FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI,
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

ECE 512 – Special Topics in Electronic and Computer Engineering, 2021/2022 SESSION (Rain Semester Exam.) **Date: 28/07/2023 Time: 3:00 Hrs**

INSTRUCTIONS: ANSWER ANY 5 QUESTIONS (EACH QUESTION CARRIES 20 MARKS)

****** Do not solve or write anything on this question paper please**

Question 1

a. Describe in not more than 5 sentences IoT technology. **(10marks)**
b. Outline four applications of IoT and their benefits. **(8marks)**
c. There are many network technologies that enable the IoT. Describe at least two **(2marks)**

Question 2

a. Explain with appropriate diagram the difference between Client-Server and Blockchain Technology Architecture **(10marks)**
b. Outline three applications of blockchain technology and the potential benefits. **(6marks)**
c. Why is it important to standardize Blockchain applications? List 3 key players in standardization of blockchain technology. **(4marks)**

Question 3

a. Briefly explain the RFID Technology and the various components that make up an RFID system. **(8marks)**
b. Give at least 4 applications of RFID and the general benefits of RFID. **(6marks)**
c. Outline the difference between the following: Active and Passive tags; RFID and Bar codes. **(6marks)**

Section B Questions are on : LASER, SPREAD SPECTRUM and FIBER OPTICS, only.

Question 4

a. Briefly explain the use of LASER in; (i) Optical Fiber communication (DH-Lasers) (ii). the provision of communication links between orbiting Satellites (iii) Future Computers based on optical switches called Trans-phasors **(12 mks)**
b. b.) Give the full meaning of LASER. State 5 Applications of LASER, and the Frequency range of its operations **(8mks)**

Question 5

a. What are the main purposes for the deployment of Spread Spectrum (SS) techniques? **(3mks)**
b. State; (i) the Power ratings (ii). the 3 approved frequency bands, and (iii) 5 Applications of SS according to FCC regulations 15.247 **(6mks)**
c. Outline 4 Gains SS techniques have over regular Narrow band modulation Schemes **(4mks)**
d. Itemize the 3 Forms of SS techniques, and hence, describe the principle of operation of one of them. **(7mks)**

Question 6

a. Describe, the basic Fiber-Optic communication System, and, state 5 advantages of Glass Fiber over Copper conductors **(14mks)**
b. What are the 3 Multimodes of propagations in Optic Fiber communication Channel **(6mks)**

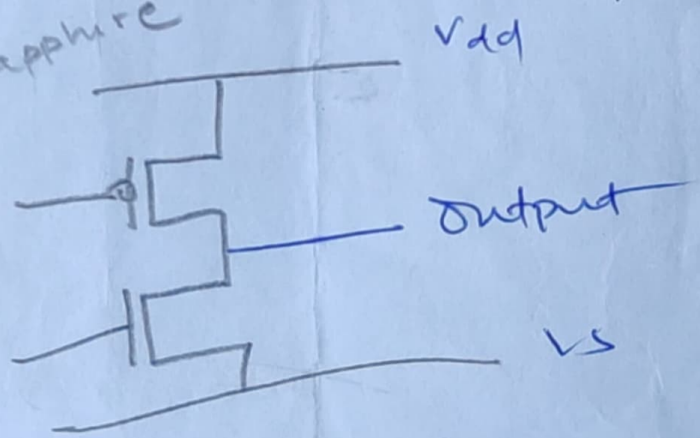
Question 7

a. Enumerate the major criteria that affect the choice of Optical Fiber over other media in Telecommunication Applications. **(8mks)**
b. Differentiate the 3 types of Optical Fibers under the following headings; (i) Pulse dispersion effect (ii) Core dimensions (iii). Refractive Index profiles clad view light paths (iv) input and output signal waveforms, respectively. **(12mks)**

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ELECTRICAL SYSTEMS ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING RAIN SEMESTER 2022/2023 ECE 512: VLSI
Test; Date: 28 /03 /2024 Instructions: Answer All Question. Time: 1HR

