TEST 1 SEMESTER I 2017/2018

| SUBJECT CODE | $:$ | SCSR 1013 |
| :--- | :--- | :--- |
| SUBJECT TITLE | $:$ | DIGITAL LOGIC |
| COURSE | $:$ | SCSR/SCSJ/SCSB/SCSV/SCSP |
| TOTAL TIME | $:$ | $\mathbf{1}$ HOUR 30 MINUTES |
| DATE | $:$ | $6 / 10 / 2017$ |
| VENUE | $:$ | DK 1, 2, $\mathbf{3}$ L50 UTM JOHOR BAHRU |

## (GENERAL INSTRUCTION):

Answer all questions from Part A and B.
Write ALL your answers in the answer booklet.
This test will contribute $15 \%$ towards the total marks of $100 \%$.

Warning!
Students who are caught cheating during the examination will be reported to the disciplinary board for possible suspension of the student for one or two semesters.

| Name |  |
| :--- | :---: |
| Matric Number |  |
| Year/Course |  |
| Section (Circle) | $\mathbf{0 1 / 0 2 / 0 3 / 0 4 / 0 5 / 0 6 / 0 7 / 0 8 / 0 9 / 1 0 / 1 1 / 1 2}$ |
| Lecturer (Circle) | Mr Firoz $/$ Ms Hazinah $/$ Ms Marina / <br> Dr Mohd Foad / Mr Muhalim / Dr Raja Zahilah |

This question booklet consists of 7 pages excluding the front page.

## PART A: 25 OBJECTIVE QUESTIONS [Total mark 25 points]

Answer all the questions in the answer booklet. Read each statement carefully.

1. Determining the vacancy in a parking space is the function of a $\qquad$ .
A. Comparator
C. Decoder
B. Encoder
D. Multiplexer
2. A key pad provides decimal value ranging from $0-9$. Each of the decimal can be converted to its binary representation using $\qquad$ .
A. Comparator
C. Counter
B. Encoder
D. Multiplexer
3. What is the meaning of an "active LOW" device?
A. The output is always LOW.
B. The input is always HIGH.
C. The device will be activated if the input is LOW.
D. The device will be activated if the input is HIGH
4. Which of the following is NOT an example of a memory device in digital system?
A. Flash
C. RAM
B. ROM
D. UPS
5. A Programmable Logic Device (PLD) IC can be categorized into the following types EXCEPT:
A. XPLD (Exhaustive Programmable Logic Device)
B. CPLD (Complex Programmable Logic Device)
C. FPGA (Field Programmable Gate Array)
D. SPLD (Simple Programmable Logic Device)
6. Which of the following IC is NOT categorized as a Small Scale Integrated (SSI) IC?
A.

C.

B.

D.

74HC85 Four Bit Magnitude Comparator
7. Which of the following Boolean Gates operations is FALSE?
A. Output of the AND gate will be HIGH if all inputs are HIGH
B. Output of the OR gate will be LOW if all inputs are LOW
C. Output of the AND gate will be HIGH if all inputs are LOW
D. Output of the INVERTER gate will always toggle with the input state
8. Which of the following statements is TRUE about the characteristic of an analog or digital signal?
A. Digital signal uses decimal base number
B. Analog signal uses binary base number
C. Analog signal always have discrete measurement value
D. Analog signal conversion must go through quantization process before converted to digital signal.
9. A digital-to-analog converter (DAC) converts $\qquad$ to $\qquad$ .
A. discrete signals, discrete digital numbers
B. continuous signals, discrete analog numbers
C. discrete digital numbers, continuous signals
D. discrete signals, discrete analog numbers
10. The figure below shows a top view of an IC. Which label indicates the position of Pin 1 of the IC as shown below?

A. Label A
C. Label G
B. Label H
D. Label E
11. The value 11 s is equivalent to $\qquad$ ms?
A. 0.0011
B. 110
C. 11000
D. 110000
12. The value 100 KHz is equivalent to $\qquad$ GHz?
A. $1 \times 10^{-4}$
B. $10 \times 10^{-9}$
C. $100 \times 10^{6}$
D. $100 \times 10^{9}$
13. Given the figure below, correctly identify i, ii, and iii.

