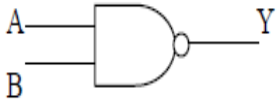
Jain College, Jayanagar
I PUC MOCK PAPER
Subject: Electronics (40)

Max Mark: 70 **Max Time: 3 hrs 15 min**

PART – A

I. Answer ALL questions. Each question carries one mark. 1 x 10 = 10

1. How many electrons supplied to a neutral conductor makes it to be charged to -1C?
2. Write the relation between RMS value and peak value of AC voltage.
3. Write the expression of time constant for an LR series circuit?
4. What type of extrinsic semiconductor will be obtained when Indium impurity is added to Germanium semiconductor?
5. What is the reason for choosing Silicon over Germanium semiconductor?
6. Which region of transistor is moderately doped?
7. Draw the circuit symbol of photo transistor.
8. What is an OR gate?
9. Write the Boolean expression for the output Y of the gate shown.



10. What is capacitive reactance?

PART – B

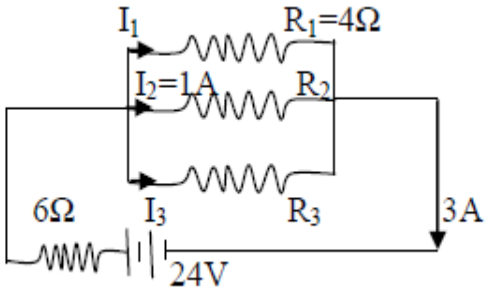
II. Answer any FIVE questions. Each question carries two marks. 2 x 5 = 10

11. Mention the uses Sphygmomanometer and Pulse oximeter.
12. An AC has instantaneous voltage V = 80 sin 200t. Determine amplitude & frequency of AC signal.
13. Draw the circuit diagram of RC high pass filter. Write an expression for its cut off frequency.
14. What are the factors on which width of depletion layer depend?
15. Current gain β of a transistor is 100. Its base current is $20\mu A$. Calculate α and I_E of the transistor.
16. What is an IR Transistor? Draw its circuit symbol.
17. What is the need of $2's$ compliment method of subtraction? Mention any two advantages of digital technology.
18. Convert 317_{10} into equivalent hexadecimal number.

PART – C

III. Answer any FIVE questions. Each question carries three marks. 3 x 5 = 15

19. Explain the role of Electronics in the day to day life.
20. State and explain Kirchhoff's voltage law.
21. Calculate I_3 *and* R_3 in the following circuit.

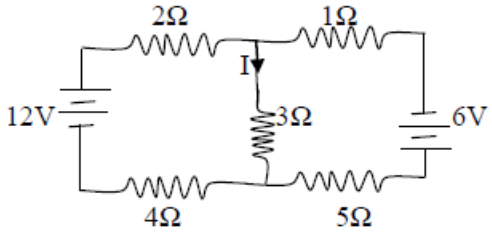


22. What is the principle of parallel plate capacitor? Briefly explain the construction of electrolytic capacitor.
23. Explain the formation of PN-junction and its working under forward biased condition.
24. What is a ripple? With a circuit diagram explain the working of shunt capacitor filter.
25. With a circuit diagram explain the working of series positive clipper.
26. Give applications of data sheet.

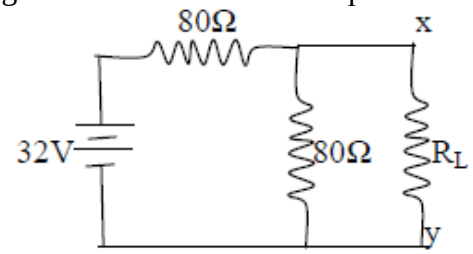
PART – D

IV. Answer any THREE questions. Each question carries five marks. 5 x 3 = 15

27. a) Calculate current through 3Ω resistor using superposition theorem.



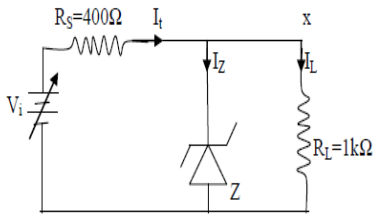
b) Convert the following circuit into Thevenin's equivalent circuit.



28. An AC of 125V is applied to the primary of an ordinary transformer of power efficiency $\eta = 60\%$ so that secondary current is 500mA. If the loss of power in the core and coil of it is 10W, calculate primary current, secondary voltage, output power and input power.

29. The following components are used in the LRC series circuit. R=100Ω, L=1mH & C=1000μF. An AC, v = 200 sin100πt is applied to it. Calculate impedance, power factor and resonant frequency of the LRC circuit

30.



Where Z - Zener diode of $V_Z = 10V$, $P_Z = 2W$, $I_{Z\min}$ for voltage regulation is 5mA.

Calculate $I_{Z\max}, I_L, V_{i\min}, V_{i\max}$ for voltage regulation. Suppose in the above circuit if $V_i = 20V$, what should be the minimum load resistance required for voltage regulation?

31. a) Convert $A1F_{16}$ into equivalent binary number.

b) Subtract 101_2 from 1010_2 using 2's compliment method.

PART – E

V. Answer any FOUR questions. Each question carries five marks. 5 x 4 = 20

32. a) With a circuit diagram derive an expression for effective resistance of parallel combination of resistors.

b) When do we prefer this combination?

33. a) What are active and apparent powers? Give the relation between them.

b) Explain charging and discharging of a capacitor in RC circuit when DC is applied.

34. a) Mention the factors that affect the capacitance of a capacitor.

b) What happens to capacitance when a dielectric medium is introduced between plates of a capacitor?

35. a) What is an active component?

b) With a diagram explain the working of an LDR. Give its applications.

36. What is a rectifier? Draw the circuit diagram of half wave rectifier, explain its working. Draw the input and output wave forms.

37. a) Show that $\overline{A} + AB = A + B$ using Boolean laws. Draw the circuit diagram and output waveform.

b) Draw the circuit diagram and output waveform of monostable multivibrator using IC 555. What is the significance of duty cycle?

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