BE/B.TECH.DEGREE EXAMINATIONS: OCTOBER/NOVEMBER-2008

Second Semester

U07EC207: Electrical & Electronics Circuits

(Common to B.E. Computer Science and Engineering & B. Tech. Information Technology Branches)

Time: Three Hours   **Maximum Marks: 100**

Answer ALL Questions:-

PART-A (20 x 2 = 40 Marks)

1) The unit of the temperature co-efficient of resistance is
   - a) mho
   - b) ohm per degree Kelvin
   - c) mho per degree Kelvin
   - d) per degree Kelvin

2) Which of the following exists in P-type semiconductor only?
   - a) Electron
   - b) Ion
   - c) Hole
   - d) All the above

3) Which of the following can have positive or negative polarity
   - a) electron
   - b) Ion
   - c) Hole
   - d) All the above

4) When the two resistors are connected in parallel
   - a) the current through each must be same
   - b) the voltage across each must be same
   - c) their combined resistance equals to the sum of individual value
   - d) each must have same resistance value

5) Ohm's law is not applicable to
   - a) carbon resistor
   - b) circuits with low current density
   - c) high voltage circuits
   - d) vacuum tubes

6) A 100V is applied R1, R2, and R3 in series, producing 10A in the series circuit. R1 = 6 Ω and R2 =2Ω. The value of R3 is
   - a) 10 Ω
   - b) 4 Ω
   - c) 2 Ω
   - d) 1 Ω

7) Form factor for a sine wave is
   - a) 0.667
   - b) 0.707
   - c) 1.11
   - d) 1.414

8) For the same peak value, which of the following wave has the highest mean value and RMS value
   - a) sine wave
   - b) square wave
   - c) triangular wave
   - d) half wave rectified sine waves

9) A wave has RMS value of 10V and frequency of 50Hz. This can be represented as
   - a) 10 sin50t
   - b) 10 sin100t
   - c) 14.1 sin50t
   - d)14.1 sin100t

10) In a series combination or R and L
   - a) a current will lag the voltage by 90
   - b) current will lag the voltage by some angle between 0 and 90
   - c) current will lead the voltage by some angle between 0 and 90
   - d) current will lead the voltage by some angle between 90 and 180

11) An RLC circuits has R=200Ω, C=5μf, L=0.1H .The natural frequency of the circuit will be
   - a) 10 radians/sec
   - b) 100 radians/sec
   - c) 1000 radians/sec
   - d) 10000 radians/sec

12) When n is the number of shell, the maximum number of electrons in the shell can be
   - a) n
   - b) 2n
   - c) n^2
   - d) $2n^2$

13) At absolute zero, an intrinsic semiconductor
   a) become superconductor   b) disintegrates into pieces
   c) behaves like an insulator   d) becomes extrinsic semiconductor
14) The impurity added to the extrinsic semiconductor is of the order of
   a) 1 in 10   b) 1 in 100   c) 1 in million   d) 1 in billion
15) The minimum number of diodes needed for a bridge rectifier is
   a) 1   b) 2   c) 3   d) 4
16) The Zener diode is invariably used with
   a) forward bias   b) reverse bias
   c) either (a) or (b)   d) zero bias
17) A transistor is common base configuration has
   a) high input resistance as well as output resistance
   b) low input resistance as well as output resistance
   c) high input resistance with low output resistance
   d) low input resistance with high output resistance
18) Negative feedback generally results in
   a) decrease in bandwidth   b)increase in noise
   c) increase in harmonic distortion   d)decrease in harmonic distortion
19) Which of the following is the unipolar device
   a) FET   b) Zener diode   c) PNP transistor   d)All the above
20) In op-amp the loop gain of the amplifier can be changed by
   a) adding dc voltage source
   b) adding ac voltage source
   c) external feedback registers
   d) none of the above

PART-B (5 x 12 = 60 Marks)

