BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER : III**
BRANCH: FOOD TECH. **SESSION : MO/18**

SUBJECT: : IMF3005 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
TIME: 3.00 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define: Dependent source, Capacitance. [2]
Q.1(b) State the conditions for a system to be linear. [4]
Q.1(c) A resistor has a resistance R = 800 Ω and the voltage across it are v and I respectively. Calculate the power absorbed by R at t = 0.1 s when (a) $i = 50\ e^{-10t}$ mA (b) v = 50 cos 25t V (c) $vi = 10\ t^{2.5}$ VA [6]

Q.2(a) Explain KCL and KVL with the help of a circuit. [2]
Q.2(b) Explain the algorithm (process) of node analysis with the help of a circuit. [4]
Q.2(c) Using mesh analysis find the values of currents I1, I2 and I3 shown in Fig. (1). Also find the power supplied by the two current sources. [6]

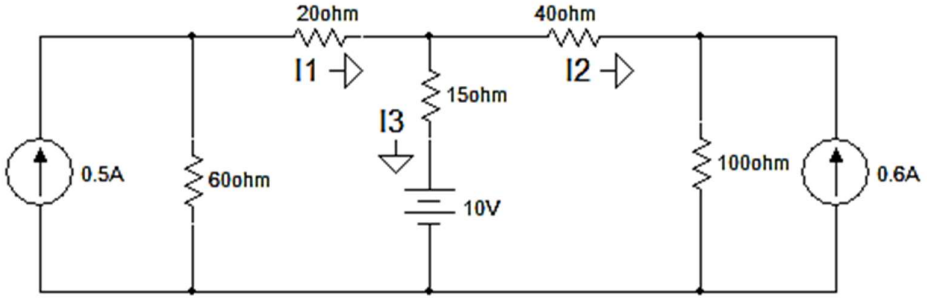

Figure 1.

Q.3(a) State and explain thevenin's theorem. [2]
Q.3(b) State maximum power transfer theorem and prove it. [4]
Q.3(c) Using the principle of superposition to find the current in the 2 Ω resistor shown in Figure 2. [6]

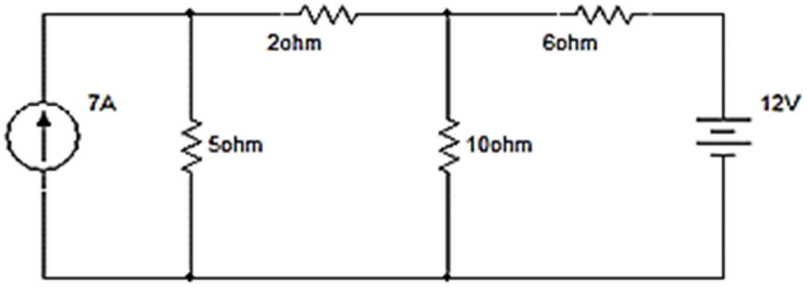

Figure 2.

Q.4(a) Define average value, phase lead for a sine wave. [2]
Q.4(b) Find the R. M. S. value of a sinusoidal alternating current. [4]
Q.4(c) A coil of resistance 8 Ω and inductance 0.1 H is connected in series with a condenser of capacitance 160 μF across 230 V, 50 Hz supply. Calculate (a) the inductive reactance (b) the capacitive reactance (c) the circuit impedance, current and power factor, and (d) the coil and condenser voltages respectively. [6]

Q.5(a) Write electronic configuration of SODIUM and SILICON. [2]
Q.5(b) A diode is mounted on a chassis in such a manner that for each degree centigrade rise in temperature above ambient, 0.1 mW is thermally transferred from diode to its surroundings. The ambient temperature is 25 degree centigrade. Diode temperature should not be allowed to increase 10 degree centigrade above ambient. If reverse saturation current is 5 microampere at 25 degree centigrade then what is maximum reverse biasing voltage that must be maintained across the diode. [4]

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Q.5(c)	Explain how simplest diode circuit acts as a half wave rectifier.	[6]
Q.6(a)	Define frequency response and BW.	[2]
Q.6(b)	Why for BJT is it difficult to make input short circuited for AC signal.	[4]
Q.6(c)	Write explanatory notes on COMMON BASE TRANSISTOR AMPLIFIER.	[6]
Q.7(a)	Write six characteristics of OPERATIONAL AMPLIFIER.	[2]
Q.7(b)	Prove INDUCED CHANNEL MOSFET operates in ENHANCEMENT MODE whereas JFET operates in DEPLETION MODE.	[4]
Q.7(c)	Write explanatory notes on OSCILLATOR.	[6]

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