II PUC- ELECTRONICS (40)
MODEL QUESTION PAPER

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

Instructions:

1. **The question paper has four parts A, B, C and D.**
2. **Part - A is compulsory.**
3. **Part - D consists of essay type questions and problems together.**
4. **Circuit diagrams, timing diagrams and truth tables must be drawn wherever necessary.**
5. **Solve the problems with necessary formulas.**

PART A

I. Select the correct answer from the choices given: **15 x 1 = 15**

1. Name a unipolar device.

    a) Diode   b) BJT   c) FET   d) TRIAC

2. For faithful amplification the operating point is chosen at the

    a) Centre of the active region   b) Cut off region

    c) Saturation region   d) Inversion region

3. What is the phase difference between input and output of a transistor CB amplifier?

    a) 0^0 b) 60^0 c) 90^0 d) 180^0

4. What happens to the input impedance of an amplifier when voltage series negative

    feedback is applied?

    a) Remains same   b) Increases

    c) Decreases   d) Oscillates

5. Virtual ground concept relates voltage at the inverting terminal V_A to the voltage at non-inverting terminal V_B by the relation

    a) $V_A > V_B$ b) $V_A - V_B = 0$ c) $V_A < V_B$ d) $V_A - V_B = 1$

6. Mention the output of an integrator if the sine wave is given to its input.

    a) Cosine wave   b) Sine wave

    c) Square wave   d) Triangular wave

7. Mention the high frequency stability oscillator

    a) Crystal oscillator   b) Hartley oscillator

    c) Wein bridge oscillator   d) Colpitts oscillator

8. Which layer of the ionosphere is called Kennelly-Heaviside layer?

   a) D layer   b) E layer   c) F1 layer   d) F2 layer

9. How many sidebands present in AM?

   a) 1   b) 2   c) 3   d) ∞

10. A SCR has

   a) Two junctions and three layers   b) Three junctions and three layers

   c) Three junctions and four layers   d) Four junctions and three layers

11. Gray code is used in shaft position

   a) Multiplexer   b) decoder   c) encoder   d) de-multiplexer

12. Logic expression for the output of XOR gate is

   a) $Y = \overline{A}\,\overline{B}$ b) $Y = \overline{A + B}$ c) $Y = \overline{A}B + A\overline{B}$ d) $Y = \overline{A}\overline{B} + AB$

13. How many timers are present in 8051 microcontroller?

   a) 1   b) 2   c) 3   d) 4

14. Size of an integer in C programming is

   a) 1 byte   b) 2 byte   c) 4 byte   d) 8 byte

15. Shapes of cells in mobile network operation system is

   a) Octagonal   b) Circular   c) Oval   d) Hexagonal

II. Fill in the blanks by choosing appropriate answer from those given in the bracket: **5 x 1 = 5**

    [a) data   b) modulation   c) biasing   d) impedance   e) switching speed]

16. FET has high ……………….

17. Application of suitable voltage across the terminals of a transistor is called ……………

18. CC amplifier is used to match …………

19. Process of changing some characteristics of carrier in accordance with instantaneous value of the signal is called ………

20. Flip-Flops are used to store ………....

PART B

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

21. Mention any two advantages of voltage divider biasing.

22. Write the steps involved in drawing DC equivalent circuit of an amplifier.

23. Calculate gain of a negative feedback amplifier with an internal gain, A = 100 and feedback factor β = 0.1.

24. Determine frequency of Hartley oscillator. Given L_1 = 4 mH, L_2 = 2 mH and C =10 nf

25. Compare forward characteristics of power diode for two different junction temperatures.

26. Write minterm designation table for two input variables.

27. Write any two comparisons between Microprocessor and Microcontroller.

28. Mention any four operators used in C programming.

29. Distinguish between uplink and downlink signals.

PART C

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

30. Obtain the relations between FET parameters.

31. Give any three differences between positive feedback and negative feedback.

32. Draw the circuit diagram of phase shift oscillator. Write the expression for its frequency of oscillations.

33. Determine frequency of tank circuit having L = 1 μH and C = 0.01 μF.

34. Draw the block diagram of basic communication system and explain the function of each block.

35. Explain diode detector circuit.

36. Determine V_{dc} and I_{dc} of SCR HWR. Given firing angle is 90^0 and rms voltage of ac input to the rectifier is 230 V and load is 10 Ω.

37. What is half-adder? Draw the logic diagram of half adder using only NAND gates.

38. What is Internet? Mention the important techniques used for Bluetooth operation.

PART D

**V. Answer any FIVE questions:**   **5 x 5 = 25**

39. With a neat circuit diagram explain the working of two stage RC-coupled amplifier.

40. With the circuit diagram derive an expression for output voltage of three input op-amp adder.

41. Derive an expression for instantaneous voltage equation of AM wave.

42. Prove the universal properties of the NOR gate.

43. Write an assembly language program to add two numbers 1FH and B4H and store the result in R0. Verify the result by binary addition.

44. Write a c-program to accept the three integers and print the largest amongst them.

45. Calculate the voltage gain, input impedance and output impedance in the circuit given below. Given $\beta = 100$ and $r_e' = 26mV/I_E$.
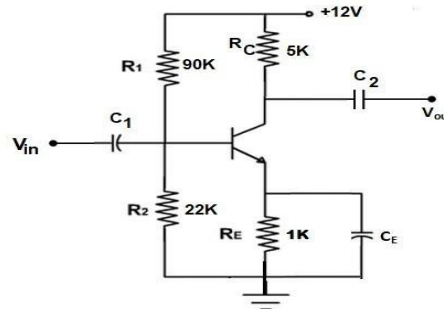
46. Find the output voltage in the op-amp circuit given.
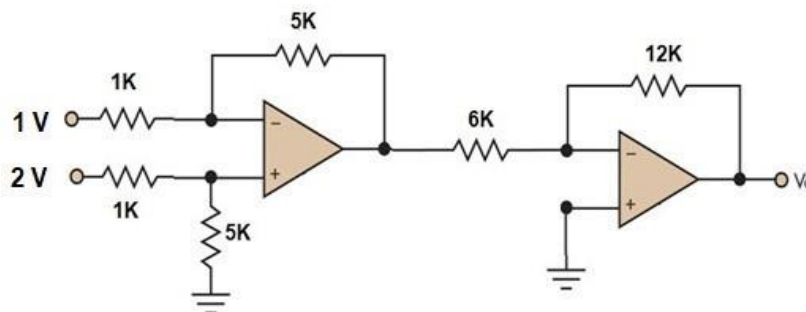
47. A 10 kW carrier wave is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal. Calculate the total power and side band power of the AM wave.

48. Simplify the Boolean expression $Y = \Sigma m$ (1, 3, 5, 7, 13, 15) + Σd (0, 12, 14) using K-map. Draw the NAND Gate equivalent circuit to realize the simplified equation.

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