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SIS 065 B-2K12
B.Sc. Ist Semester Degree Examination
Electronics
Fundamentals of Electronics
Paper - 1.3

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- i) Answer **all** questions from Section - A.
- ii) Answer any **five** questions from Section - B.
- iii) Answer any **four** questions from Section - C.

Section - A

1. Choose the correct answer.

(1×5 = 5)

- i) _____ Capacitor is a polarized capacitor.
 - a) Mica
 - b) Ceramic
 - c) Paper
 - d) Electrolytic.
- ii) A certain sine wave has a frequency of 1 mega Hertz, its time period is
 - a) 1 Sec
 - b) 1 Micro Sec
 - c) 1000 Sec
 - d) 10 Sec.
- iii) Which of the following has a high internal resistance?
 - a) A constant - voltage source.
 - b) A constant current source.
 - c) Both of these.
 - d) None.
- iv) The voltage where avalanche occurs is called the
 - a) Barrier potential
 - b) Depletion layer.
 - c) Break down voltage.
 - d) None.

- v) An Led
- Emits light when reverse biased.
 - Senses light when reverse biased
 - Emits light when forward biased.
 - Acts as a variable resistance.

2. Fill in the blanks

- Resonance curve shows variation of circuit current with _____. (1×5 = 5)
- The merging of a free electron and a hole is called _____.
- In an R-L circuit time constant is given by the ratio of _____ and _____.
- Norton's equivalent of a circuit consists of a constant current source in _____ with a resistance
- The reverse saturation current in a junction diode is the current that flows when only _____ carriers are crossing the junction.

3. State whether the following statements are true or false. (1×5 = 5)

- The impedance of a series R-L circuit is given by the algebraic sum of R and XL.
- Ceramic capacitors have very large capacitance in small sizes.
- Temperature lowers the junction barrier potential.
- Tunneling phenomenon occurs. When a very heavily doped junction is reverse-biased.
- An auto transformer has only one winding.

Section - B

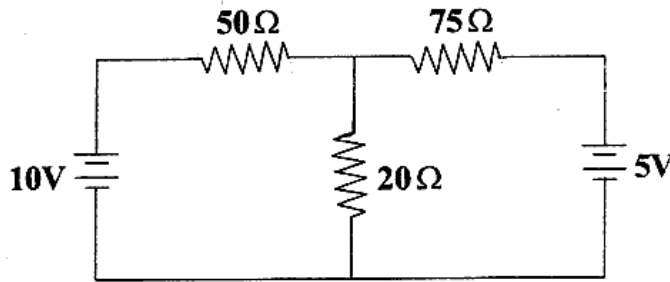
- Derive an expression for the energy stored in an inductor. (5×5=25)
- Define rms value. Show that $I_{rms} = 0.707 I_{max}$
- Convert the following rectangular numbers into polar form:
 - 5+j5
 - 12+j9
 - 8-j10
 - 5-j3
 - 3+j4.
- State and explain current divider theorem.
- Define depletion region. Explain diffusion and drift current for a semiconductor.
- Distinguish between -p-type and n-type semiconductor
- What is tunnel diode? Explain the parameters of tunnel diode.

Section - C

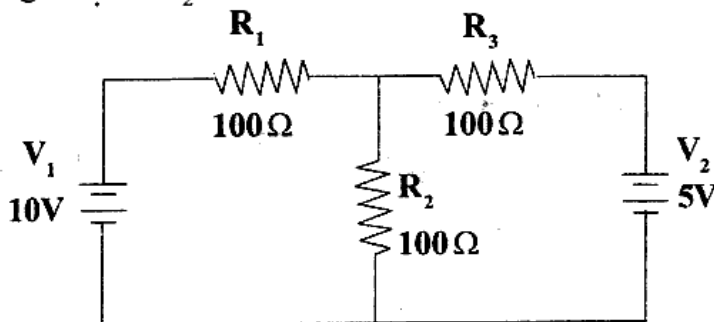
- Write a note on (4×10=40)
 - Ceramic capacitor
 - Electrolytic capacitor. (4+6)

12. With a neat circuit diagram explain the series resonant circuit and derive an expression for
- i) Resonant frequency
 - ii) Impedance of the circuit and
 - iii) Q-factor
- (10)

13. a) Explain the node voltage method for solving networks.
b) Use node voltage method to determine the current through 20Ω resistor. (4+6)



14. State superposition theorem. Using superposition theorem determine the current in and voltage across R_2 . (10)



15. What is fermi level? Explain the position of fermi level in semiconductors and its significance with respect to conductivity. (10)
16. What is a hot carrier diode? Draw the equivalent circuit and explain V-I characteristics of schottky diode. (10)