- b) Drive the logic expression of the logic circuit as given below and also write the truth table.



(2x5)