JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech- II Semester (BI/BT)

COURSE CODE(CREDITS): 18B11EC212(4) MAX. MARKS: 35

COURSE NAME: Basic Electrical Science

COURSE INSTRUCTORS: Dr. Alok Kumar MAX. TIME: 2 Hours

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***Note:*** ***(a)*** *All questions are compulsory.*

*(b)Marks are indicated against each question in square brackets.*

*(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems*

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**Q.1** Find the current in 3Ω resistance using superposition theorem in the given Fig.1.

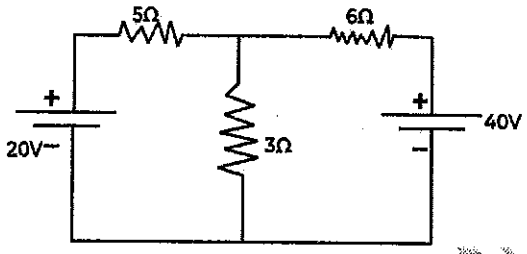


Fig.1

[CO1] **[4 Marks]**

**Q.2** How do biomedical signals differ from other types of signals? Explain the importance of biomedical signal processing in healthcare. [CO5] **[4Marks]**

**Q.3** Explain the different waves and intervals observed in a typical ECG waveform. Discuss emerging technologies and advancements in ECG monitoring and interpretation.

[CO5] **[4 Marks]**

**Q.4** Find the average value, RMS value, form factor and peak factor of the waveform shown In Fig.2

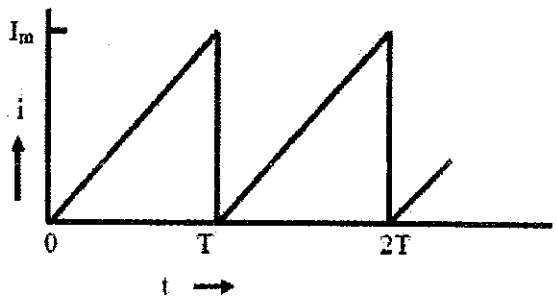


Fig.2

[CO2, CO3] **[4 Marks]**

**Q.5** What are the main components of a transformer, and how do they contribute to its operation? [CO4] **[4 Marks]**

**Q.6** What are the clinical indications for MRI, and in which scenarios is it preferred over CT? [CO5] **[3Marks]**

**Q.7** A 100-kVA, 2400/240-V, 60-Hz step-down transformer (ideal) is used between a transmission line and a distribution system.

a) Determine turns ratio.
b) What secondary load impedance will cause the transformer to be fully loaded, and what is the corresponding primary current?
c) Find the load impedance referred to the primary. [CO4] **[3 Marks]**

**Q.8** In the given Fig. 3, find the following.
(a) equation for current i(t), (b) value of current at time t=0.1 sec, (c) analyze the response. Consider the value of voltage source and other components as follows: $v_s$=20V, $R$=9Ω, L= 1H, and $C$= .05F.

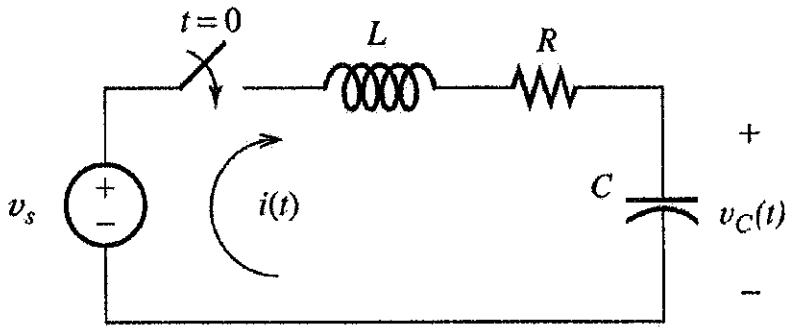


Fig.3

[CO2, CO3] **[5 Marks]**

**Q.9** Find the current i(t) in the circuit shown in Fig.4. Consider the $V_s = 40Sin(3000t)$V [CO3] **[4 Marks]**

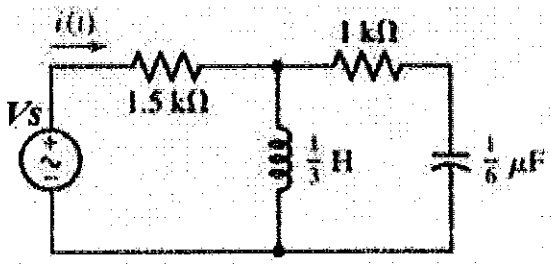


Fig.4