**II PUC- ELECTRONICS (40)**
**MODEL QUESTION PAPER - 2022**

**Time: 3hour 15 min** **Max. Marks: 70**

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**Instructions:**

1. **The question paper has four parts A , B , C and D.**
2. **Read the instructions given in each part and answer.**

## PART A

**Answer any TEN questions:** **1 x 10 = 10**

1. Is JFET unipolar or bipolar device?
2. What is heat sink?
3. What is an amplifier?
4. What happens to the input impedance of an amplifier when voltage series negative feedback is applied?
5. Mention the unit of slew-rate.
6. What are damped oscillations?
7. Which layer of the ionosphere disappears during night?
8. Define frequency modulation..
9. Sketch the AM wave for when modulation index $m_a = 1$.
10. Expand SCR.
11. Write the output Boolean expression for the two input XNOR gate.
12. Convert the decimal number 29 to BCD.
13. How many interrupt sources are there in 8051 microcontroller?
14. How many keywords are there in C-language?
15. What is meant by cell related to mobile communication system?

## PART B

**Answer any FIVE questions:** **2 x 5 = 10**

16. Define amplification factor in JFET and write its relation with $g_m$ $and$ $r_d$ .
17. Mention any two advantages of voltage divider biasing.
18. Classify the amplifiers based on coupling scheme.
19. Mention the advantages of negative feedback.
20. List any four characteristics of an ideal op-amp.

21. Explain piezoelectric effect.
22. Draw the block diagram of satellite transponder.
23. What is over modulation and why is it not preferred in AM?
24. Write any two application of power electronics?
25. Distinguish between uplink and downlink signals.

## PART C

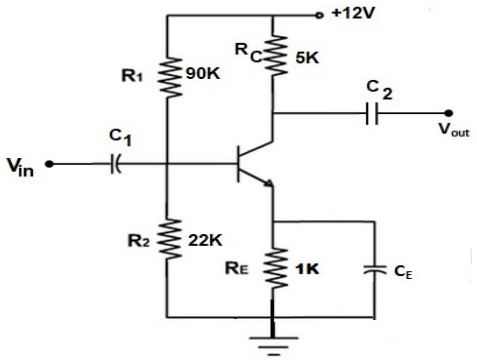
**Answer any FIVE questions:** **3 x 5 = 15**

26. Give any three comparisons between BJT and FET.
27. What is thermal runaway? Name any two leakage current in a transistor.
28. Define (i) Skip distance (iii) Skip zone and (iii) fading
29. What is half-adder? Draw the logic diagram of half adder using only NAND gates.
30. Draw the structure of a typical pn junction power diode and explain its constructional details in brief indicating typical dimensions and doping levels.
31. Determine anode current $I_A$ of SCR when $I_G = 0$. Given $(\alpha_1 + \alpha_2)$=0.98 and $I_{(CO1)} + I_{(CO2)}$ =1mA.
32. What is meant by Addressing mode in 8051? Name any two addressing modes.
33. Write the format of simple C program.
34. Discuss in detail the syntax errors, logical errors and run time errors.
35. What is Internet? Mention the important techniques used for Bluetooth operation.

## PART D

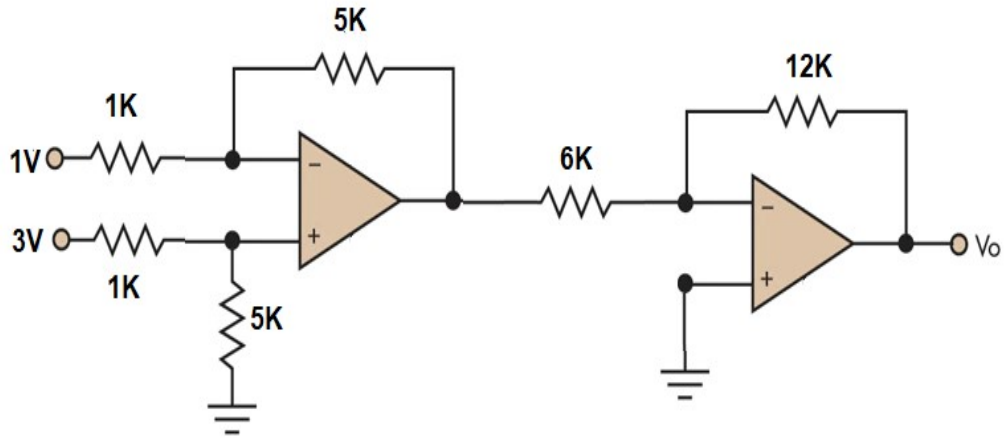
**I. Answer any THREE questions:** **5 x 3 = 15**

