

**F.Y.B.Sc. ELECTRONIC-SCIENCE (Semester –II)**  
**March- 2020**  
**Question Bank Analog Electronics March - 2020**

**Short Answer (1 mark)**

- 1) Draw the circuit symbols of BJT.
- 2) An arrow on emitter of transistor indicates which current.
- 3) What is doping concentration of emitter region in transistor?
- 4) Why the collector region is made physically larger than emitter region?
- 5) State types of amplifiers based on the operating point.
- 6) What is phase difference between input and output in common CE amplifier?
- 7) State the applications of transistor.
- 8) Give the circuit symbol for n-channel FET.
- 9) List applications of FET.
- 10) State specifications of FET.
- 11) Give circuit symbols of P - channel & n - channel enhancement mode MOSFET.
- 12) State input impedance of JFET and MOSFET.
- 13) Draw the circuit symbol of UJT.
- 14) Draw the equivalent circuit of UJT.
- 15) State application of UJT.
- 16) Draw its circuit symbol of opamp showing all terminals.
- 17) State different blocks of opamp.
- 18) What is ideal value of input and output impedance of opamp?
- 19) Define slew rate of opamp.
- 20) Define CMMR of opamp.

**Short Answer ( 2 marks)**

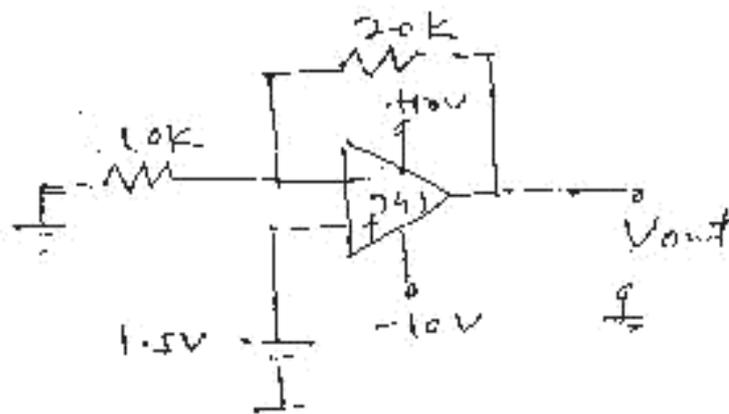
- 1) Draw the circuit symbols for PNP and NPN transistors.
- 2) "BJT is called as current controlled device", comment.
- 3) Sketch the output characteristics of a transistor showing different regions.
- 4) Define  $\alpha$  and  $\beta$  of a transistor.
- 5) In transistor circuit,  $I_c = 10 \text{ mA}$  and  $I_b = 100 \mu\text{A}$ . Find the value of  $\beta$ .
- 6) Define DC load line. Draw it for transistor.
- 7) Define Q point & load line of a transistor.
- 8) Draw circuit diagram of CB configuration of BJT.
- 9) Draw circuit diagram of CE configuration of BJT.
- 10) Draw circuit diagram of transistor as switch.
- 11) A two stage amplifier has  $AV_1 = 100$  and  $AV_2 = 40$ . Find the total gain in dB.

- 12) State the advantages of FET over BJT circuit.
- 13) "FET is called as voltage controlled device", comment.
- 14) Sketch circuit symbol of n-Channel & p-Channel JFET.
- 15) "JFET and MOSFET are unipolar devices", comment.
- 16) Sketch circuit symbols of *n*-channel depletion & enhancement type MOSFET.
- 17) Sketch the output characteristics of a MOSFET showing different regions.
- 18) What is intrinsic standoff ratio for UJT? Give its typical value.
- 19) Draw circuit symbol of opamp showing different terminals.
- 20) What is operational Amplifier?
- 21) List the ideal characteristics of opamp.
- 22) What is op-amp? Draw its circuit symbol showing all terminals.
- 23) Explain in brief any two parameters of opamp.
- 24) State any two applications of OPAMP.
- 25) Define the terms: Input offset voltage and Input bias current of opamp.

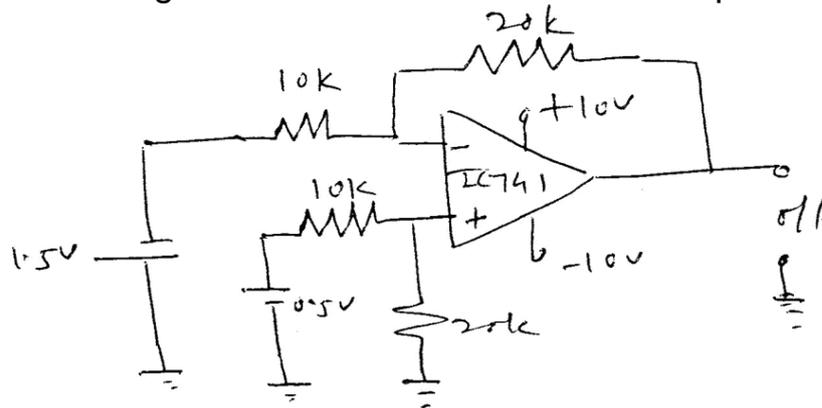
### Long Answer (6Marks)

