UNIVERSITI KUALA LUMPUR

Malaysian Institute Of Information Technology

FINAL EXAMINATION

JANUARY 2016 SEMESTER

SUBJECT CODE	:	IBB11403
SUBJECT TITLE	:	INTRODUCTION TO ELECTRONICS
LEVEL	:	BACHELOR
TIME / DURATION	:	2.00 pm – 4.00 pm (2 HOURS)
DATE	:	25 MAY 2016

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consists of ONE (1) Section A.
4. Answer any Four (4) questions in Section A.
5. Please write your answers on the answer booklet provided.
6. Required formula is appended.
7. Answer all questions in English.

THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE AND APPENDIX.

INSTRUCTION: Answer any Four (4) questions.

Please use the answer booklet provided.

Question 1

(a) Define the greatest current of the Bipolar junction transistors (BJT)?

(3 marks)

(b) Define the conditions of ***cutoff*** and ***saturation*** for BJT

(5 marks)

(c) Differentiate the main difference between BJT and FET?

(5 marks)

(d) Determine the α_{DC} if I_C=5.35mA and I_B=50μA?

(4 marks)

(e) Describe the relationship of V_{GS} that controls I_D for JFET as shown in Figure 1.

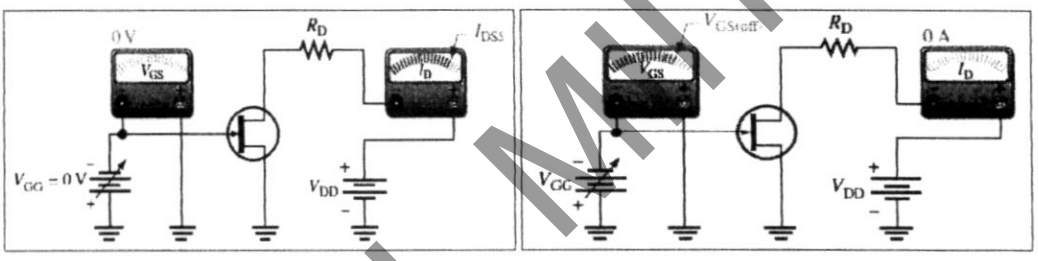

Figure 1

(8 marks)

Question 2

(a) Find I_B, I_C, α_{DC}, V_{CE}, and V_{CB} as shown in Figure 2.

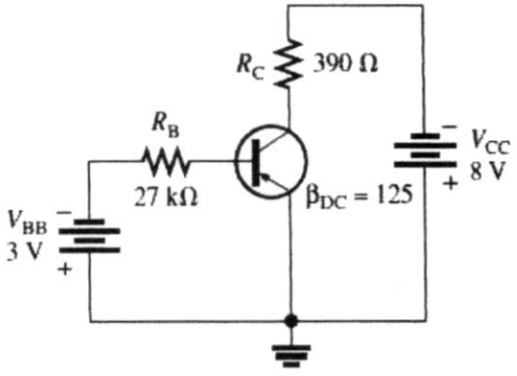

Figure 2

(15 marks)

(b) Determine I_B, I_E,I_C and V_E in Figure 3. $\alpha_{DC} = 0.98$.

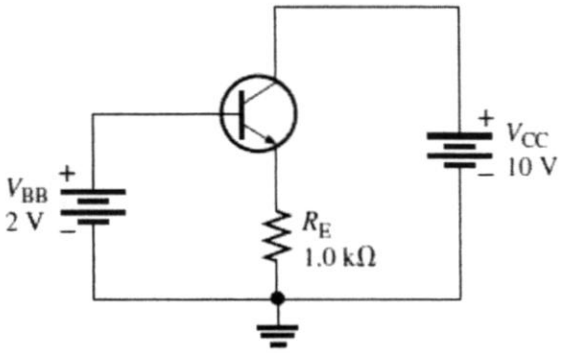

Figure 3

(10 marks)

Question 3

(a) For dc operating (bias) point of an amplifier, indicate the effect of a signal that swings outside the active area?

(2 marks)

(b) State the condition when $V_{CE} = V_{CC}$.

(3 marks)

(c) Assume that you wish to bias the transistor in Figure 4 with $I_B = 20\mu A$.

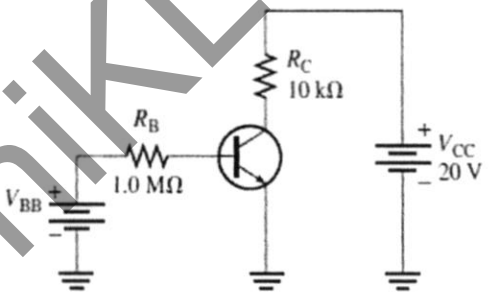

Figure 4

i.) Find supply voltage V_{BB} must you apply

(4 marks)

ii.) Find I_C and V_{CE} at the Q-point, given that $\beta_{DC} = 50$.

