

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2017/2018**

COURSE NAME : ELECTRONIC TECHNOLOGY AND MICROPROCESSING  
COURSE CODE : BNJ 30302  
PROGRAMME CODE : BNL  
EXAMINATION DATE : JUNE / JULY 2018  
DURATION : 3 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

**Q1** (a) Differentiate semiconductors, conductors and insulators on the basis of band gap and illustrate the energy gap for each of them.

(6 marks)

(b) Briefly explain the donor and acceptor impurities.

(4 marks)

(c) Interpret the effect of forward bias and reverse bias on the depletion region.

(6 marks)

(d) Illustrate the following diode models:

- (i) Simplified Diode Model
- (ii) The Constant Voltage Diode Model

(4 marks)

**Q2** (a) Describe the following type of diodes and draw their symbols:

- (i) Light Emitting diode
- (ii) Zener diode
- (iii) Schottky diode

(6 marks)

(b) Analyse the bridge rectifier in the diagram in the **Figure Q2(b)** and construct a waveform based on the diagram.

(6 marks)

(c) Briefly explain the differentiation between the NPN and PNP of the Bipolar Junction Transistor (BJT). Sketch the symbol of each transistors.

(8 marks)

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**Q3 (a)** A military requires a spy robot to sneak around the enemy's area. Identify the most appropriate technology between microprocessor and microcontroller to handle the military requirement. Justify your answer.

(4 marks)

**(b)** All components communicate via the system bus in microprocessor. Briefly explain **THREE (3)** types of buses in microprocessor.

(3 marks)

**(c)** Describe the following terms on the Motorola 68000 microprocessor:

- (i)** Data registers
- (ii)** Address registers
- (iii)** Program counter
- (iv)** Stack pointer

(8 marks)

**(d)** Condition codes register (CCR) contains several status bits that may be directly tested by the programmer. List out and describe **FIVE (5)** status bits in CCR.

(5 marks)

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**Q4 (a)** What is the advantage of using Harvard architecture compared to Von Neumann Architecture that has been used in microcontroller? Illustrate the block diagram of Harvard architecture.

(4 marks)

**(b)** Explain briefly the relationship between PORTA registers and TRISA registers. What is the main difference between PORTA and PORTB registers for PIC16F84?

(4 marks)

**(c)** Determine the contents of the file registers and working registers for each mnemonic in following codes:

```

MOVLW    0
MOVWF    0x20
INCF     0x20, W
INCF     0x20, W
INCF     0x20, F
INCF     0x20, F
INCF     0x20
INCF     0x20, W
    
```

(7 marks)

**(d)** Identify and write a comment for each of the instructions in the program below.

```

reset    CLRF      06
start    BTFSS05, 0
          GOTO reset
          BTFSC   05, 01
          GOTO start
          INCF    06
          MOVLW   OFF
          CALL    delay
          GOTO start
          END
    
```

(5 marks)

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- Q5 (a) PIC16F84 is used to execute subroutine 1. If PIC clock input is 500 kHz, evaluate the total delay to execute the subroutine. (Initial C=0).

Subroutine1

```
          MOVLW    30h
          MOVWF    20h
          MOVLW    .2
          MOVWF    21h
          MOVLW    .1
LOOP      RRF      20h
          SUBWF    21h
          BTFSS   03,2
          GOTO    LOOP
          RETURN
```

(6 marks)

- (b) An interrupt is an important mechanism used by microcontroller to handle a request from devices that connected to it. For PIC 16F84,

(i) Explain the process of interrupt.

(4 marks)

(ii) Propose the instruction to enable the TMR0 interrupt.

(2 marks)

- (c) There are two methods in serial data communication which are asynchronous and synchronous. Explain the differences between asynchronous and synchronous communication.

(4 marks)

- (d) Demonstrate the signal of character 'A' (A = 41h) in TD line of RS232 if the system used 8-bit data format with '1' start bit, '1' stop bit and used ODD parity as an error detection scheme. (Given start bit = '0', stop bit = '1')

(4 marks)

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- END OF QUESTIONS -

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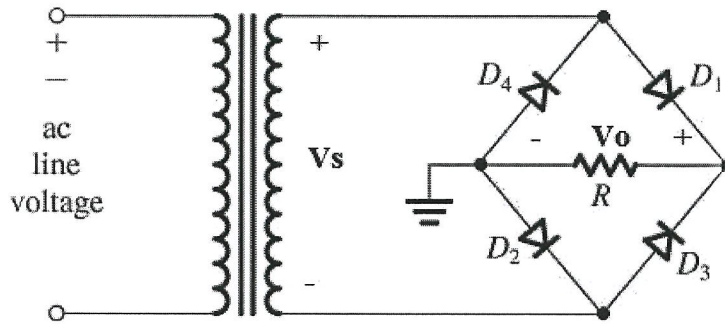


Figure Q2(b)

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