36. Calculate the voltage gain, input impedance and output impedance in the circuit given below. Given β=100 and $r'_e = \frac{26mV}{I_E}$




37. The gain of an amplifier is 50 and its output resistance is 2.5KΩ. A negative feedback is applied so that the output impedance reduces to 500Ω. What is the value of β? If the bandwidth before feedback is 200KHz, what is the new bandwidth?

38. Find the output voltage in the op-amp circuit given.




39. A transistor Colpitt's oscillator has L=4mH, $C_1 = 10nF \; and \; C_2 = 10nF$ . Calculate the frequency of oscillations.
40. A 10 kW carrier wave is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal. Calculate the total power and sideband power of the AM wave.
41. Simplify the Boolean expression Y=Σm (1,3,5,7,13,15) + Σd (0,12,14) using K-map. Draw the NAND Gate equivalent circuit to realize the simplified equation.

**II. Answer any FOUR questions: 5 x 4 = 20**

42. (a)Mention the steps involved in drawing the AC equivalent circuit of a transistor CE-amplifier and also draw the AC equivalent circuits.
    (b)What is cross-over distortion? (4+1)
43. With a neat circuit diagram explain the working of two stage RC-coupled amplifier.
44. What is an op-amp comparator? With the help of circuit diagram derive an expression for voltage gain of an op-amp non-inverting amplifier. (1+4)
45. With a neat circuit diagram derive an expression for output voltage of three input op-amp adder.
46. Derive an expression for instantaneous voltage equation of AM wave
47. What is NAND - gate? Realise the basic gates and XOR-gate using only NAND gates. (1+4)
48. With the help of logic diagram and truth table explain the working of clocked SR flip-flop.
49. write a c-program to find the largest of three numbers

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**Blue Print for Model Question Paper**

**II PUC ELECTRONICS (40)**

| Sl. no | Name of the chapter | Knowledge (30%) | | | | Understanding (40%) | | | | Application/ skill (30%) | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 5 | 1 | 2 | 3 | 5 | 1 | 2 | 3 | 5 | |
| 1 | FIELD EFFECT TRANSISTOR (FET) | | 1 | | | 1 | | 1 | | | | | | **06** |
| 2 | TRANSISTOR BIASING | 1 | | | | | 1 | 1 | | | | | | **06** |
| 3 | TRANSISTOR AMPLIFIERS | 1 | | | 1 | | 1 | | 1 | | | | 1 | **18** |
| 4 | FEEDBACK IN AMPLIFIERS | | 1 | | | 1 | | | | | | | 1 | **08** |
| 5 | OPERATIONAL AMPLIFIER | 1 | | | 1 | | 1 | | 1 | | | | 1 | **18** |
| 6 | OSCILLATORS | 1 | 1 | | | | | | | | | | 1 | **08** |
| 7 | WIRELESS COMMUNICATIONS | | | 1 | | 1 | 1 | | | | | | | **06** |
| 8 | MODULATION AND DEMODULATION | 1 | | | | 1 | 1 | | 1 | | | | 1 | **14** |
| 9 | POWER ELECTRONICS AND ITS APPLICATIONS | 1 | | | | | 1 | 1 | | | | 1 | | **09** |
| 10 | DIGITAL ELECTRONICS | 1 | | 1 | 1 | | | | 1 | 1 | | | 1 | **20** |
| 11 | MICROCONTROLLER | | | | | 1 | | 1 | | | | 1 | | **07** |
| 12 | C PROGRAMMING | | | 1 | | 1 | | | | | | | 1 | **09** |
| 13 | MODERN COMMUNICATION SYSTEMS | 1 | | 1 | | | 1 | | | | | | | **06** |

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|---|---|---|---|---|
| **Total** | **41** | **52** | **42** | **135** |