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De Mazenod College Kandana

Information and Communication Technology

1st Term Test 26th November 2018 Grade 12 Time: 3Hours

Name:……………………………. No…... Class…………………

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Answer all questions and show relevant calculations for each answer otherwise no marks are allocated.

1. Which one of the following is/are equal to 131200_{10}
   (1)4002000_8
   (2)200800_{16}
   (3)10000000000100000002
   (4)10000000010000000002
   (5)100000000010000000_2
2. Which one of the following is / are not equal to 10000000001001_2
   (1)8201_{10}
   (2)2009_{16}
   (3)20011_8
   (4)$200B_{16}$
   (5)10000000001001.00_2
3. Which one of the following is/are equal to 1024.967_{10}
   (1)1000000000.111111101_2
   (2)1000000000.111011111_2
   (3)10000000000.11111101_2
   (4)10000000000.11110111_2
   (5)10000000000.11101111_2
4. Which one of the following is/are equal to 500.467_{10}
   (1)7624.0753_8
   (2)467.0753_8
   (3)764.0753_8
   (4)467.3570_8
   (5)764.357_8
5. Which one of the following is/are equal to 262400.0321_{10}
   (1)20080.08_{16}
   (2)$40A0.18_{16}$
   (3)40100.08_{16}
   (4)$4A00.181_{16}$
   (5)$400A.180_{16}$
6. 111101.11011_2 is equal to decimal,
   (1)61.96875
   (2)60.96875
   (3)61.84375
   (4)60.83475
   (5)61.84753
7. $CAD.BAD_{16}$ is equal to
   (1)6255.72_8
   (2)3245.7294_{10}
   (3)3245.7294_{16}

(4) 625.72_{16}
(5)62555.72_{8}

8. $BED.DAD_{16}$ is equal to decimal,
   (1)797.8546
   (2)3053.8547
   (3)3051.8546
   (4)7973.8574
   (5)797.8546
9. 10110111.000100102 is equal to ,
   (1)267.044_{8}
   (2)183.044_{10}
   (3)$B7.11A_{16}$
   (4)183.125_{2}
   (5)$B7..BA_{16}$
10. $FED.CAD_{16}$ is equal to,
    (1)$111\ 111\ 101\ 101.101\ 101\ 101\ 100_{2}$
    (2)4077.3245_{10}
    (3)7755.6255_{8}
    (4)7755.5755_{8}
    (5)4077.7755_{8}
11. Which one of the following logic gate does the function of "CONJUNCTION"
    (1) NOT (2) OR (3) XOR (4)AND (5)NOR

12. The component which executes instructions in.
    (1) Primary Memory. (2) Register Unit. (3) Control Unit.
    (4) ALU. (5) Program Counter.

13. The generation of monthly salary slips of employees in an organization is an example for
    (1) Batch processing. (2) Real time processing.
    (3) Online processing. (4) Transaction processing.
    (5) Interactive processing.

14. Who invented the Analytical Engine?
    (1). Blaise Pascal (2).Charles Babbage (3). John Von Neumman
    (4). John V. Atansoff (5). John Presper Eckert

15. Which of the following technologies has been used in the Third Generation Computers?
    (1) Integrated Circuits(ICs) (2) Large Scale Integration(LSI) (3) Micro Processors
    (4)Transistors (5) Vaccum Tubes

16. Which of the following statements is correct with respect to the evolution of computing devices?
    (1)Vacuum tubes were used by Blaise Pascal to build the Pascaline.
    (2)The Pascaline is considered as a first generation computing device
    (3)Computers built using vacuum tubes are considered as second generation
    (4)Electronic Numerical Integrator and Computer (ENIAC) was built using vacuum tubes.
    (5)Apple I and II are two example for second generation computers.

17. A special digit inserted into a sequence of digits for data validation is called the ……digit. Which of the following is most appropriate to fill the above statement?
(1)Check (2)Sign (3)least significant (4)Most significant (5)error

18. Which of the following has the fastest access speed?
(1)Extended Memory (2)Register Memory
(3)Flash Memory (4)Cach (5)DRAM

19. A bulb in a staircases has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by and one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles.

