

B. Tech. SEM -I (Computer Science & Business Systems) (CBCS)
(2018 Course) : WINTER - 2018

SUBJECT : PRINCIPLES OF ELECTRICAL ENGINEERING

Day : Tuesday
Date : 27/11/2018

W-2018-2256

Time : 10.00 AM To 01.00 PM
Max. Marks : 60

N. B. :

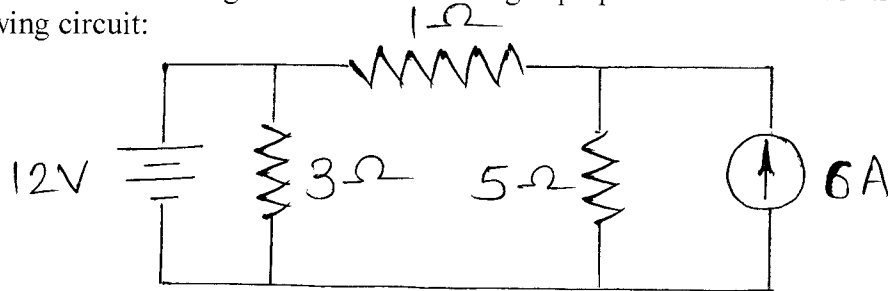
- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable calculator is **ALLOWED**.

- Q.1**
- a) Explain the concept of EMF and Potential Difference. (04)
 - b) In a hydroelectric generating station, the head of water is 425m. If 1250 liters of water is required to generate 1 kwh of electric energy. Find the overall efficiency. Assume 1 litre = 1 kg (06)

OR

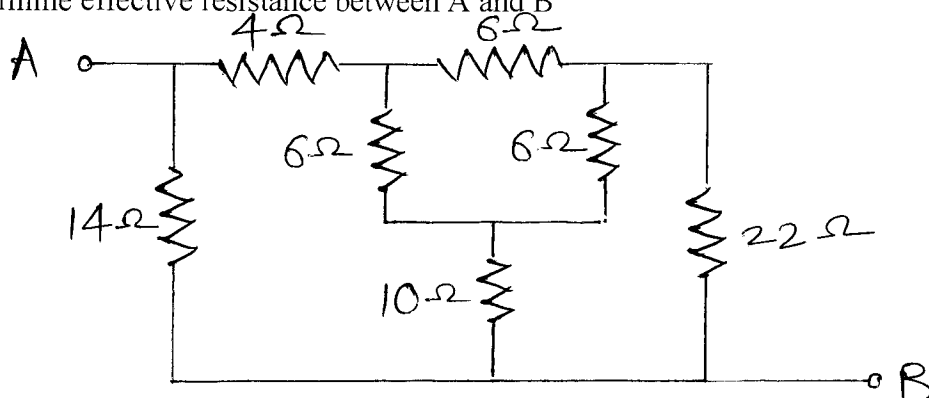
- a) With usual notations prove that: (05)
 $(\alpha_1 - \alpha_2) = \alpha_1 \alpha_2 (t_2 - t_1)$.
- b) Explain the effect of temperature on resistance of following material with graph (05)
i) Metal ii) Insulation

- Q.2**
- a) Derive a formula to convert STAR connected network into its equivalent DELTA connected network. (05)
 - b) Calculate current through all resistances using superposition theorem for the following circuit: (05)



OR

- a) State maximum power transfer theorem and derive the equation for the maximum power. (05)
- b) Determine effective resistance between A and B (05)



- Q.3**
- a) State various types of batteries. Explain any one in brief. State its specifications. (04)
 - b) Two capacitors of 60 μf are connected in series across 220V supply calculate: (06)
 - i) Resultant capacitor
 - ii) Charge on each capacitor
 - iii) Voltage across each capacitor

P. T. O.

OR

- a) Define and explain: (04)
i) Absolute Permittivity ii) Relative Permittivity
- b) Derive an expression for capacitance of a parallel plate capacitor with a composite dielectric medium of two materials. (06)

- Q. 4 a) Derive the relations between line and phase values of voltage and current for three phase balanced delta connected lagging power factor load. Sketch phasor diagram. (06)
- b) Define: i) Power factor and draw power triangle (04)
ii) Define impedance and draw impedance triangle

OR

- a) $Z_1 = 30 \angle 45^\circ$ and $Z_2 = 45 \angle 30^\circ$ are connected in parallel across single phase 230 V, 50 Hz supply. Calculate (06)
i) Current drawn
ii) Power factor
- b) Draw phasor diagram of series R-C circuit and write down of equation of voltage and current. Draw V, I wave forms. (04)

- Q. 5 a) State Fleming's left hand rule, Flemings Right hand rule with necessary figure. (04)
- b) A coil of 500 turns and resistance 20Ω is wound uniformly on an iron ring of mean circumference 50 cm and cross sectional area 4 cm^2 . It is connected to 24 V d.c supply. Under these conditions the relative permeability of iron is 800. Calculate the values of (06)
i) mmf ii) magnetic field strength
iii) the total flux in the iron iv) the reluctance of the ring

OR

- a) A metal ring of mean diameter of 80 cm is made out of two semicircular pieces of cast iron and cast steel. If the ring is uniformly wound with 1000 turns, calculate the value of current required to produce a flux density of 0.85 wb/m^2 in the ring. Given that μ_r of cast iron is 200 and μ_r of cast steel is 1200. Take $\mu_0 = 4\pi \times 10^{-7}$ (06)
- b) Describe the types of emf induced in i) transformer primary winding (04)
ii) generator and write down its equation.

- Q. 6 a) What is importance of earthing? What are the different types of earthing? Explain any one with neat diagram. (04)
- b) What type of wiring system is used in domestic electrical system? Rating of MCB. State rating of electric iron, fan, geyser used in house. (06)

OR

- a) Describe construction and working of LED with neat diagram. What are the advantages of LED over fluorescent lamp? (06)
- b) What is the incoming voltage and rating in electrical department laboratory, computer laboratory of our collage and for each computer? What is the type of wiring system used? (04)

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