

**I B. Tech II Semester Supplementary Examinations, January/February - 2023****BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

(Common to CSE-CS&amp;T, CSE-CS, CSE-IOT&amp;CS Incl BCT, CSE-CS&amp;BS, CSE-IOT, Cyber Security)

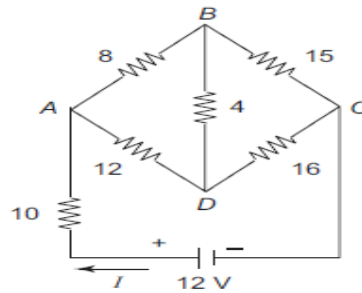
Time: 3 hours

Max. Marks: 70

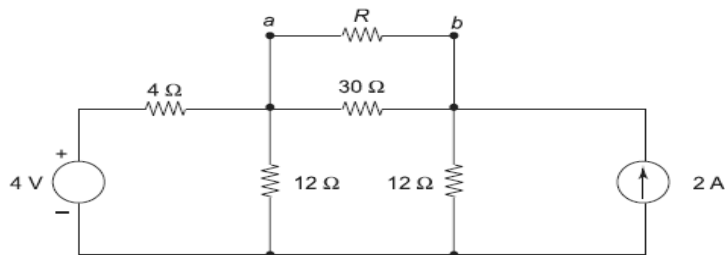
*Answer any FIVE Questions ONE Question from Each Unit  
All Questions Carry Equal Marks*

**UNIT-I**

- 1 a) Distinguish between Dependent Sources and Independent Sources [7M]  
 b) Consider a 230 V, 100 W incandescent lamp. Determine: [7M]  
 (i) the lamp resistance,  
 (ii) the lamp current, and  
 (iii) the energy consumed by the lamp in 8 hours  
 (OR)
- 2 a) Derive an expression for the equivalent inductance when the inductances are [7M]  
 connected in parallel.  
 b) Find the battery current for the following circuit [7M]

**UNIT-II**

- 3 a) State and explain super position theorem [7M]  
 b) Find the Thevenin equivalent as viewed by the resistance R [7M]

**(OR)**

- 4 a) Explain the following terms w.r.t AC circuits: [7M]  
 i) Amplitude ii) Frequency iii) Time Period iv) Cycle  
 v) RMS Value vi) Average value vii) Form factor



- b) A resistance  $12 \Omega$ , an inductance of  $0.15 \text{ H}$  and a capacitance of  $100 \mu\text{F}$  are connected in series across a  $120 \text{ V}$ ,  $50 \text{ Hz}$  supply. Calculate: (i) The current. (ii) The phase difference between current and the supply voltage. (iii) Power consumed. [7M]

**UNIT-III**

- 5 a) Explain the construction and working of an elementary generator. [7M]  
b) A long shunt generator supplied  $500 \text{ A}$  at  $500 \text{ V}$ . Calculate its generated e.m.f. if its armature, series and shunt field resistances are  $0.02 \Omega$ ,  $0.04 \Omega$  and  $125 \Omega$  respectively. [7M]

**(OR)**

- 6 a) Explain the principle of operation of a Single-phase transformer with a neat diagram and required labeling. [7M]  
b) A  $3300/220 \text{ V}$ ,  $30 \text{ kVA}$ , single-phase transformer takes a no-load current of  $1.5 \text{ A}$  When the low voltage winding is kept open. The iron loss component is equal to  $0.4 \text{ A}$  find: (i) No-load input power. (ii) Magnetising component and power factor of no-load current. [7M]

**UNIT-IV**

- 7 a) Deduce the relation between number of poles, frequency and speed of an alternator. [7M]  
b) An eight-pole synchronous generator is running at  $750 \text{ rpm}$ . What is the frequency of induced EMF? At what speed should the generator be run so that the EMF induced will have a frequency of  $60 \text{ Hz}$ ? [7M]

**(OR)**

- 8 a) Explain the constructional details of a Three phase induction motor. [7M]  
b) List and explain the various losses that occur in a Three phase induction motor. [7M]

**UNIT-V**

- 9 a) What is meant by diffusion of charge carriers? How is it different from drift? [4M]  
b) Explain the operation of a Half wave rectifier with a neat circuit and also draw the relevant waveforms. [10M]

**(OR)**

- 10 a) Explain the constructional details, symbols and operation of a Transistor. [7M]  
b) Explain the basic block diagram of an operational amplifier. [7M]

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