Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER III
SESI 2014/2015

NAMA KURSUS	:	ELECTRICAL TECHNOLOGY AND MICRO PROCESSING
KOD KURSUS	:	DAJ32302
PROGRAM	:	DAJ
TARIKH PEPERIKSAAN	:	OGOS 2015
JANGKA MASA	:	3 JAM
ARAHAN	:	JAWAB **LIMA (5)** SOALAN SAHAJA

KERTAS SOALAN INI MENGANDUNGI **SEMBILAN (9)** MUKA SURAT

SOALAN DI DALAM BAHASA MELAYU

Q1 (a) Berikan perbezaan di antara semikonduktor jenis-P dan jenis-N. Termasuk atom contoh struktur.

(10 markah)

(b) Lukis dan terangkan rektifikasi gelombang penuh menggunakan *smoothing capacitor* dengan beban rintangan dan carikan satu ungkapan untuk *ripple factor* merentasi beban.

(10 markah)

Q2 (a) Berpandukan **RAJAH S2**, Voltan masukan, $V_{in} = 9 + \sin(wt)$ Volt dan penghadang potensi voltan, , $V_\phi = 0.7$ Volt. Menganggap aliran arus terus adalah lebih besar daripada 1 mA, Tentukan aliran arus diod, I_D dan kejatuhan voltan pada diod, V_D.

(10 markah)

(b) Senaraikan tiga jenis diod dan kegunaannya dalam litar elektronik.

(5 markah)

(c) Satu lagi aplikasi diod adalah untuk melewati lebih tinggi daripada dua voltan tanpa menjejaskan lebih rendah. Ini adalah gerbang diod panggilan, tunjukkan contoh dengan penerangan terperinci.

(5 markah)

Q3 (a) Mikropengawal tidak cukup kuat untuk memacu motor. Litar **RAJAH Q3** digunakan.

i) Mengenal pasti komponen X, yang dilabel **RAJAH Q3**.

(2 marks)

(ii) Apakah tujuan komponen X dalam litar ini.

(3 marks)

(iii) Motor boleh bekerja hanya apabila salah satu input adalah tinggi. Apakah jenis get logik boleh digunakan untuk memastikan bahawa hanya satu input sentiasa tinggi

(5 marks)

(b) Apa teknik lain reka bentuk litar boleh digunakan, untuk mengurangkan penggunaan kuasa.

(10 marks)

Q4 (a) Terangkan perbezaan antara mikropemproses dan mikropengawal, termasuk ciri-ciri umum mikropengawal.

(15 markah)

(b) Terangkan faedah utama dan had menggunakan mikropengawal.

(5 markah)

Q5 (a) Jelaskan organisasi asas memori data PIC.

(10 marks)

(b) Jelaskan organisasi asas timbunan PIC.

(10 marks)

Q6 (a) Merujuk kepada litar dalam **RAJAH S6**, apakah tujuan litar RC yang disambungkan ke input RESET mikropengawal.

(5 marks)

(b) Apakah kesan melaksanakan arahan berikut

```
movlw   b'11110000'
movwf   trisb
```

(5 marks)

(c) Menganggap bahawa kod berikut baru sahaja dilaksanakan. Apa kandungan

binary pada *working register*.

```
movlw   2f
addlw   55
```

(10 marks)

Q7 (a) Berapa lama ia mengambil masa yang diambil untuk melaksanakan arahan pada mikropengawal PIC16F628 berjalan pada *clock* 20 MHz.

```
      goto    L2
L1    movwf   var1
      btfss   var1,0
end
L2    sublw   10
      goto    L1
```

(10 marks)

(b) Apakah kandungan dalam *working register* selepas melaksanakan urutan arahan berikut.

```
movlw   14
movwf   44
subwf   44, w
```

(10 marks)

SOALAN DI DALAM BAHASA INGGERIS

Q1 (a) Give the differences between p-type and n-type semiconductors. Include atomic structure illustration.

(10 marks)

(b) Draw and explain full wave rectifier using a smoothing capacitor with a resistance load and find an expression for ripple factor across load.

(10 marks)

Q2 (a) Refer to **FIGURE Q2**, The source voltage, $v_{in} = 9 + \sin(wt)$ Volts and the barrier potential voltage, $V_\phi = 0.7$ Volts. Assume the dc current is greater than 1 mA. Determine the current across the diod, I_D and voltage drop across the diod, V_D.

(10 marks)

(b) List down the three types of diodes and their uses in electronic circuit.

(5 marks)

(c) Another application of diode is to pass the higher of two voltages without affecting the lower. This is call diode gates, show an example with detail explanation.

(5 marks)

Q3 (a) The microcontroller is not powerful enough to drive the motors. The circuit **FIGURE Q3** is used.

(i) Identify component X, which is labeled in **FIGURE Q3**.

(2 marks)

(ii) What is the purpose of component X in this circuit

(3 marks)

(iii) The motor can work only when one of the inputs is high. What type of logic gate should be used to ensure that only one input is always high

(5 marks)

(b) What other techniques of circuit design can be applied, to minimize power consumption.

(10 marks)

Q4 (a) Explain the major differences between a microprocessor and a microcontroller, including the typical features of a microcontroller.

