UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013

COURSE NAME	:	ELECTRONICS 1
COURSE CODE	:	BWC 10703
PROGRAMME	:	1 BWC
EXAMINATION DATE	:	JUNE 2013
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Find the total impedance, *Z* for the circuit in **Figure Q1 (a)**.

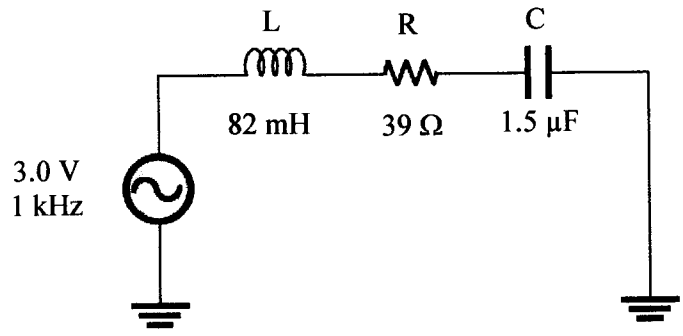

Figure Q1 (a)

(7 marks)

(b) A three branches parallel circuit supply by 12V DC consists of resistance, R = 1500 Ω, capasitive reactance, X_C = 1000 Ω and inductive reactance, X_L = 500 Ω as in **Figure Q1 (b)**. Determine:

(i) The current in each branch (I_R, I_C, I_L).
(ii) Total current in the circuit, I_T
(iii) The phase angle, ∅
(iv) Explain either the circuit is capasitive of inductive.

(13 marks)

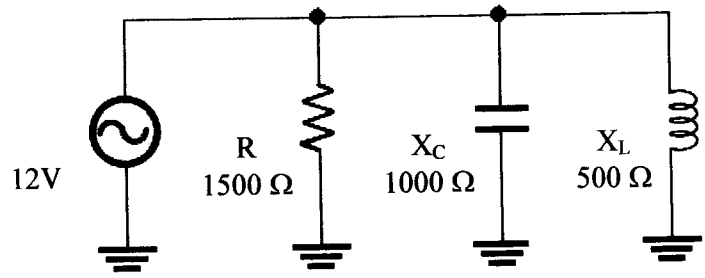

Figure Q1 (b)

Q2 (a) Name of the diode symbols in **Figure Q2 (a)**.

(i)

(ii)

(iii)

(iv)

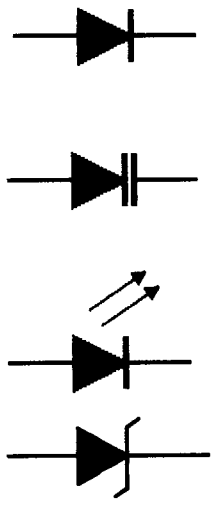

Figure Q2 (a)

(4 marks)

(b) Determine the peak output voltage (V_P) and average value of the output voltage (V_{avg}) of the rectifier in **Figure Q2 (b).**

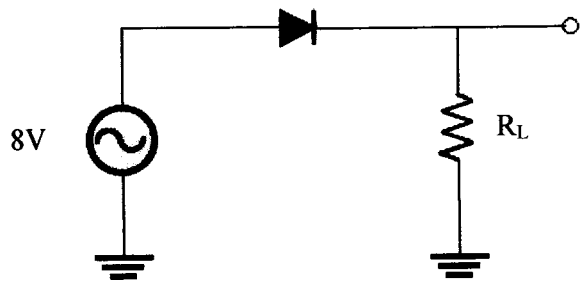

Figure Q2 (b)

(4 marks)

(c) A half wave rectifier has a load resistance of 3.5 KΩ. If the diode and secondary of the transformer have a total resistance of 800 KΩ and the AC input voltage has 240 V (peak voltage), determine;

(i) Peak, RMS and average values of current through load.
(ii) DC power output.
(iii) AC power input.
(iv) Rectification efficiency.

(12 marks)

Q3 **Figure Q3** shows a voltage divider circuit consisting of an *npn* transistor, a supply voltage and a few resistors. Given the values of V_{CC} = 15V, R_{B1} = 100 kΩ, R_{B2} = 50 kΩ, R_C = 5kΩ and R_E = 3 kΩ. Assume β = 100.

(a) Draw the Thevenin's equivalent circuit and hence calculate the values of V_{TH} and R_{TH}.

