Reg. No. :

Question Paper Code: 53B05

B.E./B.Tech. DEGREE EXAMINATION, DEC 2021

Third Semester

Biomedical Engineering

15UBM305- SEMICONDUCTOR DEVICES AND CIRCUITS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The diffused impurities with _____ valence electrons are called   CO1-R
   donor atoms.

   (a) 4   (b) 3   (c) 5   (d) 0

2. If I_B =1 mA, β= 50 for a transistor, I_E is _____   CO1-App

   (a) 51 mA   (b) 50 mA   (c) 101 mA   (d) 49 mA

3. Which of the following equipment can check the condition of a   CO2-U
   transistor?

   (a) Current tracer   (b) Digital display meter (DDM)

   (c) Ohmmeter (VOM)   (d) All of the above

4. g_m of MOSFET is controlled by _____   CO2- R

   (a) Drain-source voltage   (b) Gate-source voltage   (c) Drain current   (d) Gate current

5. The approximate current gain of CE transistor amplifier is _____.   CO3- R

   (a) h_{ie} (b) - h_{ie} (c) - h_{fe} (d) h_{fe}

6. The main feature of a large-signal amplifier is the circuit's _____   CO3- U

   (a) power efficiency   (b) maximum power limitations

   (c) impedance matching to the output device   (d) All of the above

7. Oscillator is similar to _____   CO4- R

   (a) Rectifier   (b) Amplifier   (c) D.C source   (d) A.C source

8. Which of the following improvements is (are) a result of the negative feedback in a circuit?　　　　　　　　　　　　　　　CO4- R

(a) Lower output impedance　　　　　　(b) Reduced noise

(c) More linear operation　　　　　　　(d) All of the above

9. Bistable multivibrator is _____ in any state.　　　　　　CO5- R

(a) Stable　　　　(b) Unstable　　　　(c) Saturated　　　　(d) Independent

10. Which of the following equipment can check the condition of a transistor?　　　　　　　　　　　　　　　　　　　CO5- U

(a) Current tracer　　　　　　　　(b) Digital display meter (DDM)

(c) Ohmmeter (VOM)　　　　　　　(d) All of the above

PART – B (5 x 3= 15Marks) (5 Out of 7)

11. Define drift current?　　　　　　　　　　　　　　　　　CO1- R

12. BJT as a current controlled device – Justify　　　　　　　　CO1- E

13. Why do we choose q point at the center of the load line?　　　CO2- E

14. Compare the operations of Class A and Class B amplifiers.　　CO3- Ana

15. Point out the advantages of negative feedback.　　　　　　　CO4- Ana

16. State and explain Barkhausen criterion for oscillation.　　　　CO4- U

17. What is meant by hysteresis voltage in a Schmitt trigger?　　　CO5- Ana

PART – C (5 x 15= 75 Marks)

18. (a) Illustrate the operation of a zener diode and discuss its V-I characteristics. Also discuss zener diode as a voltage regulator　　CO1- U　　(15)

Or

(b) Compare the operation of voltage divider bias circuits, base bias circuits and Emitter bias circuits.　　CO1- Ana　　(15)

19. (a) With neat diagram explain the operation of MOSFET in Enhancement mode and derive its current equations　　CO2-U　　(15)

Or

(b) Explain the working and characteristics of SCR and its applications　　CO2-U　　(15)

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20. (a) Determine the h-parameters from transistor characteristics. CO3- App (15)

Or

(b) Find the input impedance, output impedance, voltage and current CO3- Ana (15)
gain for CE amplifier

21. (a) Explain the concept of negative feedback in amplifier. Derive the CO4-U (15)
expressions for voltage gain, input impedance and output
impedance

Or

(b) Draw the circuit of Hartley oscillator and explain its working. CO4-U (15)
Also derive the expressions for frequency of oscillation for
starting of oscillation.

22. (a) Write the operation of collector coupled monostable multivitrator CO5-U (15)
with neat circuit diagram and draw the various waveforms.

Or

(b) Illustrate the construction, equivalent circuit and operation of UJT CO5-U (15)
and also explain the characteristics of UJT.

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