

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: BMT 1043
COURSE	: ELECTRONICS (FLEXIBLE)
SEMESTER/SESSION	: 2-2023/2024
DURATION	: 3 HOURS

**Instructions:**

1. This booklet contains 4 questions. Answer **ALL** questions.
2. This Final Exam is an **OPEN BOOK**.
3. All answers should be written in answer booklet.
4. Write legibly and draw sketches wherever required.
5. If in doubt, raise your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE**

## QUESTION 1

a) A 100 V peak sine wave is applied to the primary winding in Figure 1.

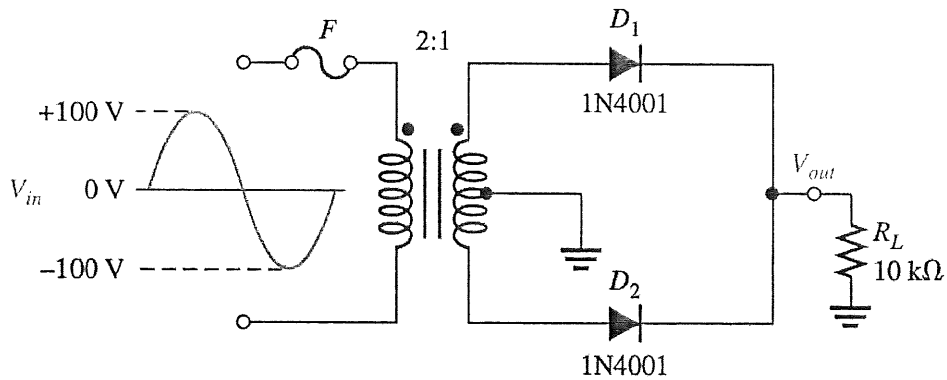


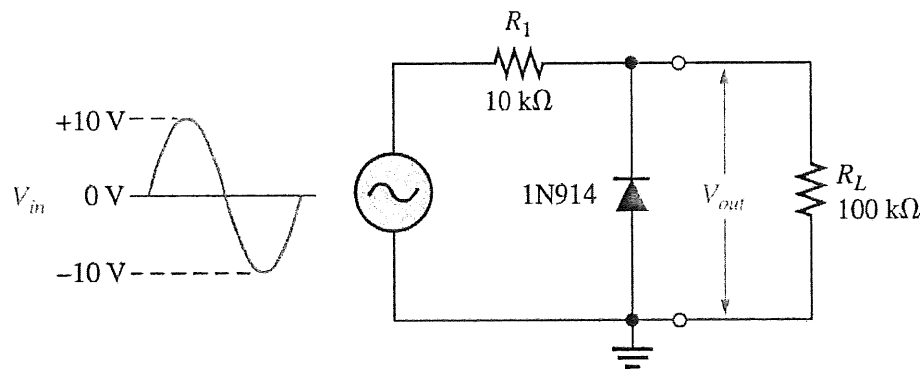
Figure 1

- i. Calculate the voltage waveforms across each half of the secondary winding and across  $R_L$ . (4 marks)
- ii. Draw the voltage waveforms across each half of the secondary winding and across  $R_L$ . (3 marks)

**QUESTION 2**

a) Refer to diode application circuit in Figure 2.

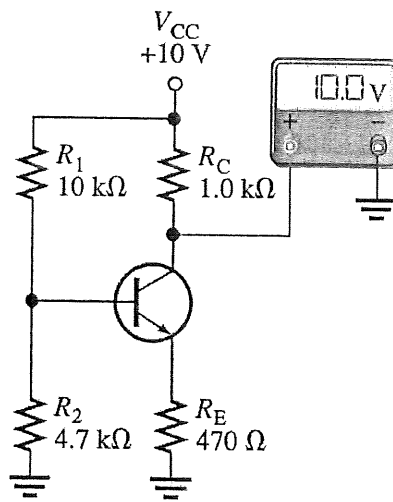
- i. Calculate the output voltage,  $V_{out}$  across the load resistor,  $R_L$  for the complete input cycle. (5 marks)
- ii. Draw the output voltage waveform in (i) (3 marks)



**Figure 2**

**QUESTION 3**

- a) Given the faulty BJT circuit shown in Figure 3, where the measured collector voltage ( $V_C$ ) reading with respect to ground is equal to  $V_{CC}$  (10V), describe each possible fault for the base voltage and the emitter voltage with respect to ground in Table 1. (15 marks)



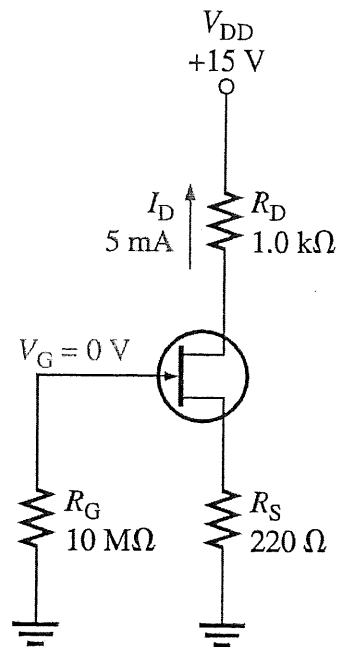
**Figure 3**

**Table 1**

Fault	$V_C$ (V)	$V_E$ (V)	$V_B$ (V)
1	10	0	0
2	10	2.50	3.20
3	10	0	3.20
4	10	0	3.20
5	10	0.41	1.11

**QUESTION 4**

- a) For the particular JFET in Figure 4, the parameter values such as  $g_m$ ,  $V_{GS(off)}$ , and  $I_{DSS}$  are such that a drain current ( $I_D$ ) of approximately 5 mA is produced.
- Calculate voltage drain to source,  $V_{DS}$  (5 marks)
  - Calculate voltage gate to source,  $V_{GS}$  (2 marks)

**Figure 4**

- iii. Determine the value of  $R_S$  required to self-bias an n-channel JFET that has the transfer characteristic curve shown in Figure 5 at  $V_{GS} = -5$  V.

(3 marks)

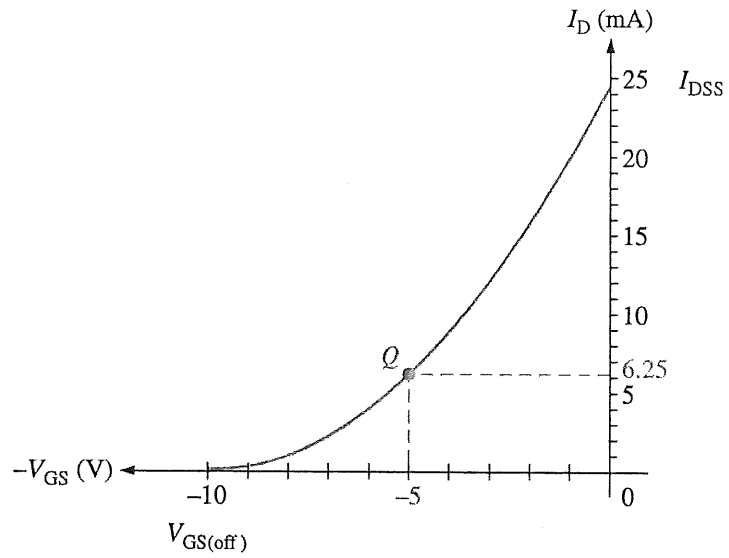


Figure 5

-----End of question-----