A. $\mathrm{i}=$ Pulse width, $\mathrm{ii}=$ Period, $\mathrm{iii}=$ Amplitude
B. $\mathrm{i}=$ Frequency, $\mathrm{i}=$ Droop, $\mathrm{iii}=$ Period
C. $\mathrm{i}=$ Amplitude, $\mathrm{ii}=$ Pulse width, $\mathrm{iii}=$ Period
D. $\mathrm{i}=$ Duty cycle, $\mathrm{ii}=$ Frequency, $\mathrm{iii}=$ Droop
14. A counter is used to count the occurrences of input, and then use the result to do some action. Which of these systems uses a counter?
i. Traffic light iii. Vending machine
ii. Washing machine
iv. House lights
A. All of the above
C. i, ii and iii
B. None of the above
D. ii, iii, and iv
15. In a base 4 numbering system, or Quarternary, how many digits will it have?
A. 3
B. 4
C. 5
D. 16
16. Which of the following shows the decimal number $\mathbf{3 4 5 6 . 2}$ accurately?
A. $\left(3 \times 10^{3}\right)+\left(4 \times 10^{2}\right)+\left(5 \times 10^{1}\right)+\left(6 \times 10^{0}\right)+\left(2 \times 10^{-0}\right)$
B. $\left(3 \times 10^{4}\right)+\left(4 \times 10^{3}\right)+\left(5 \times 10^{2}\right)+\left(6 \times 10^{1}\right)+\left(2 \times 10^{-0}\right)$
C. $\left(3 \times 10^{3}\right)+\left(4 \times 10^{2}\right)+\left(5 \times 10^{1}\right)+\left(6 \times 10^{0}\right)+\left(2 \times 10^{-1}\right)$
D. $\left(3 \times 10^{3}\right)+\left(4 \times 10^{2}\right)+\left(5 \times 10^{1}\right)+\left(6 \times 10^{-1}\right)+\left(2 \times 10^{-2}\right)$
17. In the decimal number $\mathbf{3 7 6 8 . 2 5}$, the number $\mathbf{3}$ is also known as the $\qquad$ .
A. Magnificent Sign Digit
C. Most Signed Digit
B. Most Significant Digit
D. Mostly Digit
18. In the decimal number $\mathbf{3 7 6 8 . 2 5}$, which of these is TRUE?
A. 3768 is the Fraction, and 25 is the Base
B. 3768 is the Decimal, and 25 is the Binary
C. 3768 is the Coefficient, and 25 is the Integer
D. 3768 is the Integer, and 25 is the Fraction
19. A base 16 number system is called $\qquad$ .
A. Binary
C. Hexagonal
B. Octal
D. Hexadecimal
20. What do you call the smallest unit of data on a computer?
A. Bit
C. Nibble
B. Byte
D. Word
21. A group of 4 bits is called a $\qquad$ .
A. Byte
C. Word
B. Bite
D. Nibble
22. Which of these is NOT a valid code in BCD (Binary Coded Decimal)?
A. 1100
B. 0101
C. 1001
D. 0001
23. What are parity bits used for?
A. To detect too many zeros in cable transmissions
B. To detect the possibility of error occurring during transmission of data
C. To create an extra long conversation extension
D. To detect the state of the receiver, whether he is OFF or ON
24. A byte can store how many unsigned integers?
A. 4096
B. 128
C. 256
D. 51
25. What is the upper bound for an unsigned 10-bit number?
A. 1023
B. 1024
C. 512
D. 511

## PART B: 6 SUBJECTIVE QUESTIONS [Total mark 60 points]

Answer all the questions in the answer booklet.

## Question 1 [8 Marks]

Calculate the pulse width of a system with $25 \%$ duty cycle and frequency 10 KHz . Draw the waveform for 4 cycles and clearly label it with pulse width, period and amplitude values. You are given the amplitude of 5 V .

## Question 2 [9 Marks]

Convert the string UTM in the table below to its ASCII hexadecimal value using odd parity. Copy the table into the answer booklet and complete it with the correct answers.

| Character | ASCII <br> (hex) | Binary | Add odd <br> parity | Recalculate ASCII <br> hex |
| :---: | :---: | :---: | :---: | :---: |
| U | 55 |  |  |  |
| T | 54 |  |  |  |
| M | 4 D |  |  |  |

## Question 3 [6 Marks]

List the first 20 numbers in the following number systems:
a) Hexadecimal (Base 16)
b) Quinary (Base 5)
[3M]

## Question 4 [16 Marks]

Given the following numbers, convert them to decimal. Show all your workings clearly.
a) $1010.11_{2}$
b) $235_{8}$
c) $14 \mathrm{CF}_{16}$
d) $342_{5}$

## Question 5 [13 Marks]

Convert the following numbers. Show all your workings clearly.
a) $24.32_{8}$ to binary [3M]
b) $1011011.0010101_{2}$ to hexadecimal $[3 \mathrm{M}]$
c) $124.3125_{10}$ to octal ( 2 fractional points) [4M]
d) $011101_{2}$ to gray code [3M]

## Question 6 [8 Marks]

Using an 8-bit binary and 2's complement representation, solve the following arithmetic equations. Show all your workings clearly.
a) $14_{10}-10_{10}$
b) $(-12)_{10}+(-2)_{10}$