- 1) What is voltage amplifier? Draw the circuit diagram of voltage amplifier using transistor. Explain its working.
- 2) Explain construction & working of p-n-p transistor.
- 3) Explain construction & working of n-p-n transistor.
- 4) Draw block diagram of an amplifier. What is voltage gain and current gain?
- 5) Compare CB, CC & CE configurations of a transistor
- 6) What is biasing a transistor? Explain the voltage divider bias.
- 7) State different types of transistor biasing. Which of them is widely used? Why?
- 8) Define  $\alpha$  and  $\beta$  of a transistor. Obtain relation between them.
- 9) A transistor has  $\alpha = 0.99$ . Calculate the base current if emitter current is 8mA.
- 10) Define Q point. Give the classification of amplifiers based on the operating point.
- 11) Explain how transistor can be used as switch.
- 12) Draw the frequency response of amplifier. How to find bandwidth from it?
- 13) Explain construction and working of n-channel FET.
- 14) Draw and explain circuit diagram to find I-V characteristics of FET (n-channel).
- 15) Draw the diagram showing construction of JFET. Explain its working.
- 16) Compare BJT, JFET and MOSFET.
- 17) Explain construction & working of n - channel FET.
- 18) What is MOSFET? Give circuit symbols of P - channel & n - channel enhancement & depletion type of MOSFETs.

- 19) Explain the construction and working of enhancement type MOSFET.
- 20) Explain construction and working of depletion type MOSFET.
- 21) What is UJT? Draw its circuit symbol. Explain negative resistance region in its characteristics.
- 22) Draw I.V characteristics of UJT & explain different regions. State application of UJT.
- 23) What is UJT? Explain with the help of an equivalent circuit working of UJT? Draw its I-V characteristics.
- 24) Define intrinsic stand- off ratio of UJT. Find firing voltage of UJT if  $V_{BB} = 10V$  and  $\eta = 0.65$ .
- 25) Write a short note on UJT as relaxation oscillator.
- 26) What is opamp? Draw block diagram of it & explain function of each block.
- 27) What is virtual ground? Using it derive the expression for the inverter using op-amp.
- 28) Draw the circuit diagram of opamp as inverting amplifier. Derive the expression for its output.
- 29) Obtain an expression for gain of inverting opamp.
- 30) Obtain the expression for gain of opamp in non-inverting configuration.
- 31) Find the input resistance of opamp with feedback whose output is  $-12V$  with input of  $120\text{ mV}$ . The feedback resistance is  $10M\Omega$ .
- 32) Draw the circuit diagram for operational amplifier as voltage follower. Derive its o/p expression.
- 33) Explain action of opamp as adder.
- 34) Draw the circuit diagram for subtractor using opamp. Derive its output voltage expression.
- 35) Explain use of opamp as comparator.
- 36) What is comparator? Explain it using opamp.
- 37) Explain the use of opamp as Schmitt trigger.
- 38) What is Schmitt trigger? Draw its circuit diagram using opamp. Explain its working.
- 39) Identify the following circuit and find the o/p voltage of it.



40) Identify the following circuit and obtain the value of o/p voltage for it



**Long Answer (12 marks)**

- 1) What is voltage and current amplifier? Explain transistor amplifier configurations CB,CC and CE.
- 2) What is amplifier? Draw the circuit diagram of single stage CE amplifier and explain it in detail. Give designing steps of it.
- 3) What is FET? Give circuit symbol of p-channel and n-channel FET. State specification parameters and applications of it. Explain I-V characteristics of FET.
- 4) Explain the construction and working of MOSFET. How it is used as depletion and enhancement mode?
- 5) What is MOSFET? Give circuit symbols of P - channel & n - channel enhancement & depletion type of MOSFETs. Explain construction of MOSFET. Draw the output characteristics of a MOSFET showing different regions. State Applications of it.
- 6) Give comparison of BJT, FET and MOSFET in detail.
- 7) What is UJT? Explain with the help of an equivalent circuit working of it. State specifications and application of it.
- 8) What is UJT? Draw its circuit symbol. Explain construction of it. Explain application of UJT as relaxation oscillator.
- 9) What is operational amplifier? Give pin connection of Ic741. List the ideal characteristics of opamp. With circuit diagram explain opamp as summing amplifier.
- 10) What is operational amplifier? Draw the block diagram of it. What is the concept of virtual earth? Explain use of opamp as comparator