

Reg. No. :

**Question Paper Code : 20463**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Third Semester

Computer and Communication Engineering

EC 8353 — ELECTRON DEVICES AND CIRCUITS

(Common to : Biomedical Engineering/Electrical and Electronics Engineering /  
Electronics and Instrumentation Engineering/Instrumentation and Control  
Engineering/Robotics and Automation)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A source of a.c voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500  $\Omega$ . If the forward resistance of the diode is 10  $\Omega$ , find the peak current through the diode.
2. Draw the circuit of a half wave rectifier using PN junction diode.
3. State four advantages of JFET over BJT.
4. Write any two application for Thyristor and IGBT.
5. What is meant by small signal model of a transistor?
6. Give an application each for CB and CC amplifiers.
7. A tuned amplifier has maximum voltage gain at a frequency of 2 MHz and the bandwidth of 50 KHz. Find the Q factor.
8. What is the difference between a power amplifier and a voltage amplifier?
9. The overall gain of a multi storage amplifier is 140. When negative voltage feedback is applied, the gain is reduced 17.5. Find the fraction of the output that is fed back to the input.
10. A phase shift oscillator uses 5 PF capacitors. find the value of R to produce a frequency of 800 KHz.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the working of a full wave rectifier circuit. (9)  
 (ii) Find the voltage  $V_A$  in the following circuit : (4)

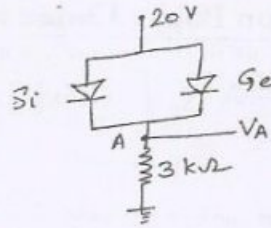


Fig (i)

Or

- (b) (i) Explain the working of a voltage regulator using zener diode. (10)  
 (ii) What is the current through the LED in the following circuit? Assume that voltage drop across the LED is 2V. (3)

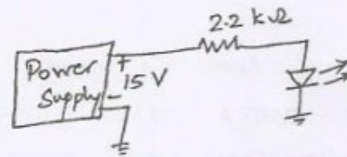


Fig (ii)

12. (a) Explain the working of an UJT. (13)

Or

- (b) Describe the working of a MOSFET with neat diagram. (13)

13. (a) Explain and analyse the working of a CE amplifier. (13)

Or

- (b) Explain and make a high frequency analysis of a source follower using MOSFET. (13)

14. (a) With neat diagram, elaborate the working of single tuned amplifier. (13)

Or

- (b) Briefly explain the working of different amplifier. (13)

15. (a) Discuss the effects of negative voltage feedback and negative current feedback on the performance of amplifiers.  
Or  
(b) Explain the working of a wein bridge oscillator. State its advantages and disadvantages.

PART C — (1 × 15 = 15 marks)

16. (a) (i) A 1 PF capacitor is available. Choose the inductor values in a hartley oscillator so that  $f = 1$  MHz and feedback fraction  $m_v = 0.2$ . (5)
- (ii) The following figure shows that a silicon transistor with  $\beta = 100$  is biased by base resistor method. Draw the d.c. load line and determine the operating point. What is the stability factor operating point? (10)

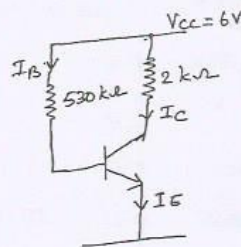


Fig (iii)  
Or

- (b) (i) The following is a UJT circuit. The parameters of UJT are  $\eta = 0.06$  and  $R_{BB} = 7k\Omega$ , Find  $R_{B1}$ ,  $R_{B2}$ ,  $V_{B1B2}$  and  $V_p$ .

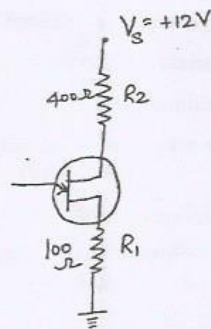


Fig (iv)

- (ii) In a JFET amplifier, the source resistance  $R_s$  is unbypassed. Find the voltage gain of the amplifier. given  $g_m = 4 \text{ms}$ ;  $R_D = 1.5 \Omega$  and  $R_s = 560 \Omega$ . (4)
- (iii) An amplifier is required with a voltage gain of 100 which does not vary by more than 1%. It is to use negative feedback with a basic amplifier, the voltage gain of which can vary by 20%, find the minimum voltage gain required and the feedback factor. (3)