Roll No : .....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch : **EEE and CSE** **Semester** : **III**

Title of the Course : **Analog Electronics** **Course Code** : **ECB-206**

Time: 3 Hrs **Maximum Marks: 50**

Section A: Answer the 10 multiple choice questions. Each question carries 01 mark. **[10×1=10]**

A1. Ripple factor of half wave rectifier is

a) 1.414 b) 1.21 c) 1.3 d) 0.48

A2. Component that eliminates fluctuations in rectified voltage and produces a relatively smooth DC voltage is

a) rectifier b) Modulator c) Filter d) Amplifier

A3. When transistors are used in digital circuits they usually operate in the:

a) active region b) breakdown region c) saturation and cutoff regions d) linear region

A4. A current ratio of I_C/I_E is usually less than one and is called:

a) beta b) theta c) alpha d) Omega

A5. Power amplifier directly amplifies

a) Voltage of signal b) Current of the signal c) Power of the signal d) All of the mentioned

A6. JFET is a _____carrier device.

a) Unipolar b) Bipolar c) Minority d) Majority

A7. In an oscillator if phase of feedback is same as that of oscillation waveform then feedback is called _____

a) Positive feedback b) Negative feedback c) Cannot be predicted d) Either positive or negative depending upon frequency

A8. Which of these is incorrect for an operational amplifier?

a) It has a high voltage gain b) It is a direct coupled amplifier

c) It is only useful for amplifying AC signals d) It was originally designed to perform mathematical operations

A9. Which of the following configuration is used for impedance matching?

a) Common base configuration b) Common emitter configuration

c) Common collector configuration d) All configurations are equally suited

A10. Which of the following correctly determines the relation between α and β?

a) $\beta=\alpha/(1-\alpha)$ b) $\alpha=\beta/(1-\alpha)$ c) $\beta=\alpha/(1-\beta)$ d) $\beta=\alpha*(1-\beta)$

Section B: Answer any 4 questions. Each question carries 05 mark. **[4×5=20]**

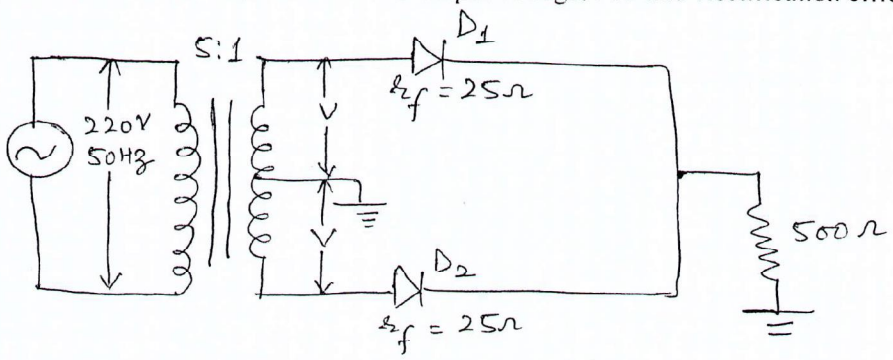
B1. Discuss the classification of power amplifiers and explain the working of Class-A amplifier with suitable circuit diagram and waveform.

B2. Explain how LC tank circuit is used to generate AC oscillations in an electronic oscillator and what is the condition for oscillation?

B3. Explain in detail the concept of Virtual Ground in operational amplifiers (Op-Amp) and discuss any 4 parameters of Op-Amp.

B4. In a transistor Hartley oscillator, if L_1= 0.1mH, L_2= 10 μH and mutual inductance between the two coils M=20 μH, calculate the value of capacitor C_1 of oscillatory circuit to obtain frequency of 4110 KHz.

B5. For the circuit shown below, determine DC output voltage, PIV and Rectification efficiency.



Section C: Answer any 2 questions. Each question carries 10 mark. **[2×10=20]**

C1. Explain the need of h-parameters. Draw the h-parameter equivalent circuit for common emitter configuration and derive input impedance, current gain, voltage gain and output admittance for the same?

C2. Distinguish between FET and BJT. Explain the construction and working principle of FET with the help of suitable diagrams. Also explain Drain characteristics in detail.

C3. Write a short note on any **Two** of the following:

a) Avalanche and Zener Breakdown
b) Clipper and Clamper Circuit
c) Voltage divider biasing circuit