1). an AND gate

2). an OR gate

3). an XOR gate

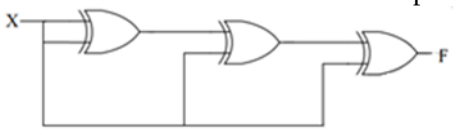
4). a NAND gate

5). a NOT gate

20. Minimum number of 2 input NAND gates required to implement the function,
$F = (\overline{X} + \overline{Y})(Z + W)$ is
1). 3 2). 4 3)5 4) 6 5)2

21. The Boolean expression for the output of XNOR (equivalence) logic gate with inputs A and B is
1). $A\overline{B} + \overline{A}B$ 2). $\overline{A}\overline{B} + AB$ 3). $(\overline{A} + B)(A + \overline{B})$
4). $(\overline{A} + \overline{B})(A + B)$ 5).(A+B)AB

22. For the circuit shown below the output F is given by X



1). = 1 2). $F = 0$ 3). $F = X$ 4). $F = \overline{X}$ 5)X+1

23. The minimum number of 2-input NAND gates required to implement the Boolean function $Z = A\overline{B}\overline{C}$, assuming that A, B and C are available is
1).Two 2). Three 3) Five 4) Six 5)Seven

24. The minimum number of NAND gates required to implement the Boolean function
$A + A\overline{B} + A\overline{B}\overline{C}$ is equal to

1).0 2). 1 3) 4 4) 7 5)2

25. Representation of 5_{10} and -9_{10} in 8-bit Two's complement forms are
(1) 00 00 01 01 and 11 11 01 11 respectively
(2) 11 11 01 11 and 11 11 01 11 respectively
(3) 00 00 01 01 and 10 00 10 01 respectively
(4) 00 00 01 01 and 11 11 01 10 respectively
(5) 11 11 10 11 and 11 11 01 10 respectively

Structured **Part(A)**

Answer all questions, show all the calculations when necessary,

(1)

1.(i) Draw the data life cycle(3marks)

(ii).Draw the abstract model of information (3marks)

(iii). Explain is golden rule of information (2marks)

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(iv).Draw golden rule of information in graphically with respect to value and time (2marks)

2.(i). What is big data(2marks)

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(ii). Who generate big data problem? (2marks)

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(iii).Give 3 characteristics of big data (3marks)

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(iv).What are the proposed solutions for big data problem (3marks)

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(i). What is cloud computing?(2marks)

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(ii). List three basic service models of Cloud Computing.(3marks)

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(iii). Give 2 benefits of cloud computing(2marks)

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(iv).Give 2 disadvantages of cloud computing(2marks)

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(v).What is digital divide(1 mark)

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4. (i).What is patent(2marks)

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(ii).What is FOSS and give 2examples for it(2marks)

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(iii).What is Plagiarism (2marks)

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(iv).What is piracy (2marks)

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(v).What is phishing (2marks)

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5.(i).Name 5 steps in data process(2.5 marks)

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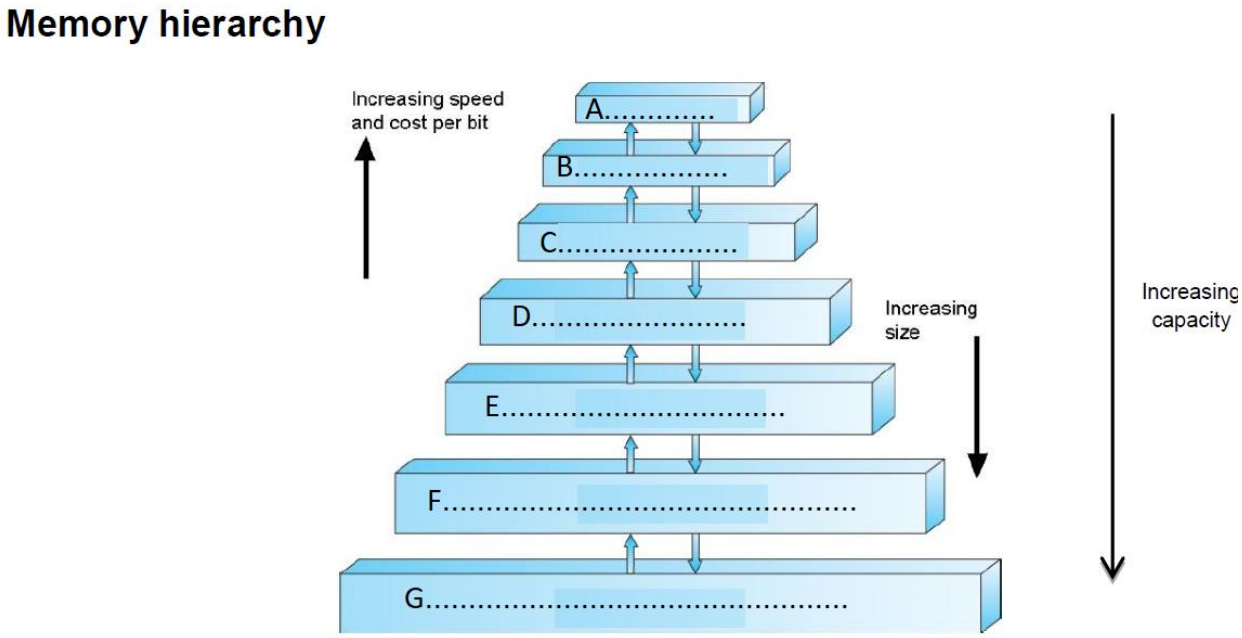
(ii)Name the following memory hierarchy diagram(3.5marks)



