Register No: ……

B.E./B.TECH. DEGREE EXAMINATIONS: MAY / JUNE 2011

Second Semester

EEE231: ELECTRICAL AND ELECTRONIC CIRCUITS

(Common to Computer Science and Engineering and Information Technology)

Time: Three hours **Maximum Marks: 100**

Answer ALL Questions

PART A (10x1 = 10 Marks)

1. Which of the following relation is not correct?

   A) $P = V/R^2$ B) $P = VI$ C) $I = \sqrt{P}/R$ D) $V = \sqrt{PR}$

2. When two resistances 10 Ω and 15 Ω are connected in parallel then the equivalent resistance is

   A) 10 Ω B) 25 Ω C) 15 Ω D) 6 Ω

3. In a pure inductive circuit the current will

   A) Lag behind the voltage by 90° B) Remain in phase with voltage

   C) Lead the voltage by 90° D) Lead the voltage by 45°

4. The peak factor is the ratio of

   A) Average value to RMS value B) RMS value to average value

   C) Peak value to average value D) Peak to RMS value

5. When forward bias is applied to a junction diode,

   A) it increases the potential barrier

   B) it decreases the potential barrier

   C) it reduces the majority-carrier current to zero

   D) it reduces the minority – carrier current to zero

6. A zener diode

   A) has a high forward voltage rating B) has a sharp breakdown at low reverse voltage

   C) is useful as an amplifier D) has a negative resistance

7. For proper transistor action,

   A) its collector – base junction must be forward – biased

   B) its collector must be more heavily doped than its emitter

   C) its base must narrow and very lightly doped

   D) its base region must be heavily doped

8. The coupling capacitors in an amplifier are used

A) to match the impedances B) to limit the bandwidth

C) to control output signal voltage D) to prevent dc mixing with the input or the output.

9. Relaxation oscillator is also known as

A) Sinusoidal oscillator B) Harmonic oscillator

C) Non sinusoidal oscillator D) None of the above

10. An Op. Amp. Comparator basically converts an input voltage into:

A) a square wave voltage B) a triangle wave voltage

C) a ramp voltage D) a sinusoidal voltage

PART B (10 x 2 = 20 Marks)

11. Define passive element. Give an example.
12. The equivalent resistance of two wires is 25 Ω when connected in series and 6 Ω when connected in parallel. Calculate the resistance of each wire.
13. What is the value of form factor for sinusoidal waveform?
14. Define Q- factor.
15. Define Peak Inverse Voltage of a diode.
16. Mention the applications of zener diode.
17. What are the different configurations of BJT?
18. Mention the applications of a photo transistor.
19. What is an oscillator?
20. Define current gain of an amplifier.

PART C (5 x 14 = 70 Marks)

21. a) (i) State and prove Kirchhoff's laws. (7)

(ii) Define RMS value and obtain the same for sinusoidal waveform. (7)

(OR)

b) A circuit consists of 3 resistors 3 Ω, 4 Ω and 6 Ω in parallel and a fourth resistor 4 Ω in series. A battery of emf 12 V and internal resistance 6 Ω is connected across the circuit.

Find the total current in the circuit and terminal voltage across the battery.

22. a) Derive the expression for impedance, current, phase angle, power factor and power for the RL series circuit supplied with ac voltage source. Also draw the phasor diagram.

(OR)

b) Derive the expression for resonant frequency of a parallel circuit having R1 and L in one branch and R2 and C in the second branch. Also derive the expression for Q factor.

23. a) (i) Draw and explain the V-I characteristics of PN junction diode. (7)

(ii) Explain the mechanism of avalanche breakdown and zener break down. (7)

(OR)

b) Construct a full wave bridge rectifier. Explain its operation with neat output waveforms.

24. a) (i) Explain the operation of NPN transistor. (7)

(ii) Draw and explain the operation of a simple CE amplifier. (7)

(OR)

b) With the help of neat sketches and characteristic curves, explain the operation of the JFET.

25. a) (i) Explain Barkhausen criterion for oscillation. (4)

(ii) Explain the working of any one type of LC oscillator (10)

(OR)

b) With circuit diagram, explain the working of :

(i) Integrator (7)

(ii) Differentiator (7)

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