Register Number:

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ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
B.Sc. ELECTRONICS - I SEMESTER
SEMESTER EXAMINATION - OCTOBER 2019
EL118: BASIC ELECTRONICS

Time: 2 ½ hrs **Maximum marks: 70**

This question paper has three printed pages and three parts.

PART-A

Answer any five questions **5x8=40**

1. a) Define rms value and average value of an alternating waveform.
   b) With a help of a circuit derive an expression for an instantaneous current through an inductor in a series RL circuit connected to a DC source when the switch is closed. Define the time constant for the circuit. **(2+6)**

2. a) Explain the phenomenon of resonance in a series RLC circuit with necessary diagrams.
   b) Arrive at the voltage divider rule for three resistors in series with voltage source. Give its statement. **(4+4)**

3. a) State maximum power transfer theorem and derive the condition for the maximum power transfer in the circuit.
   b) With the help of necessary circuit draw V-I characteristics of a diode and explain.

   (4+4)

4. a) Explain the working of a bridge rectifier and derive expression for its output DC voltage.
   b) Explain the working of biased negative clipper. **(5+3)**

5. a) Differentiate between avalanche breakdown and zener breakdown.
   b) Arrive at the relation between alpha and beta of a transistor.
   c) Plot output characteristics of a transistor in CE mode and mention the different regions. **(2+3+3)**

6. a) Obtain the Q point for a fixed bias with emitter resistor circuit and discuss its stability.
   b) Draw the circuit of a CE amplifier using r_e model and derive expression for its voltage gain. **(4+4)**

7. a) Explain the construction of n-channel JFET and obtain its transconductance characteristics. Define pinchoff voltage.
   b) Sketch drain characteristics for enhancement type MOSFET.
   c) Compare FET and BJT. **(4+2+2)**

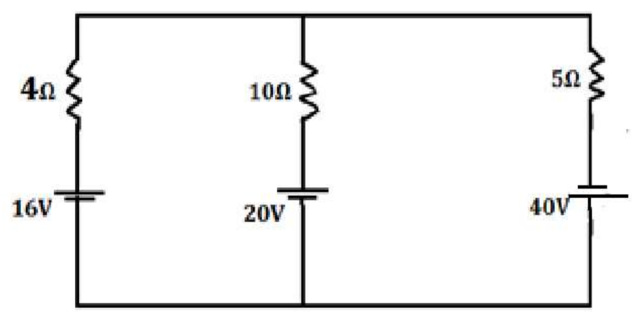
PART-B

Answer any five questions **5x4=20**

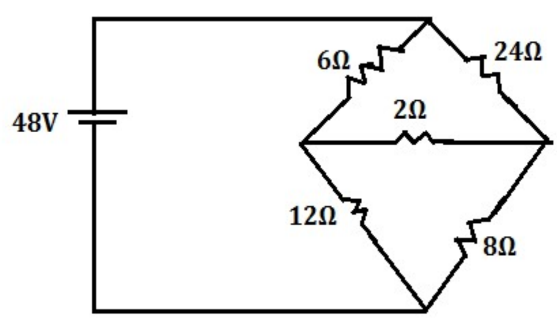
8. A capacitor having a capacitance 10μF is connected in series with a non-inductive resistance of 120Ω across a 100V,50Hz supply. Calculate:

a) current **b)** phase difference between current and the supply in the circuit voltage **c)** Resistive power **d)** Plot current and voltage waveform of the circuit.

9. Determine current in 10Ω resistor using mesh analysis.



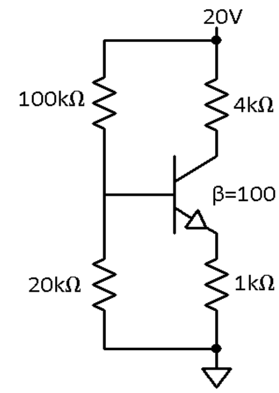
10. Using Thevenin's theorem, determine current through 2Ω resistor.



11. A transformer having a turns ratio of 10:1 is connected to AC mains of 220V, 50Hz. Determine the dc output voltage, rms voltage and its ripple factor when connected as centertapped full-wave rectifier with a load of 1KΩ. (given: $\mathbf{r_d}$=20Ω)

12. Determine the range of input voltage for which a Zener regulator gives a constant output of 10V across a 2kΩ resistor (given: $\mathbf{P_{ZM}}$=400mW, R_s = 1kΩ).

13. Determine the Q point for the following circuit.

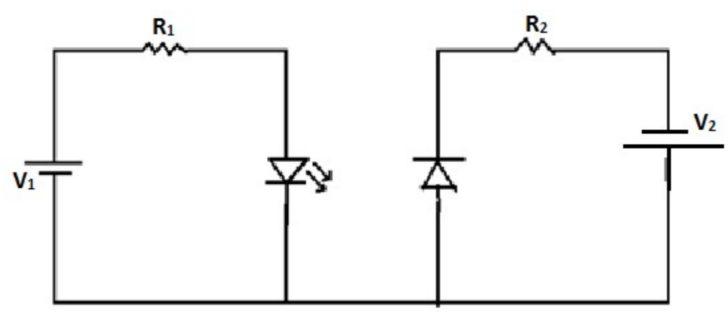


14. A CE amplifier circuit has R_1=24kΩ, R_2=5kΩ, R_C=1.2kΩ, R_E=400Ω, V_{CC}=30V, β=200. Determine its input impedance and output voltage for an input=10mV.

PART-C

Answer any five questions **5x2=10**

15. Convert 8-j6 into polar form and represent it graphically.
16. Name the rejecter circuit. Why is it called so?
17. What are the limitations of super position theorem?
18.



Name the given circuit with necessary correction.

19. Voltage divider bias is the best form of biasing circuit-substantiate.
20. Name the buffer amplifier and mention its advantages.
21. Enumerate the advantages of CMOS devices.

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