1. What is VLSI? State the different Integration levels and materials for VLSI Systems
2. With the aid of schematic diagram, describe the CMOS two-input NAND Gate and conclude with a Truth Table.
3. Sketch the CMOS Inverter, describe how it works.
4. With the aid of diagram, explain the processes involved in the fabrication of NMOS devices.
5. Briefly explain: Full custom approach, programmable Arrays (PAs), and Standard Cells Approach
6. What is Yield? The major causes of yields are processing problems, poor design and point defects. Briefly explain them.
7. Why is testing VLSI a big Challenge? Briefly explain the three testing techniques.
8. Briefly illustrate the parasitic capacitance of an NMOS transistor.
9. Give the full meaning of the following: BILBO, BIST, SOS, POLY, Thinox, and FOX.
10. What is Latch up and describe in not more than 4 sentences how to prevent Latch-up.

Built-self test
SOS - Silicon on Sapphire



Afam-Ibe Chinweke

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FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI
DEPT OF ELECTRICAL/ELECTRONIC ENGINEERING
RAIN SEMESTER EXAMINATION 2022/2023 TIME 3 HOURS
ECE 512 - SPECIAL TOPICS IN ELECTRONIC AND COMPUTER ENGINEERING OPTION (ECE)
***INSTRUCTIONS: ANSWER ANY 5 QUESTIONS* (EACH QUESTION CARRIES 20 MARKS)**

1a. Describe the three different classes of RFID Tags and readers. (***6marks)***
1b. List with explanation the three components that make up RFID Tag (***6marks)***
1b. Give 3 applications of RFID and the general benefits of RFID. ***(4marks)***
1c. State why RFID Applications should be regulated and list two International organization who have published RFID standards ***(4marks)***

2a. Describe in not more than 5 sentences IoT technology. ***(10marks)***
2b. Outline four applications of IoT and their benefits. ***(8marks)***
2c. There are many network technologies that enable the IoT. Describe at least two. ***(2marks)***
3a. Explain with appropriate diagram the difference between Client-Server and Blockchain Technology Architecture (***10marks)***
3b. Outline three applications of blockchain technology and the potential benefits. (***6marks)***
3c. Why is it important to standardize Blockchain applications? List 3 key players in standardization of blockchain technology. (***4marks)***

4a. Describe Social Internet of Things and how it differs from the traditional IoT. ***(8marks)***
4b. Give two examples of Social Internet of Things systems and potential challenges. (***6marks)***
4c. Safety and Privacy can become a problem with the use of IoT applications, explain. (***6marks)***

Question 5

a. In a corporate Software development process using, System's Analysis and Design (SAD), state the Five distinct steps involved, in their correct sequence, and elaborately comment on step 4.(7mks)
b. Who are the 'yahuu! yahuu!! Personnel"? (3mks)
c. Give 5 motivational factors for the "yahuu! yahuu!! quest.(5mks)
d. Outline 5 common techniques employed by these 'yahuu! yahuu!! personnel in their illegal activities. (5mks)

Question 6

a. By the use of, a well labeled Programming Language Translation diagram, explain how, an Assembly Language, High Level Language and Basic Language, are converted to Machine Codes, respectively. (6mks)
b. State; Four (4) Application based groupings in Procedural Oriented Language (POL), and Two (2) Examples for each of the groups.(8mks)
c. Outline Four (4) Limitations of the use of Machine Language, in computer system programming. (6mks)

Question 7

a. Illustrate with appropriate diagrams, the three types of Database Organizations.(9mks)
b. Hence, define and outline the Features of; Database Management System (DBMS).(5mks)
c. State Five (5) main Advantages of Database over File System. (6mks)

Question 8

a. Explain the following Concepts; (i) Coupling effect (ii) Cohesion (iii) Refinement process (iv) Acceptance testing (v) Synthesis and Analysis . (10mks)
b. No amount of Security measures put in place, will completely eradicate database vulnerability schemes at computer centres. Hence; (1). List Five (5) Level-Security Areas, for effective policing. (2). Itemize Ten (10) mitigation schemes to prevent the vulnerability escalation. (7mks)
c. Is computer system, a general purpose machine? Justify.(3mks)