Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad-402401 Affiliated to University of Mumbai	
Class: -S.Y.B.Sc	**Subject: - Physics - II**
Semester:- III	**Course code: -USPH302**
Exam Event:- Additional Exam Summer 2024 (FH)	**Marks: -75**
Date:- 21/03/2024	**Duration:- 2.30 Hours**

Q1. Attempt any Four of the following. **(20)**

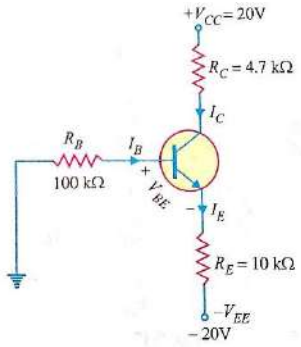
1) Draw the circuit diagram of CE amplifier using fixed bias method.

2) Write note on decibels.

3) An NPN silicon transistor has Vcc 6 V and the collector load Rc = 2.5 KΩ. Find the maximum collector and minimum zero signal collector current.

4) An amplifier has a signal input voltage, V_i of 0.25 V and draws 1 mA from the source. The amplifier delivers 8 V to a load at 10 mA. Determine the current, voltage and power gains.

5) For the emitter bias circuit shown in fig. find Ic and V_{CE} for $\beta = 85$ and V_{BE} = 0.7 V.



6) Explain the frequency response curve and bandwidth of amplifier.

Q 2. Attempt any Four of the following. **(20)**

1) Write a note effect of positive feedback on oscillations.

2) Draw the diagram of Colpitt's Oscillator.

3) In Wein bridge oscillator F = 3KHz, R1=R2=330 KΩ then find capacitance.

4) Draw diagram of Non-Inverting amplifier and write the formula of output voltage.

5) Consider A_V = 40 calculate voltage gain with feedback at k = 0.01, 0.02 and 0.025.

6) Explain the Voltage Follower Circuit along with diagram.

Q 3. Attempt any Four of the following. **(20)**

1) Draw circuit diagram of RS Flip flop using NOR gate.

2) Explain Asynchronous Counter in detail.

3) Explained Clocked RS Flip Flop using circuit diagram and truth table.

4) How many Flip flop are required to construct a mod 128 counter?

5) Show how a number 0100 is inter serially in a serial in serial out shift registor.

6) what is the clock frequency of wave form if the period of wave form C is 24 μS.

Q4. A) Select correct answer. **(Solve any 8 out of 12)** **(08)**

1) The value of stability factor for a base resister bias is_____

a) $R_B(\beta + 1)$ b) $R_C(\beta + 1)$ c) $(\beta + 1)$ d) $(\beta - 1)$

2) _____is called loop gain.

a) $\frac{\beta}{A_v}$ b) $\frac{A_v}{\beta}$ c) βA_v d) none of these

3) What does the term "Decibel gain" measure in amplifiers?

a) Current gain b) Voltage gain c) Power gain d) Frequency response

4) An electronic oscillator is an amplifier with_____feedback

a) Negative b) Positive c) Positive and negative d) none of these

5) An Oscillator circuit must satisfy_____

a) Dune-Hunt law b) Barkhausen criterion c) Newtons law d) none of these

6) An inverting amplifier has $Rf = 1\ M\Omega$ and $R1 = 1\ K\Omega$

a) -1000 b) 1000 c) 0 d) 1

7) Which type of oscillator uses a phase shift network to provide the required phase shift for sustained oscillations?

a) Colpitt's oscillator b) Wien Bridge Oscillator

c) Phase Shift Oscillator d) Crystal Oscillator

8) Which configuration provides a 180-degree phase shift between the input and output signals in an OPAMP?

a) Inverting Amplifier b) Non-Inverting Amplifier

c) Voltage Follower d) Summing Amplifier

9) Minimum _____number of flip-flops are required for MOD-5 counter.

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

10) What is the primary purpose of a register in digital electronics?

a) To perform arithmetic and logic operations b) To store data temporarily

c) To control the flow of data d) To generate clock signals

11) In a J-K Master-Slave Flip-Flop, what happens during the negative edge of the clock signal if both J and K inputs are high?

a) The output toggles b) The output remains unchanged

c) The output is set to 0 d) The output is set to 1

12) In a 3-bit asynchronous counter, how many different states can it represent?

a) 4 b) 8 c) 3 d) 6

Q4. B) Answer in one sentence (Solve any three out of five) (03)

1) What is ideal value of stability factor?

2) Why is negative feedback essential in amplifier circuits?

3) Define inverting amplifier.

4) What is the effect of positive feedback in an oscillator circuit?

5) What is the basic difference between a latch and a flip-flop?

Q4. C) Fill in the Blanks (Solve any four out of six) (04)

1) Base resistor method provide_____stabilisation.

2) Positive feedback is also called as _____feedback.

3) An Op-amp is _____gain d.c. apmilfier.

4) For sustained oscillation phase shift should be_____

5) A _____ counter changes its state on each clock pulse.

6) The Edge-Triggered J-K Flip-Flop changes its output state when both J and K inputs are set to _____.