(10 marks)

(b) Explain the major benefits and limitations of using a microcontroller.

(10 marks)

Q5 (a) Explain the basic organization of the PIC data memory.

(10 marks)

(b) Explain the basic organization of the PIC stack.

(10 marks)

Q6 (a) For the following circuit in **FIGURE Q6**, what is the purpose of RC circuit that is connected to the RESET input of the microcontroller.

(5 marks)

(b) What is the effect of executing the following instructions?

```
movlw   b'11110000'
movwf   trisb
```

(5 marks)

(c) Assume that the following code has just been executed. What the binary content of the working register.

```
movlw    2f
addlw    55
```

(10 marks)

Q7 (a) How long does it take to execute the following instructions on a PIC 16F628 running at a clock of 20 MHz.

```
         goto     L2
L1       movwf    var1
         btfss    var1,0
end
L2       sublw    10
         goto     L1
```

(10 marks)

(b) What is the content of the working register after executing the following sequence of instructions.

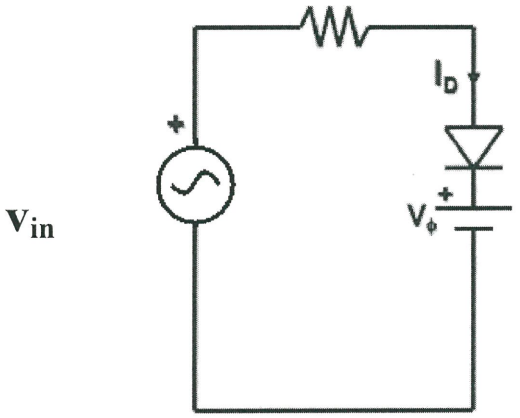
```
movlw    14
movwf    44
subwf    44, w
```

(10 marks)

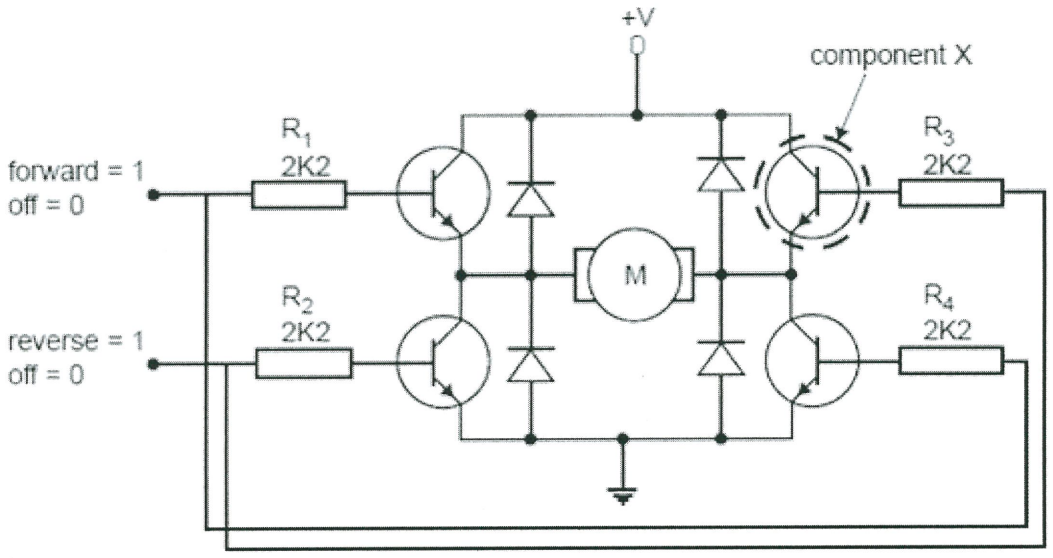
PEPERIKSAAN AKHIR
FINAL EXAMINATION

SEMESTER / SESI *SEMESTER / SESSION*	**: SEM III / 2014/2015**	**PROGRAM** *PROGRAMME*	**: 1 DAJ**
KURSUS *COURSE*	**: ELECTRICAL TECHNOLOGY & MICRO C**	**KOD KURSUS** *COURSE CODE*	**: DAJ32302**

$R_S = 1000\ \Omega$



RAJAH S2 / FIGURE Q2



RAJAH S3 / FIGURE Q3

PEPERIKSAAN AKHIR
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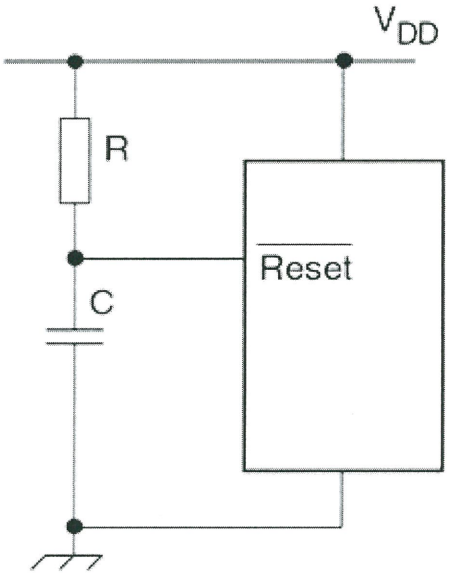

RAJAH S6 / FIGURE Q6