

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY
LONERE – RAIGAD - 402 103
Semester Examination – December – 2017

Branch: B. Tech.

Semester: I

Subject with Subject Code: Basic Electrical Engineering
[EE104]

Marks: 60

Date: 18 / 12 / 2017

Time: 3 Hrs.

Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1.

(a) Define resistance temperature coefficient and prove that $R_2 = R_1 [1 + \alpha_1 (\theta_2 - \theta_1)]$
where R_2 = resistance at temperature θ_2 °C R_1 = resistance at temperature θ_1 °C ,
 α_1 = temperature coefficient at θ_1 °C (6M)

(b) An electric water heater raises the temperature of 20 liter of water from 20 °C to 100 °C . If efficiency of heater is 90% calculate the energy consumed by the heater in joules and in kWh? The specific heat capacity of water is 4190 J/kg K. (6M)

Q.2.

- (a) For the network shown in fig. 1 determine: (6M)
- i) the voltage drop in each resistor and
 - ii) current in each resistor.

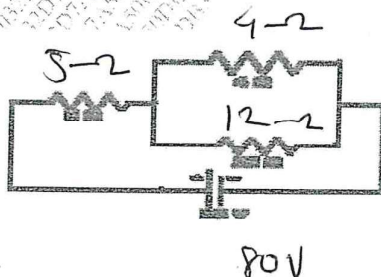


Fig.1. Q2(a)

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(b) State and explain Superposition theorem. (6M)

OR

(b) Find the current through 20Ω resistance using KVL for the network shown in fig. 2. (6M)

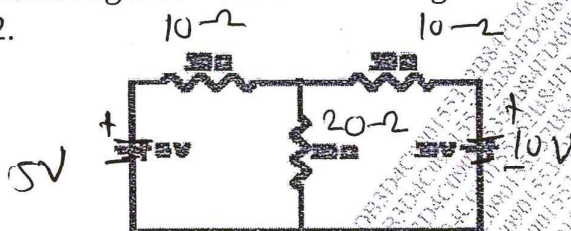


Fig.2. Q.2 (b)

Q.3

(a) Define i) RMS value ii) Form factor, iii) Peak factor for sinusoidal wave. (6M)

(b) Two voltages are represented by $V_1 = 100 \sin 314t$ & $V_2 = 150 \sin \left(314t + \frac{\pi}{6} \right)$.

Calculate the resultant voltage and express it in the form $V = V_m \sin(314t + \phi)$.

(6M)

OR

(b) Write the expression for the current flowing through $100 \mu\text{F}$ capacitor when the voltage $V = 15 \sin 2000\pi$ is applied across it also sketch the waveform of the current showing the phase relationship to the applied voltage. (6M)

Q.4

(a) Explain with neat circuit the resonance in series RLC circuit. (6M)

(b) A coil of resistance 6Ω and inductance 16mH is connected in series with another coil of resistance 10Ω and inductance 0.02H . A 230V , 50Hz supply connected across it. Calculate

- Total circuit impedance
- Total circuit current
- Voltage and current phasor

(6M)

Q.5.

(a) Explain the meaning and give practical example of each effect: (6M)

- self induced emf
- mutually induced emf.



(b) A magnetic core in the form of closed ring, has a mean length of 15cm and across section of 1 cm^2 . The relative permeability of iron is 2400. What direct current will be needed in a coil of 1800 turns uniformly round the ring to create a flux of 0.2 mWb in the iron? (6M)

Q. 6

(a) Derive the EMF equation of transformer. (6M)

(b) Explain charging of capacitor and define time constant. (6M)

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