21. (a) (i) A battery having emf of 12v is connected across terminals AB of the circuit shown in fig (1). Find
   i) The current flowing in each resistance
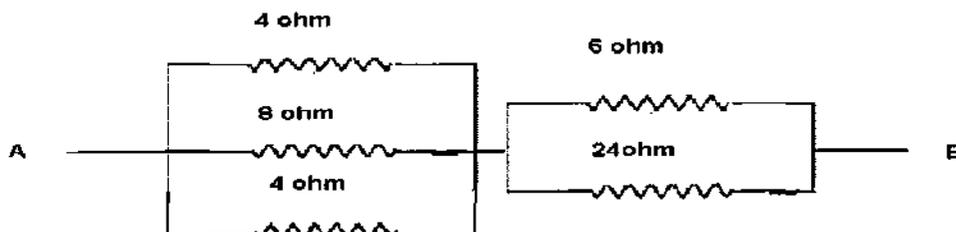   ii) Total power absorbed by the circuit.

Fig-1

(ii) For the network shown in fig (2).Determine the current through the ammeter .Where Ra=10Ω, Rm=20Ω, Rx=90Ω, Rn=30Ω

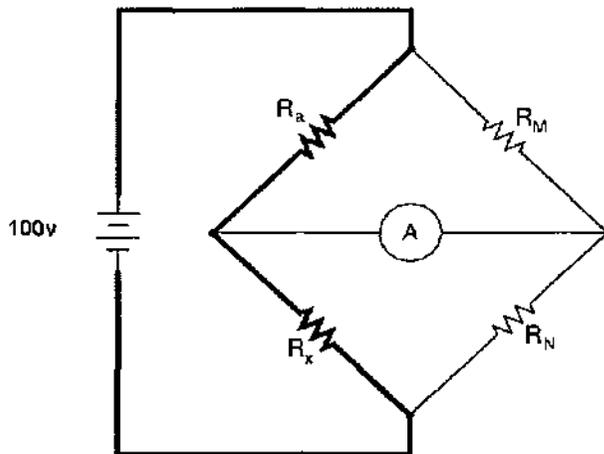Fig-2

(OR)

21 (b) (i)   A circuit consists of three resistors 3 ohms,4 ohms and 6 ohms in parallel and
a forth resistor 4ohms in series. A battery of 12v and internal resistance
6 ohms is connected across the circuit. Find the total current in the circuit
and terminal voltage across the battery.

(ii)State and explain the following laws
(a) Ohm's law
(b) Kirchoff's laws

22 (a) (i) Calculate (i) Form factor (ii) peak factor of
(a) A half wave rectified sine wave
(b) Full wave rectified sine wave

(ii) A pure inductor, a non inductive resistor and a capacitor are connected
In series .The supply emf is 85V at 50 Hz ,the potential difference
across the inductor is 40V and potential difference across the resistor
and capacitor together is 85V. The current is 5A. Calculate the values of
all components and power factor of the circuit

(OR)

22 (b) (i) A series RLC circuit has R=5Ω, L= 0.01H, C=10μF. Calculate the
resonant frequency ,Q-factor and band width

(ii) Compare the series and resonant circuit.

23 (a) (i) With the help of VI characteristics show how a zener diode is used as
Voltage regulator

(ii) Describe the action of PN junction diode under forward and reverse bias

(OR)

23 (b) (i) Explain the operation of full wave rectifier and derive the expression
for average output voltage.

(ii) Define the following terms for a rectifier.
a) ripple factor
b) Peak factor
c) Efficiency

24 (a) (i) Explain the input and output characteristics of a transistor in CB configuration

(ii) With the help of suitable diagrams, explain the working of different types of
MOSFET

(OR)

24 (b) (i) Explain the construction principle of SCR and draw its VI characteristics

(ii) Write short notes on
a) Multistage amplifier
b) Photo transistor

25 (a) Explain how an op-amp can be used to perform summing ,integrating and
differentiating operations and list its important characteristics features of an ideal
Operational amplifier.

(OR)

25 (b) (i) Explain the operation of relaxation oscillator.

(ii) Explain the operation of RC feed back oscillator.

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