(6 marks)

(b) Calculate the voltages of al nodes and the currents through all branches.

(9 marks)

(c) Sketch the DC load line and estimate the position of the Q-point.

(5 marks)

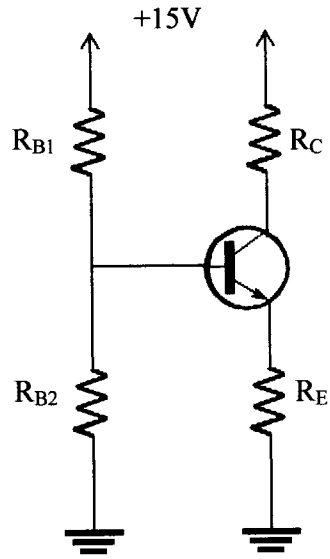

Figure Q3

Q4 A common emitter amplifier is shown in **Figure Q4** with the transistor having $\beta_{DC} = \beta_{AC}$ = 100. Given the values of resistances and capacitances as in the Figure Q5 and with input AC voltage, V_{in} = 10 mV rms.

(a) Determine the output signal voltage for the amplifier and draw the output waveform.

(6 marks)

(b) Find the DC collector voltage on which the output signal voltage is riding.

(4 marks)

(c) Determine the voltage gain, current gain and power gain for the amplifier. Express the answer of voltage and power gains in decibels.

(10 marks)

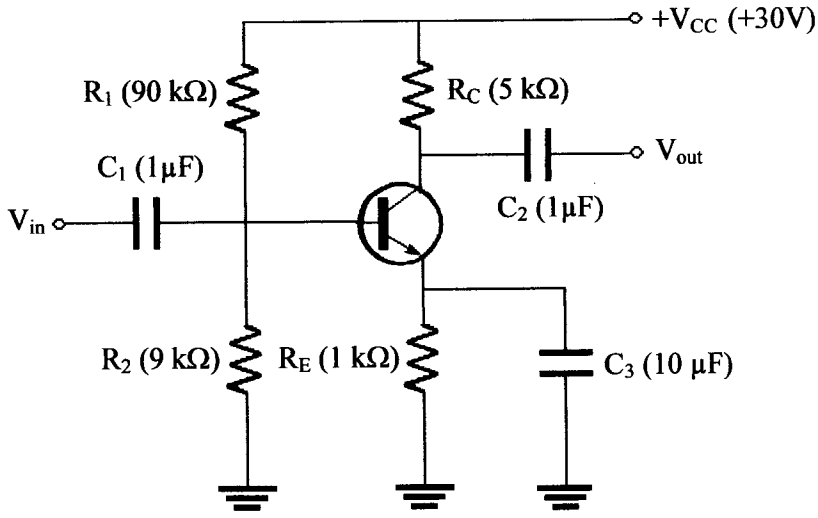

Figure Q4

Q5 (a) A bipolar junction transistor (BJT) has a base current, I_B of 250 μA and emitter current, I_E of 15 mA. Determine:

(i) Collector current, I_C
(ii) Current gain, β of the transistor.

(5 marks)

(b) (i) Draw the symbol of N-channel junction field effect transistor (JFET).
(ii) Plot IV characteristic for JFET and marks the linear region, saturation region and breakdown region.

(9 marks)

(c) Suggest the modification needed for the given Op-Amp circuit in **Figure Q5 (c)** to make it as:

(i) inverting.
(ii) non inverting.

(6 marks)

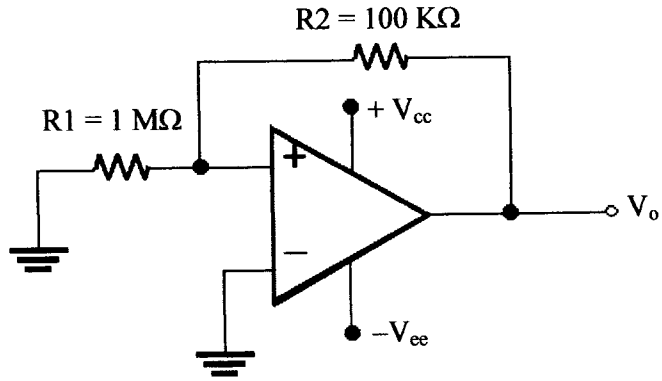

Figure Q5 (c)

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