

## DAFFODIL INSTITUTE OF INFORMATION TECHNOLOGY (DIIT)

BSc. (Hons) in CSE 1<sup>st</sup> Year 1<sup>st</sup> Semester 20<sup>th</sup> Batch

Electrical and Electronic Circuit

Course Code: CSE-510203

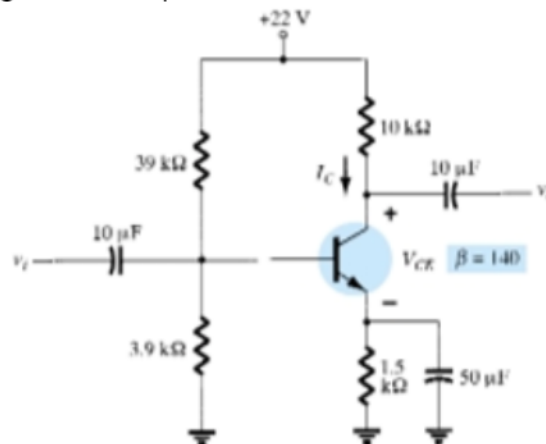
Internal final Examination, 2021

Time – 2 hour &amp; 30 minutes

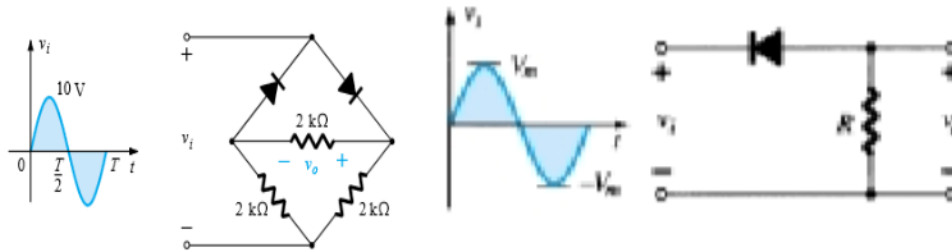
Full marks – 80

[N.B. – the figures in the right margin indicate the full marks. Answer any **four** questions of the following segment.]

1. (a). What is load line and operating point (Q)? Draw the output characteristics of a transistor in CE configuration and describe its regions? 6
- (b). Determine the dc bias voltage  $V_{CE}$  and the current  $I_C$  for the voltage-divider configuration of Fig. find also Q point 7

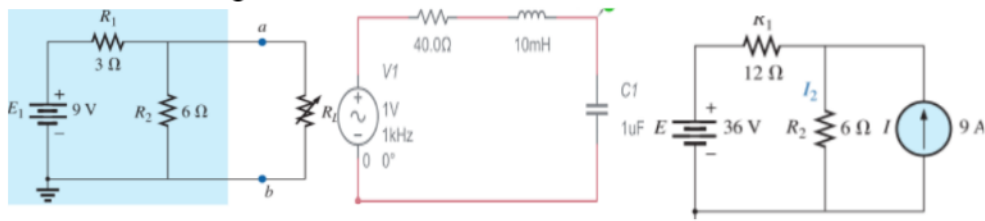


- (c). Calculate the output voltage of an op-amp summing amplifier for the following sets of voltages and resistors. Use  $R_f = 1\text{ M}$  in all cases.  $V_1 = 1\text{ V}$ ,  $V_2 = 2\text{ V}$ ,  $V_3 = 3\text{ V}$ ,  $R_1 = 500\text{ k}$ ,  $R_2 = 1\text{ M}$ ,  $R_3 = 1\text{ M}$  3
- (d). Calculate the output voltage of a non-inverting amplifier for values of  $V_1 = 2\text{ V}$ ,  $R_f = 500\text{ k}$ , and  $R_1 = 100\text{ k}$  4
2. (a). What is FET? Draw and explain JFET characteristics curve with external bias and explain different region? 5
- (b). Determine the output waveform for the network and calculate the output dc level(a) 6

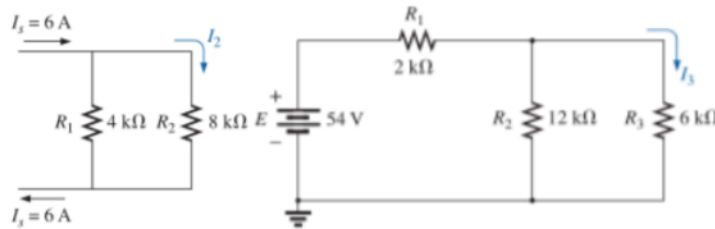


- (c). A crystal diode having internal resistance  $r_f = 20\ \Omega$  is used for half-wave rectification. If the applied voltage  $v = 50 \sin \omega t$  and load resistance  $R_L = 800\ \Omega$ , find : (i)  $I_m$ ,  $I_{dc}$ ,  $I_{rms}$  (ii) a.c. power input and d.c. power output (iii) d.c. output voltage (iv) efficiency of rectification. 5
  - (d). Define feedback? Explain about negative feedback? 4
3.
  - (a). Sketch the FET self-bias and fixed bias circuit and voltage divider circuit? 5
  - (d). Draw different biasing ckt of BJT using their equation? 6
  - (c). Explain clipper and clamper ckt with an example? 5
  - (d). Explain the formation of p-n junction and formation of depletion layer in p-n junction? 4
4.
  - (a). What is diode? Draw the equivalent ckt of a diode and V-I characteristics of a diode? 4
  - (b). Define following terms:- (a). Drift Velocity (b). Diffusion Current 2
  - (c). Define Rectifier? With necessary diagram explain the working principle of full wave rectifier? 5
  - (d). Draw the symbol of Zener diode? Zener diode can act as a voltage stabilizer" – Justify the statement. 4
  - (e). Draw symbol: - Diode, LED, Photo diode? Classify the transistor with symbol? 5
5.
  - (a). Explain the construction of npn transistor? Justify the statement"BJT used as an amplifier" 3+  
3
  - (b). State and explain norton's theorem with proper circuit diagram? 4
  - (c). State and explain Superposition theorem with proper circuit diagram? 4
  - (d). Define amplification factor  $\alpha$  and  $\beta$ ? 2
  - (e). Explain the average value and r.m.s value? Show that the rms value of a current 70.7% of its maximum value? 4

6. (a). Find  $R_{th}$ ,  $V_{th}$ ,  $I_L$  (If  $R_L = 2K$ ) and draw thevenin equivalent ckt Fig. 01? find  $X_L$ ,  $X_C$ ,  $X$ ,  $Z$ ,  $I_T$  Fig. 02, Using the superposition theorem, determine the current through resistor  $R_2$  for the network in Fig. 03.



- (b). State and explain with diagram Kirchhoff's Voltage Law (KVL) & Current Divider Rule (CDR)?
- (c). Determine current  $I_2$ ,  $I_1$  for the network in Fig. 1 using the current divider rule Find current  $R_7$ ,  $I_3$ ,  $I_2$ ,  $I_1$  for the series-parallel network in fig2



- (d). Explain RLC Series Circuit with Phasor Diagram and calculate impedance of the circuit?

#### bonus questions

In the network shown in Fig.01, find the value of  $R_L$  such that maximum possible power will be transferred to  $R_L$ . Find also the value of the maximum power and the power supplied by source under these conditions

