BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - I CS&BS : WINTER : 2023

SUBJECT : PRINCIPLES OF ELECTRICAL ENGINEERING

Day : Wednesday | Time : 10:00 AM-01:00 PM

Date : 6/12/2023 | **W-24132-2023** | Max. Marks : 60

N. B. :

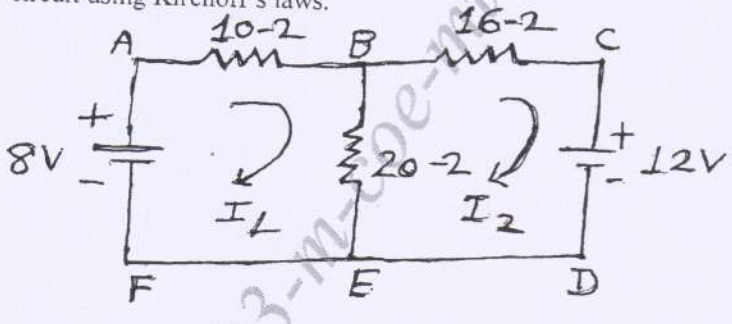
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labelled diagrams **WHEREVER** necessary.
4) Use of non-programmable calculator is **ALLOWED**.
5) Assume suitable data, if necessary.

Q. 1 Define and write down the units of : **(10)**

i) EMF
ii) Current
iii) Energy
iv) Power
v) Work

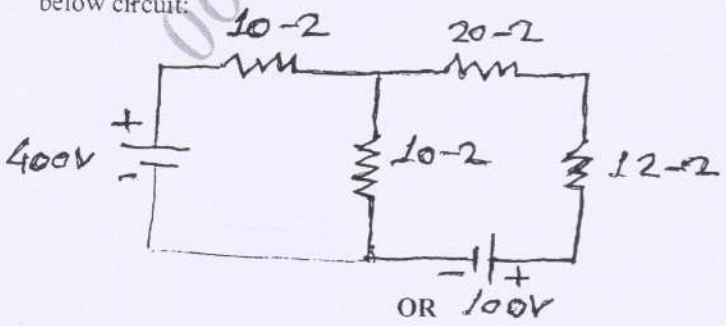
OR

State and explain Kirchoff's current law. Find currents I_1 and I_2 for given circuit using Kirchoff's laws. **(10)**



Q. 2 a) State and explain maximum power transfer theorem. **(05)**

b) Apply Thevenin's theorem to calculate the current in 12 Ω resistance for below circuit: **(05)**



OR

Derive the equations for delta to star and star to delta conversion for resistive circuit. **(10)**

Q. 3 Sketch A.C. waveform and power triangle. Define the following parameters related to A.C. system: **(10)**

i) Cycle
ii) Frequency
iii) Admittance
iv) Conductance
v) Form factor
vi) Peak factor

P. T. O.

OR

Sketch and explain R–L–C series circuit. Discuss the concept of resonance in case of series R–L–C circuit. Derive the formula for resonance frequency. **(10)**

Q. 4 a) Define the following parameters: **(05)**

i) Electrostatic field
ii) Electric field strength
iii) Permittivity
iv) Absolute permittivity
v) Relative permittivity

b) Two capacitors $4\mu F$, $8\mu F$ are connected in **a)** Parallel and **b)** Series across a 100 V DC source. Determine following parameters for both connections: **(05)**

i) Energy stored in each capacitor.
ii) Equivalent capacitance of that combination.

OR

Define battery and list out its different types. Explain construction and working of Nickel – Cadmium battery in detail and also write down different applications of Nickel – Cadmium battery. **(10)**

Q. 5 a) Define the following terms: **(05)**

i) Magnetic field
ii) Magnetic flux
iii) Magnetic field density
iv) Magnetic field strength
v) Reluctance

b) State and explain Faraday's law of Electromagnetic Induction. **(05)**

OR

Define efficiency and voltage regulation related to performance of single phase transformer. Explain direct load test on single phase transformer to determine efficiency and regulation. **(10)**

Q. 6 a) Write down the different types of wiring and list out different safety devices used in electrical system. **(05)**

b) Discuss the importance of electrical earthing in short and list out different safety devices used in electrical system. **(05)**

OR

What are the different types of lamps used in illumination system? Explain construction and working of fluorescent tube in detail with neat diagram. **(10)**

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