

MODEL QUESTION PAPER – 1

For 2020-21 Only

II PUC ELECTRONICS [40]

Time: 3 Hours 15 minutes

Max Marks: 70

Instructions:

1. The question paper has four parts: A, B, C and D.
2. Part – A is compulsory.
3. Part – D contains two sub parts (I) Numerical problems
(II) Essay type questions.
4. Read the instructions given for each part.

PART-A

Answer ALL questions.

10 × 1 = 10

1. Name the voltage controlled device.
2. In which region of characteristics a transistor behaves as a closed switch?
3. Name the biasing circuit which gives the excellent stabilization.
4. What is faithful amplification?
5. Name the transistor amplifier which gives output 180° phase shift with the input voltage.
6. Mention any one application of comparator.
7. Write the expression for voltage gain of positive feedback amplifier.
8. Mention the speed of radio waves through free space.
9. What is amplitude modulation?
10. What is a bit?

PART-B

Answer any FIVE questions.

5 × 2 = 10

11. Determine value of I_D given $I_{DSS} = 4 \text{ mA}$, $V_{GS} = -2\text{V}$ and $V_P = -5\text{V}$.
12. Write the steps involved in drawing DC equivalent circuit of an amplifier.
13. Draw the block diagram of op-amp.
14. Determine the output voltage of a non-inverting amplifier.
Given $V_{in} = 1.25 \text{ V}$, $R_f = 10 \text{ k}\Omega$ and $R_i = 4.7 \text{ k}\Omega$.
15. Write the circuit symbol and electrical equivalent circuit of a crystal.
16. Define critical frequency and skip distance.
17. Realize XOR gate using basic gates.
18. Mention any two applications of gray codes.

PART-C

Answer any FIVE questions

5 × 3 = 15

19. Define drain resistance (r_d) and trans-conductance (g_m) and amplification factor (μ) in JFET.
20. With the circuit diagram of CE mode arrive suitable expressions to draw DC load line.
21. Discuss about frequency response curve of CE amplifier at different frequencies.

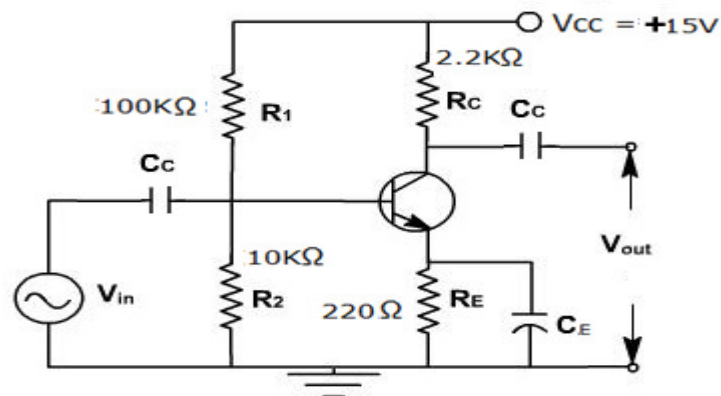
22. Write the block diagrams for different types of transistor coupled amplifiers.
23. An amplifier with $Z_i = 1 \text{ k}\Omega$, has a voltage gain $A = 1000$. If a negative feedback of $B = 0.01$ is applied to it, what shall be the input impedance of the feedback amplifier?
24. Derive an expression for the output of op-amp inverting amplifier.
25. Write a note on D layer, E layer and F layer.
26. Write min term designation table for three input variables.

PART-D

I Answer any THREE questions.

3 × 5 = 15

27. For the CE amplifier circuit using silicon transistor given below, find
 (i) r_e ii) A_v iii) A_p iv) Voltage gain in dB, v) Power gain in dB.
 Given $I_E = 3.41 \text{ mA}$ and $A_i = 100$.



