EL-Dec 18

2016

Roll No.....

Dec 2018

B.Tech. I SEMESTER

ELECTRICAL TECHNOLOGY (BEC/E-105)

Time: 3 Hours **Max. Marks:60**

Instructions: *1. It is compulsory to answer all the questions (2 marks each) of Part -A in short.*
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

Q1 (a) Differentiate unilateral and bilateral circuits. (2)

(b) What is the significance of 'j' operator. (2)

(c) A 60-Hz voltage of 230-V effective value is impressed on an inductance of 0.265 H. Write the time equation for the voltage and the resulting current. (2)

(d) Define the terms related to magnetic circuits : (*i*) reluctance (*ii*) flux density (*iii*) magnetomotive force (2)

(e) State Millman's theorem. (2)

(f) What are the effects of low power factor? (2)

(g) Define statically and dynamically induced emfs. (2)

(h) What are the advantages of three phase system over single phase system? (2)

(i) What is the function of Commutator in a d.c. machine? (2)

(j) Why transformer cores are laminated? (2)

PART -B

Q2 (a) Find the current in the branches of the network shown in figure-1 using nodal voltage method. (5)

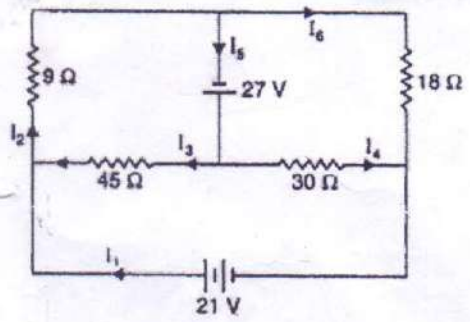

Figure-1

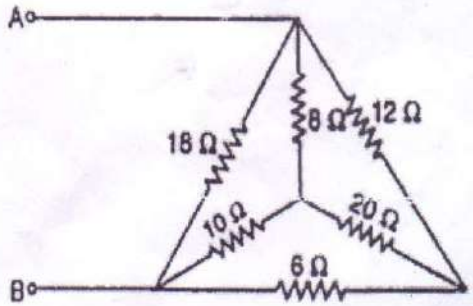

Figure-2

(b) Figure-2 shows a number of resistances connected in star and delta. Find the resistance across the terminals A and B. Use star/delta conversion method. (5)

Q3 (a) Find the average value, effective value, form factor and peak factor for the wave shape shown in figure-3 if the curves are parts of a sine wave. (5)

P.T.O.

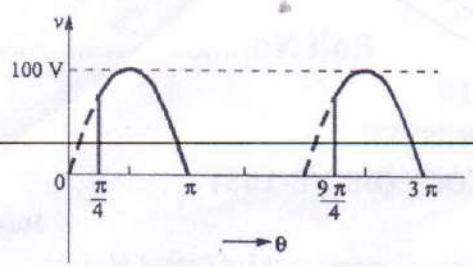

Figure-3

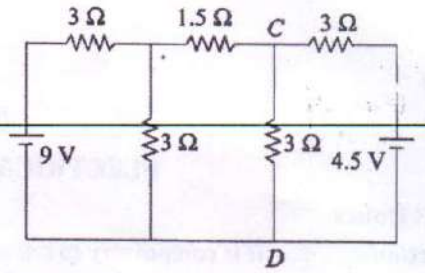

Figure-4

(b) State and explain maximum power transfer theorem. (5)

Q4 (a) Find the current through the 3Ω resistance connected between C and D in the circuit shown in figure-4 using superposition theorem. (5)

(b) Compare electric and magnetic circuits with respect to their similarities and dissimilarities. (5)

Q5 (a) Two circuits, the impedances of which are given by $Z_1 = 15 + j12$ ohms and $Z_2 = 8 - j5$ ohms are connected in parallel. If the potential difference across one of the impedance is 250 + j0 V, calculate: (i) total current and branch currents (ii) total power and power consumed in each branch and (iii) overall power-factor and power-factor of each branch. (5)

(b) What is meant by resonance in series a.c. circuit? Draw resonance curve. Define half power frequencies and quality factor for series resonant circuit. (5)

Q6 (a) Three identical coils are connected in star to a 400V, three phase, a.c. supply and each coil takes 300W. If the power factor is 0.8 lagging, calculate: (i) the line current (ii) impedance and (iii) resistance and inductance of each coil. (5)

(b) Explain two wattmeter method of power measurement in three phase system at balance load. What are the effects of power factor on wattmeters reading? (5)

Q7 (a) Explain the construction and working of three phase induction motor with neat sketches. (5)

(b) Explain working principle of transformer. Also, derive emf equation of single phase transformer. (5)

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