KSPUCPA PE-2020

# SECOND PUC PREPARATORY EXAMINATION - 2020

**Time : 3 Hrs. 15 Mins.** **ELECTRONICS (40)** **Max Marks : 70**

**No. of Pages : 02** **Total No. of Ques. : 37**

## PART - A

**I Answer all questions :** **10x1=10**

1) Name the terminals of FET.
2) Write the relation between $I_{CEO}$ and $I_{CBO}$.
3) What is the value of output impedance of an ideal op-amp ?
4) Mention any two types of antennas.
5) Find excess-3 code for $(12)_{10}$.
6) Expand PBJT.
7) Which digital code is also called as unit-distance code ?
8) What is cell splitting ?
9) In which header file getch( ) and Clrscr( ) functions are declared ?
10) Define Carrier Swing in FM.

## PART -B

**II Answer any FIVE questions :** **5x2=10**

11) Draw the frequency response of CE amplifier. Write formula for its Bandwidth.
12) Name the type of feedback used in amplifier and an oscillator.
13) An amplifier of gain 600 reduces to 50 after negative feedback. Calculate the feedback fraction.
14) State Barkhausen Criteria for sustained oscillations.
15) What is meant by a punch through p-n power diode.
16) Convert $AB+\overline{B}$ into canonical SOP expression.
17) State the different techniques used for improving capacity in cellular system.
18) Distinguish between uplink and downlink signals.

## PART - C

**III Answer any FIVE questions :** **5x3=15**

19) Write any three comparisons between BJT and FET.
20) Derive an expression for the DC load line for a transistor in CE mode biased with two sources.
21) Explain the different modes of propagation of electromagnetic waves.
22) With the graph, explain output characteristics of power transistor.
23) Sketch V-I characteristics of SCR for different gate currents and indicate their upon holding current, latching current and break over voltage.
24) What is data type ? How many types of data types are there in C.
25) Classify the instruction set of 8051 with respect to their functions.
26) Draw the block diagram of superheterodyne AM radio receiver. Sketch waveforms at different stages.

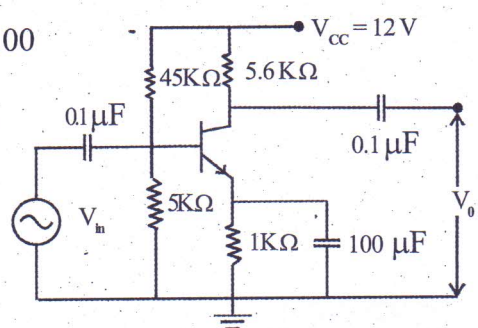
## PART - D

**I Answer any THREE questions :** **3x5=15**

27) The CE amplifier circuit using silicon transistor is given below calculate :

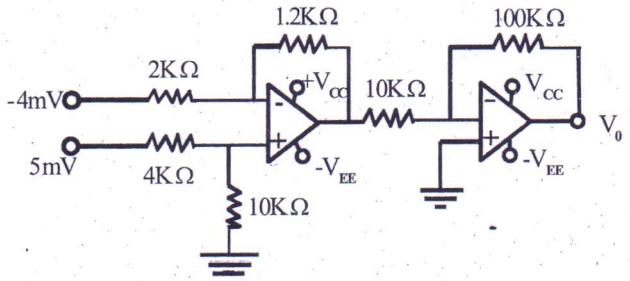
i) Voltage across 5 KΩ ii) $I_E$ iii) $A_v$ iv) $A_i$ v) $A_p$

Given $r_e^1 = \frac{26mV}{IE}$, $\beta = 100$




(P.T.O)

28) Calculate the output voltage for the circuit shown below.




29) a) Determine the frequency of oscillations of Hartley Oscillator for the following values $L_1 = 3mH$, $L_2 = 5mH$ and $C = 10nF$

b) Determine the frequency of oscillations and feedback ratio in a colpitts oscillator circuit containing the tank circuit with $L = 10\,\mu F$, $C_1 = 0.22\,\mu F$ and $C_2 = 0.47\,\mu F$.

30) A FM wave is represented by $V_{FM} = 10 \sin \left[2\pi \times 10^8 t + 5 \sin 2\pi \times 3 \times 10^3 t\right]$

Determine :

a) Carrier frequency

b) Modulating signal frequency

c) Modulation index

d) Frequency deviation.

e) Carrier Swing.

31) Simplify the Boolean expression using K-Map.

$F(A, B, C, D) = \Sigma m\,(4, 5, 7, 9, 11, 12, 13, 15) + \Sigma d\,(1, 3, 8)$ using NAND gate draw the equivalent circuit to realize the simplified expression.

**II Answer any four questions : 4x5=20**

32) With circuit diagram and input output waveforms, explain the working of two stage RC coupled amplifier.

33) What is an op-amp integrator ? Draw the circuit of an Op-amp integrator and derive an expression for its output voltage.

34) What is Amplitude modulation ? Derive an expression for instantaneous voltage of AM wave.

35) Realise NOT, OR, AND and NAND gates using NOR gates.

36) Write a C program to check a given number is even or odd.

37) Write a program to add two 8-bit numbers and store it in R6. The numbers are 01EH and 01 CH.

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