(4 marks)

iii.) Draw the dc load line.

(4 marks)

(d) Determine V_{CE} and I_C in voltage-divider biased transistor circuit shown in Figure 5 if β_{DC}=100.

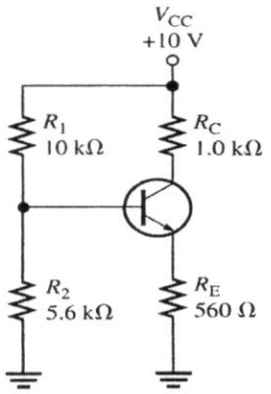

Figure 5

(8 marks)

Question 4

(a) For the op amp shown in Figure 6, calculate the current across resistor of 10 kΩ and the output voltage v_o

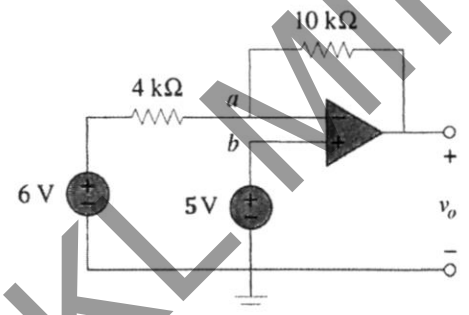

Figure 6

(7 marks)

(b) Find V_o and i_o in the circuit shown in Figure 7

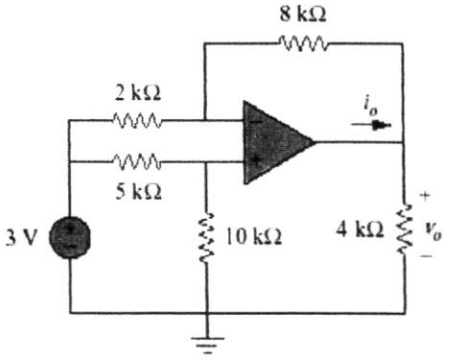

Figure 7

(8 marks)

(c) Find V_o in the op amp circuit shown in Figure 8

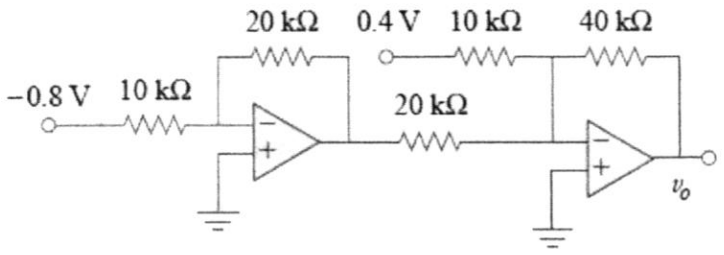

Figure 8

(10 marks)

Question 5

(a) Derive relationship of gain expressed in decibels is equal to 10 times the log of the power ratio and 20 times the log of the voltage ratio.

(5 marks)

(b) A certain amplifier exhibits an output power of 5W with an input power of 0.5W. What is the power gain in dB?

(2 marks)

(c) If the output voltage of an amplifier is 1.2V rms and its voltage gain is 50, determine the rms input voltage and the gain in dB.

(4 marks)

(d) Determine, voltage gain (A_V), output voltage (V_{OUT}), and power gain (A_P) in dB for the circuit in Figure 9, given $re' = 50\Omega$ and $\beta = 200$.

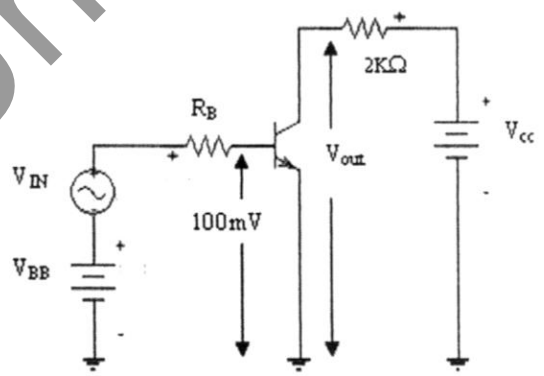

Figure 9

(10 marks)

END OF EXAMINATION PAPER

Appendix

Formulas

Operational amplifier

Inverting amplifier	$v_0 = -\frac{R_2}{R_1} v_i$
Noninverting amplifier	$v_0 = \left(1 + \frac{R_2}{R_1}\right) v_i$
Summer	$v_0 = -\left(\frac{R_f}{R_1} v_1 + \frac{R_f}{R_2} v_2 + \frac{R_f}{R_3} v_3\right)$
Difference amplifier	$v_o = \frac{R_2(1 + R_1 / R_2)}{R_1(1 + R_3 / R_4)} v_2 - \frac{R_2}{R_1} v_1$