

Register Number:

B.E/B.TECH DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2009)

Second Semester

EEE231:ELECTRICAL AND ELECTRONICS CIRCUITS

(Common to CSE & IT)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. What is the voltage across the heater of resistance 5Ω through which passes a current of 46 A?
 - a) 41 V
 - b) 230 V
 - c) 9.2 V
 - d) 51 V
2. Identify the passive element among the following
 - a) Voltage source
 - b) Current source
 - c) Inductor
 - d) Transistor
3. In a pure capacitive circuit the current
 - a) Lags the voltage by 90°
 - b) Leads the voltage by 90°
 - c) Lags the voltage by less than 90°
 - d) Leads voltage by less than 90°
4. The RMS value of sinusoidal alternating current is
 - a) $I_m/2$
 - b) $0.637I_m$
 - c) $2I_m/\pi$
 - d) $I_m/\sqrt{2}$
5. The addition of impurity atoms to a pure semiconductor makes it an
 - a) Extrinsic semiconductor
 - b) Intrinsic semiconductor
 - c) None of the above
 - d) Both
6. Avalanche breakdown is primarily dependent on the phenomenon of
 - a) collision
 - b) doping
 - c) ionization
 - d) recombination
7. When a transistor is fully switched ON, it is said to be
 - a) shorted
 - b) saturated
 - c) open
 - d) Cut-off
8. FETs have similar properties to
 - a) PNP transistors
 - b) NPN transistors
 - c) thermionic valves
 - d) Unijunction transistors

9. The frequency of oscillation of an elementary LC oscillatory circuit depends on
 - a) Coil resistance
 - b) Coil inductance
 - c) capacitance
 - d) Both (b) and (c)
10. The OP-AMP comparator circuit uses
 - a) Positive feedback
 - b) negative feedback
 - c) regenerative feedback
 - d) no feedback

PART B (10 x 2 = 20 Marks)

11. State Kirchhoff's laws.
12. List the limitations of ohm's law.
13. Distinguish between form factor and peak factor.
14. Distinguish between series and parallel resonance.
15. Define N type semiconductor.
16. How depletion layer is formed in a PN junction diode?
17. Write down the applications of phototransistor.
18. What do you understand by the term pinch off voltage?
19. What are all the advantages of negative feedback?
20. Draw the circuit of inverting summer.

PART C (5 x 14 = 70 Marks)

21. a) (i) A copper conductor has its specific resistance of 1.58×10^{-6} ohm-cm at 0°C and a temperature coefficient of $1/254.5$ per $^\circ\text{C}$ at 20°C . Find (i) Specific resistance at 60°C (ii) Temperature coefficient at 60°C (7)
- (ii) Determine the total amount of power supplied by the source in the circuit shown in fig.1 (7)

(OR)

- b) Determine the total current in the circuit shown in fig.2.

22. a) An RLC series circuit with $R=25\Omega$, $C=20\mu F$ and $L=150\text{ mH}$ are connected across a voltage of 250 V and 50 Hz supply. Determine the following (i) Inductive reactance (ii) Capacitive reactance (iii) Impedance (iv) Current (v) Power factor (vi) Phase angle (vii) Voltage across R,L,C. Also draw the phasor diagram

(OR)

- b) (i) A sine wave has a peak value of 12 V. Determine the following values (i) rms (8)
(ii) average (iii) crest factor and (iv) form factor.
(ii) Determine the rms value of the voltage defined by $v = 5 + 5\sin(314t + \pi/6)$ (6)
23. a) A $5\text{ K}\Omega$ load is fed from a bridge rectifier connected across a transformer secondary whose primary is connected to 460 V, 50 Hz supply. The ratio of number of primary to secondary turns is 2:1. Calculate the DC load current, DC load voltage, ripple voltage and PIV rating of diode.

(OR)

- b) Write short notes on,
(i) Different types of power supply filters. (10)
(ii) Optical diode. (4)

24. a) Sketch the input and output characteristics of CB configuration and explain in detail.

(OR)

- b) Explain the working of SCR and Photo Transistor and draw its VI characteristics.
25. a) Explain about integrator and differentiator using operational amplifier with neat circuit and waveforms.

(OR)

- b) Draw the circuit of a RC phase shift oscillator and explain its operation.