(iii). Write 4 steps of Fetch –Execute cycle (2marks)

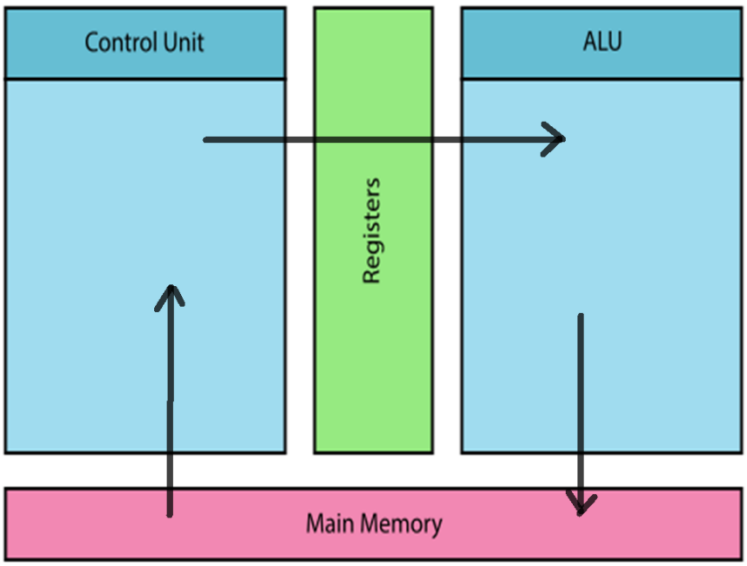
Step 1:-……..

Step 2:-……..

Step 3:-……..

Step 4:-…….

(iv). Label the steps in following diagram(2marks)



Essay **Part B**

Answer all 3 questions

1.a Complete the following table show the working on this paper itself(24Marks)

Decimal	Binary	Octal	Hexadecimal
			BAD.F63
	100011.1100		
		7277.537	

51966.72974_{10}			

b. Calculate the following and use the space given below (20 marks)

a)10000_2-0101_2	b)111011_2+1101_2	b)1111011_2X111.1_2	d)110110_2/1011_2	e)70767_2+77_2
f)7123_2-127_2	g)$D1AB2_{16}$+ DE_{16}	h)BAD_{16}+ CAF_{16}	i)765_8/72_8	j)BAD_{16} / CF_{16}

2. i) Use BITWISE operators and answer the following. Use the space given below.(8marks)

a)11101_2&101_2	b)101101_2|1100_2	c)1101101_2^1011_2	d) ~101010111_2

ii)(A,B,C,D)=$\sum_m(0,3,4,7,8,11,12,15)$

a). Simplify using K-map in SOP. Show grouping in SOP

CD / AB	00	01	11	10
00				
01				
11				
10				

b). Simplify using K-map in POS. Show grouping in POS

CD / AB	00	01	11	10
00				
01				
11				
10				

iii) Simplify the following Boolean expirations with Boolean algebraic laws.

Name all laws.*****(marks are not allocated without the name of the law)****(6marks)

S'IFV+SI'FV+SIF'V+SIFV+SIFV'

3. An automated fish tank system injects both O_2 and water automatically. The system consists of PH sensor, Pressure sensor, Water level detector and timer.

The timer has preset time (on mode) and off mode.
The system inject O_2 during preset time (on mode) period of 10 minutes and it has 15 minutes intervals (off mode).
If the PH level of the water is lower than 5, the system is automatically inject O_2 even the timer is in off mode.
If the water level is law than predefined value, the system injects water. The pressure sensor is at the bottom of the water tank.
If the pressure is lower than predefined value **AND** the water level is less than predefined value the system will automatically fill water. Find out when both O_2 injectors and water injectors are functioning at same time.
W→Water level is low than predefined value→1
P→Pressure level is low than predefined value→1
L→PH Level is lower than predefined value→1
T→Timer is on preset time(On mode)→1
**********Answers should written in W,P,L and T notations only**********
**********marks are not allocated for other notations**********

(i) Draw the truth table for above conditions
(ii) Write a Boolean expression to represent the logic function of the above circuit in the sum of products form.
(iii) Simplify the Boolean expression using correct lows(Marks are not allocated if the name of the low is not given
(iv) Design a logic circuit for the Boolean expression you have obtained for the above part.(use only minimum number of logic gates)