Government of Karnataka

Karnataka School Examination and Assessment Board (KSEAB)

Model Question Paper – 2

Subject: **II PUC Electronics (40)** **Academic Year: 2024-25**

**[Time: 3 Hours]** **[Total No. of Questions: 45]** **[Max. Marks: 70]**

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**Instructions:**

1. For PART-A questions, only the first written answers will be considered for evaluation.
2. Part – D consists of two sections.

   Section - I is of essay type questions and Section - II is of problems.
3. Circuit diagram and truth tables must be drawn wherever necessary.
4. Solve the problems with necessary formulae.
5. For questions having diagrams, alternate questions are given at the end of the question paper in separate section for visually challenged students.

**PART A**

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

1. Drain characteristics of JFET in Ohmic region is

   a) nonlinear b) linear c) exponential d) constant
2. The most commonly used biasing circuit for the stable operating point is

   a) Fixed bias b) Collector to base feedback bias
   c) Emitter feedback bias d) Voltage divider bias
3. If $A_m$ is the voltage gain of transistor amplifier at mid frequency band, then what will be the voltage gain at cutoff frequencies?

   a) $A_m/2$ b) $A_m/\sqrt{2}$ c) $2A_m$ d) $\sqrt{2}A_m$
4. Negative feedback is used in

   a) Oscillator b) Amplifier c) Digital Circuit d) Power Devices
5. Phase difference between the input and output of op-amp inverting amplifier is

   a) $0^0$ b) $90^0$ c) $180^0$ d) $270^0$
6. What is the output of op-amp integrator circuit if sine wave is given to its input?

   a) Sine wave b) Square wave
   c) Cosine wave d) Triangular wave
7. Condition for sustained oscillations is

   a) $|A\beta| = 0$ b) $|A\beta| = 1$ c) $|A\beta| > 1$ d) $|A\beta| < 1$
8. Ground waves are also called

   a) Surface waves b) Space waves
   c) Sky wave d) Line of sight waves

9. The maximum transmission efficiency in AM wave is

a) 25% b) 33.33% c) 66.66% d) 100%

10. A thyristor is a

a) Controlled device b) Uncontrolled device

c) Passive device d) None of the above

11. Excess-3 code of $(18)_{10}$ is

a) 00011000 b) ) 00011110 c) 10000001 d) 01001011

12. A full adder adds

a) Two input bits b) Three input bits

c) Four input bits d) Two input bytes

13. 8051 microcontroller is a

a) 8 bit controller b) 16 bit controller

c) 32 bit controller d) 64 bit controller

14. What is the meaning of the C operator && (double ampersand)

a) Bitwise AND b) Bitwise OR

c) Logical AND d) Logical OR

15. Expansion of CDMA is

a) Code Division Mobile Access b) Call Division Mobile Access

c) Code Division Multiple Access d) Call Division Multiple Access

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

**[ a) Capacitive b) biasing c) Schmitt trigger d) modulation index e) arithmetic f) high frequency ]**

16. CB amplifier is suitable for ……applications

17. Zero crossing detector is an application of …….

18. …….. feedback is used in Colpitts oscillator.

19. In AM the ratio of amplitude of signal to amplitude of carrier is called ……

20. A half adder is ……..circuit.

**PART B**

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

21. Mention two leakage currents in a transistor.

22. An amplifier has $Z_0$ = 5 kΩ, voltage gain A = 100 and $\beta = 0.02$. Find the output impedance of the feedback amplifier.

23. Determine frequency of the tank circuit. Given L = 10 mH and C = 1 µF.

24. Write the circuit diagram of diode detector.

25. Sketch electric field strength of punch through type power diode.

26. Draw the pin diagram of IC 7402.

27. Mention the memory capacity of internal RAM and ROM of 8051 chip.

28. Draw the block diagram of fiber optic communication system.

## PART C

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

29. Explain the construction of n channel JFET.
30. Derive an expression for voltage gain of negative feedback amplifier.
31. Draw the circuit diagram of Hartley oscillator. Write the expression for the feedback ratio β.
32. Write a short note on ionosphere.
33. Sketch modulating signal, carrier wave and modulated wave of FM.
34. Determine $V_{dc}$ and $I_{dc}$ of SCR HWR. Given firing angle is $60^0$ and rms voltage of ac input to the rectifier is 230 V and load is 10 Ω.
35. Convert Y(A, B, C) = AC+$\overline{B}$ into canonical SOP form.
36. Write any three uses of satellites.

