



**JAIN COLLEGE, J C Road Bangalore**  
**Mock Paper December - 2017**  
**I PUC- Electronics (40)**

**Time: 3 Hours 15 Minutes**

**Max. Marks: 70**

**PART-A**

**I. Answer all the questions:**

**1 × 10 = 10**

1. Expand JFET.
2. What is the internal resistance of ideal current source?
3. What is the commercial unit for electrical energy?
4. What is a clamper circuit?
5. Draw the symbol of schottkey diode.
6. Name any one acceptor and donor impurity.
7. Mention heavily and lightly doped region of a transistor.
8. What is a photodiode?
9. What is a nibble?
10. Write the compliment of  $10110_{(2)}$ .

**PART – B**

**II. Answer any FIVE questions:**

**2 × 5 = 10**

11. Name few power semiconductor devices.
12. Define peak value and rms value.
13. Mention any two application of CRO.
14. Draw the circuit diagram of RC low pass filter and draw its frequency response.
15. Write the circuit of positive clipper and show the input and output waveform.
16. A transistor amplifier connected in CE mode has  $\beta=80$  and  $I_C=5\text{mA}$ . Calculate  $I_E$ .
17. Simplify using De-Morgan's theorem.

$$Y = \overline{A}BC + A\overline{B}C + ABC$$

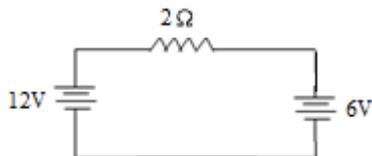
18. Write the logic symbol and truth table of 2 input AND gate.

**PART – C**

**III. Answer any FIVE questions:**

**3 × 5 = 15**

19. Explain how a DC current source is converted into its equivalent voltage source.
20. Find the current through and voltage across resistor using super position theorem.



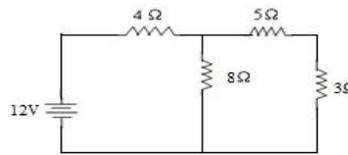
21. Derive an expression to find the effective capacitance of 3 capacitors connected in parallel.
22. Compare LED with LCD display.
23. What is an inductor? Mention 2 different types of inductor and write its application?
24. Draw the circuit diagram of bridge rectifier. Draw the input and output waveform. Mention its application.
25. Explain the input and output characteristics of a transistor in CE mode with neat diagram and graph.
26. Explain the steps involved in PCB designing?

**PART – D**

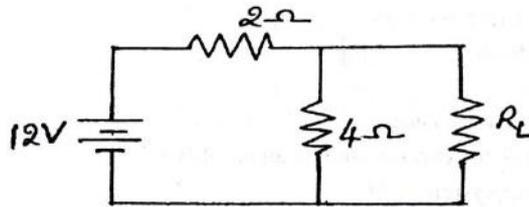
**IV. Answer any THREE questions:**

**5 × 3 = 15**

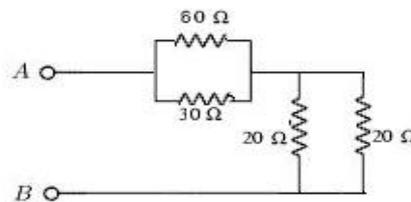
27. Determine the branch currents through each resistor using Kirchhoff's laws.



28. a) Calculate the maximum power delivered to the load  $R_L$  in the circuit given below.



b) Find the resistance between A and B in the circuit shown below.



(3+2)

29. A 230V to (15-0-15) V stepdown transformer is used in a centre tapped full wave rectifier connected to a load of  $200\Omega$ . Determine the following:

- (i) Maximum value of the output voltage of the transformer
- (ii) D C output voltage
- (iii) D C load current
- (iv) D C output power delivered to the load
- (v) PIV of the diode.

30. An unknown capacitor, a  $5\Omega$  resistor and an inductor of  $50\text{mH}$  are in series with an AC source of  $100\text{V}$ ,  $50\text{Hz}$ . It is found that the current is in phase with voltage. Determine

- (i) Capacitance of the unknown capacitor
- (ii) Impedance of the circuit
- (iii) Current in the circuit

31. a) Subtract  $36_{(10)}$  from  $54_{(10)}$  using 2's complement method.

b) Perform the following operations

- i)  $11011_{(2)} \times 110_{(2)}$
- ii)  $100011_{(2)}$  by  $111_{(2)}$

(3+2)

**PART – E**

**V. Answer any FOUR questions:**

**5 × 4 = 20**

32. a) Explain the construction and application of carbon film resistor.

b) Determine the resistance value of an electrical appliance marked with  $220\text{V}$ ,  $550\text{W}$ . (3+2)

33. With a neat diagram, explain the working of a loudspeaker. Mention any one application.

34. a) For an RLC AC circuit, derive an expression for impedance.

b) What is the condition for resonance? Write the expression for resonant frequency. (3+2)

35. a) Write a note on diode approximation.

b) Draw the diagram of seven segment LED display. (3+2)

36. With a neat circuit diagram and graph, explain the forward bias V-I characteristics of semi-conductor diode.

37. State and prove De-Morgan's theorem with truth table.

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