28. Design an op-amp circuit to realize the output, $V_o = 3V_1 - 2V_2 + V_3$. Assume $R_F = 10 \text{ k}\Omega$.
29. Determine the frequency of oscillations of a Hartley oscillator when (a) $L_1 = 2 \text{ mH}$, $L_2 = 4 \text{ mH}$ and $C = 10 \text{ nF}$; (b) $L_1 = 1 \text{ mH}$, $L_2 = 3 \text{ mH}$ and $C = 0.1 \text{ }\mu\text{F}$.
30. A modulating signal $10 \sin(2\pi \times 10^3 t)$ is used to amplitude modulate a carrier signal $20 \sin(2\pi \times 10^6 t)$. Find the (a) modulation index (b) percentage modulation (c) frequencies of the sideband components and their amplitude (d) bandwidth of the modulated signal.
31. Simplify $Y = f(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 8, 9, 10, 12, 13)$ and draw the logic circuit for simplified expression using NAND gates.

II Answer any FOUR questions.

4 × 5 = 20

32. With the circuit diagram explain the working of CC amplifier.
33. Obtain an expression for voltage gain of negative feedback amplifier.
34. Derive an expression for the output of op-amp subtractor.
35. Explain working of Colpitts oscillator.
36. Draw the block diagram of AM transmitter and explain the function of each block.
37. Explain the working of JK Flip-Flop with logic circuit and truth table.

MODEL QUESTION PAPER-2

For 2020-21 only

II PUC– Electronics (40)

Time: 3 Hours 15 Minutes

Max. Marks: 70

Instructions:

1. The question paper has four parts: A, B, C and D
2. Part-A is compulsory.
3. Part-D contains two sub parts (I) Numerical problems
(II) Essay type questions.
4. Read the instruction given for each part.

PART A

Answer all the questions

10 × 1 = 10

1. What is the function of drain?
2. Mention any one leakage current in a transistor.
3. What is a heat sink?
4. What is buffer amplifier?
5. Where operating point does located in class B power amplifier?
6. Define slew rate.
7. Mention the principle used in crystal oscillator.
8. Define noise.
9. Define modulation index for an AM wave.
10. Write the BCD code for $129_{(10)}$

PART B

Answer any FIVE questions

5 × 2 = 10

11. Given $r_d = 2 \text{ k}\Omega$ and $g_m = 10 \text{ mS}$, determine value of μ .
12. What is a cross over distortion? Sketch the graph showing cross- over distortion.
13. Mention any four ideal characteristics of OP-AMP.
14. Determine the output voltage of an inverting amplifier.
Given $V_{in} = 5\sin 100\pi t$, $R_f = 10 \text{ k}\Omega$ and $R_i = 5 \text{ k}\Omega$.
15. Mention the Barkhausen criterion for sustained oscillations.
16. What is a skip zone and critical angle in communication?
17. Realize half adder using only NAND gates.
18. Convert the gray code $1010_{(G)}$ into binary using XOR gates.

PART C

Answer any FIVE questions

5 × 3 = 15

19. Explain how V_{GS} control I_D in N-channel JFET.
20. Derive the equations to determine the co-ordinates of Q-point in the voltage divider bias circuit.
21. Give the comparison between CB, CE and CC amplifier.
22. What is direct coupled amplifier? Draw the circuit diagram and frequency response of direct coupled amplifier.
23. An amplifier has gain of 600 with feedback ratio of 0.05. Calculate the gain with negative feedback.
24. Derive the voltage gain expression of op-amp non inverting amplifier.
25. Draw the block diagram of a communication system and explain the function of each block.

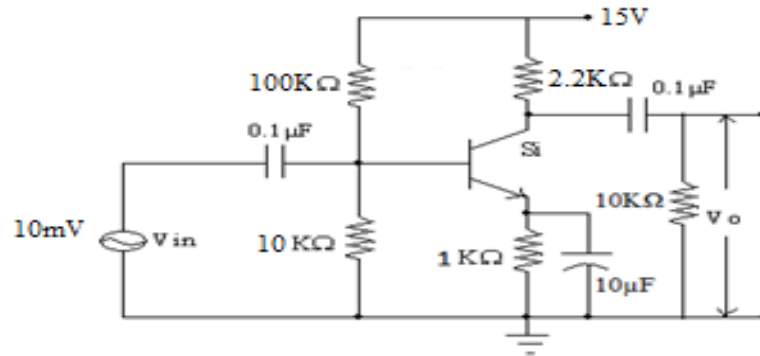
26. Realize NOT, AND and OR gate using NOR gates.

