D.C.

B 2261

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Information Technology

IF 141 — ELECTRONIC DEVICES AND CIRCUITS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. In the following circuit (figure - 1), find the value of I.

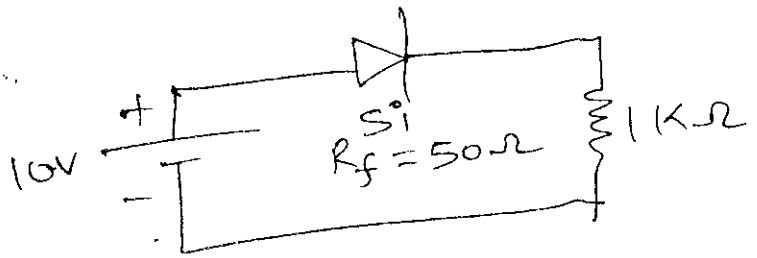

Fig - 1

R_f ⟶ forward resistance of diode.

2. Name the different methods by which a conducting SCR can be turned off.

3. How the θ-point is determined graphically in a CE amplifier with fixed bias?

4. Differentiate class A and class B amplifiers.

5. What are the effects of introducing negative feedback in an amplifier?

6. In a Colpitts oscillator, the value of C_1, C_2 and L in the tank circuit is 0.1 μf, 0.01 μf and 50 mH respectively. Find the frequency of oscillation.

7. Draw the diagram of an astable multivibrator constructed using transistors.

8. Write the expression for frequency of output square wave in astable multivibrator constructed using IC 555.

9. Define the terms input off set current and CMRR in an op-amp.

10. What is an active filter? Mention any two of its advantage.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the construction, working principle and characteristics of *n*-channel JFET. (16)

Or

(b) (i) Explain the Forward and reverse characteristics of P-N junction diode. (10)

(ii) Explain the output characteristics of BJT in CE configuration and mark the various regions of operation in it. (6)

12. (a) (i) Find the value of I_{BQ}, I_{CQ} and V_{CEQ} in the following circuit (Figure - 12 a). (8)

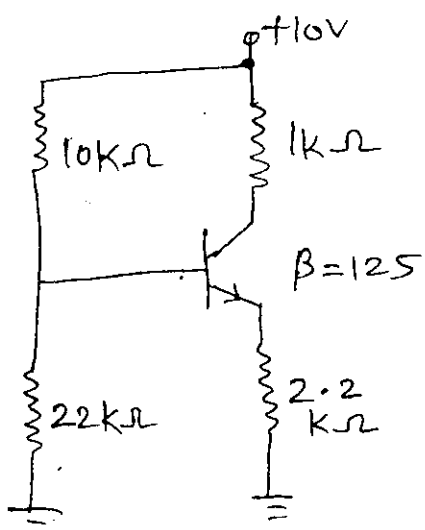

Figure - 12 a

(ii) Derive the expression for current gain and voltage gain in a CE amplifier having voltage divider, bias. Assume hre = hoe Ω O and the load resistance if Rc alone. (8)

Or

(b) Explain the working principle of class A transformer coupled amplifier and derive the expression for conversion efficiency in it. Also find its maximum conversion efficiency. (16)

13. (a) (i) Derive the expression for input impedance, output impedance and voltage gain with negative feedback in a voltage - series feedback amplifier. (9)

(ii) Explain the basic principle employed in sinusoidal oscillators and the condition for sustained oscillation. (7)

Or

(b) With neat diagram, explain the constructions and working principle of Hartley oscillator. Also indicate the condition for sustained oscillation in it. (16)

14. (a) Explain the construction and working principle of monostable multivibrator constructed using transistors with necessary waveforms. (16)

Or

(b) Draw the functional block diagram of 555 timer and explain the function of various pins in it. (16)

15. (a) Draw the circuit of voltage to current convertor and integrator using op-amp and explain their operation by deriving necessary equations. (8 + 8)

Or

(b) (i) Draw the circuit of inverting amplifier using op- amp and derive the expression for gain in it. (8)

(ii) With neat circuit explain the frequency response characteristics of first order high pass active filter. (8)