## PART D (Section I)

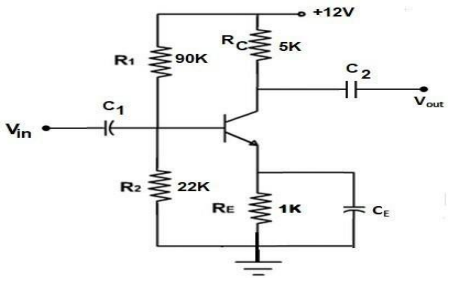
**V. Answer any THREE questions:** **3 x 5 = 15**

37. Explain the working of a CE amplifier.
38. Derive an expression for the output of op-amp subtractor circuit.
39. Explain the working of a clocked RS Flip-Flop using NAND gates. Write its truth table.
40. Write ALP for the multiplication of unsigned numbers 35H and 45H. Store lower byte in R0 and higher byte in R1.
41. Write a C program to accept three integer numbers and print their sum and average.

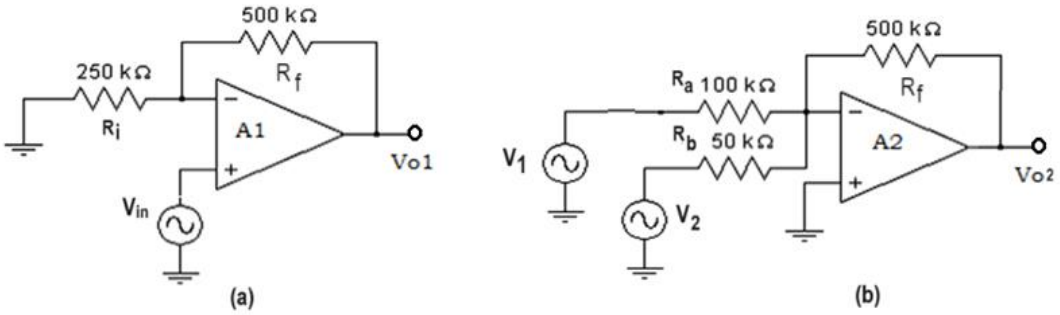
## PART D (Section II)

**VI. Answer any TWO questions:** **2 x 5 = 10**

42. Calculate the voltage gain, input impedance and output impedance in the circuit shown. Given β = 100, $V_{BE}$ = 0.7 V and $r_e'$ =26mV/$I_E$.




43. Calculate the output voltages of Op-amp circuits shown below.
Given $V_{in}$ = 10 mV, $V_1$ = 20 mV and $V_2$ = 30 mV.




(2+3)

44. A sinusoidal carrier voltage $V_C = 80 \sin 2\pi \times 10^5 t$ is amplitude modulated by a sinusoidal voltage $V_m = 32 \sin 2\pi \times 10^3 t$. Write the equation of the AM wave and draw the output frequency spectrum.

45. Simplify the Boolean expression
Y = ∑m (1, 2, 3, 5, 7, 9, 11, 13) + ∑d (0, 10, 15) and then draw the logic diagram for simplified expression using basic gates.

**PART-E**

**(For visually challenged students only)**

42. In a single stage CE transistor amplifier $R_1$ = 90 kΩ, $R_2$ = 22 kΩ, $R_C$ = 5 kΩ, $R_E$ = 1 kΩ, $V_{CC}$ = 12 V, β =100, $V_{BE}$ = 0.7 V and $r_e' = \frac{26mV}{I_E}$.
Calculate the voltage gain, input impedance and output impedance.

43. (a) An op-amp noninverting amplifier circuit is given with $R_i$ = 250 kΩ, $R_f$ = 500 kΩ and $V_{in}$ = 10 mV. Determine the output voltage $V_{01}$. 2

(b) An op-amp inverting adder circuit is given with $R_1$ = 100 kΩ, $R_2$ = 50 kΩ, $R_f$ = 500 kΩ $V_1$ = 20 mV and $V_2$ = 30 mV. Determine the output voltage $V_{02}$. 3