PART D

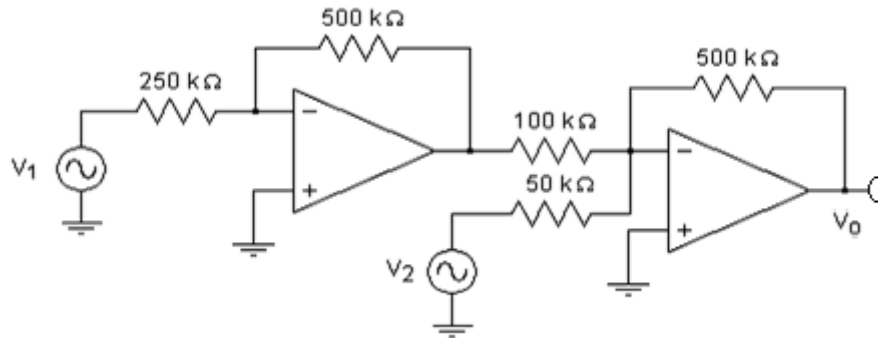
I. Answer any THREE questions

3 × 5 = 15

27. For the circuit shown below using silicon transistor, determine (i) I_E , (ii) r_e' , (iii) $Z_{in(base)}$, (iv) Z_o and (v) A_i .
Given $V_{BE} = 0.7\text{ V}$ and $\beta = 200$.



28. Calculate the output voltage if $V_1 = 200\text{ mV}$ and $V_2 = 500\text{ mV}$.



29. A Colpitts oscillator circuit generates a frequency of 2.4 MHz. The capacitors used in the tank circuit are $C_1 = 0.2\ \mu\text{F}$ and $C_2 = 0.22\ \mu\text{F}$. Calculate the value of inductor.
30. The current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.65 A when the carrier is amplitude modulated. Find the (i) percentage of modulation. (ii) antenna current when depth of modulation is 0.75.
31. Simplify the Boolean function $Y = f(A,B,C, D) = \sum m (1,2,3,8,9,11,13) + \sum d (0,7,10,15)$ using K- map. Draw the logic circuit using NAND gate to realize the simplified expression.

II. Answer any FOUR questions

4 × 5 = 20

32. With a circuit diagram and waveform explain the working of CB amplifier.
33. Derive an expression for input impedance of voltage series negative feedback amplifier.
34. What is an op-amp differentiator? Derive an expression for the output of op-amp differentiator.
35. With circuit diagram explain the working of phase shift oscillator.
36. Derive an expression for instantaneous voltage of A.M wave.
37. Explain the working of R-S Flip Flop with NAND logic circuit and truth table.

DEPT OF PRE UNIVERSITY EDUCATION
II PUC PRACTICAL SYLLABUS IN ELECTRONICS

Practical Electronics–II

For 2020-21 only

Performance Experiments:

Name of the experiment	
1.	CE amplifier – to study the frequency response and determine its bandwidth.
2.	CB amplifier – to study the frequency response and determine its bandwidth.
3.	Characteristics of common source n-channel JFET – determination of its parameters.
4.	Op-amp inverting and non-inverting amplifier.
5.	Op-amp adder and subtractor – for two DC input signals.
6.	First order low-pass filter using op-amp – to study frequency response and determine its cut-off frequency.
7.	First order high-pass filter using op-amp – to study frequency response and determine its cut-off frequency.
8.	Colpitts oscillator using BJT.
9.	Wein bridge oscillator using op-amp.
10.	Phase shift oscillator using op-amp.
11.	Realization of AND, OR, NOT and XOR gates using IC 7400.
12.	Realization of AND, OR, NOT and XNOR gates using IC 7402.
13.	Half adder and half subtractor using IC 7400.
14.	Clocked RS flip flop using IC 7400.
15.	Verification of truth table of JK flip-flop using IC 7476 and conversion of JK FF into T FF.

Note: Any 8 Experiments must be performed among the above experiments.

Marks Distribution in Practical Examination: As usual

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