

ITI Examination

ELECTRICIAN-II

Time : Three hours

Maximum : 75 Marks

Question 1 is compulsory

Answer any four from Questions 2 to 8

All questions carry equal marks

1. a) What do you understand by feedback in amplifiers? Explain the terms feedback factor and open loop gain.
b) What are the characteristics of an ideal operational amplifier?
c) In class A power amplifier circuit, 20 V V_{CC} = the load resistance is 12Ω . Find out power, input power and efficiency.
d) Explain lower and upper triggering voltages in a Schmitt trigger.
e) Give the simple Miller Sweep circuit using NPN transistor and explain.
2. a) Draw the circuit of Wien Bridge oscillator and explain the principle of operation.
b) Derive the expression for its frequency of oscillations. What is the condition on β for getting sustained oscillations.
c) State Barkansen Criterion for oscillation.
3. a) Obtain the response of an RC high-pass filter to a step input.
b) Obtain the condition of RC high-pass filter to behave as a good differentiation.
c) Obtain the response of an RC high-pass filter and to a pulse Input for $R_c/t_p \gg 1$ and $R_c/t_p \ll 1$.
4. a) Draw the circuit of class B Power amplifier using BJT and explain its working principle. Derive the expression for its efficiency.
b) What are the advantages of push pull amplifiers?
5. a) Draw the circuit diagram of a single tuned FET Amplifier and explain its operation.
b) What are the advantages of doubled tuned amplifiers over single tuned amplifiers?
6. a) Draw the circuit diagram of an emitter coupled binary and explain its operation. State its advantages over collector coupled binary circuit.

b) Design an astable Multivibrator to produce the square wave at 10KHZ. With 30% duty cycle. Use transistors having $(\beta)_{min}=60$, $V_{BE(sat)}=0.7V$. $V_{BE} \text{ (cut off)}=0V$ and $V_{CE(sat)}=0.2V$. Assume $I_{C(sat)}=1mA$ and $V_{CC}=10V$. Show the circuit diagram with all-----

7. a) Draw the circuit diagram of a linear current time base generator and explain its operation with waveforms.

b) Explain the following with relevant sketches

i) Diode clipper at two independent levels

ii) Diode Clamping circuits

8. a) Explain the concepts of Miller and Bootstrap time base generators with neat circuits.

b) Write short notes on the following

i) Simple current sweep generator

ii) Transistor as a switch

iii) Comparator Circuit.