NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

NET–Telecommunication & Audio-Visual Devices

T061

Monday, 29/07/2024
08:30 – 11:30 AM

Names:.....

Index number:.....

TSS NATIONAL EXAMINATIONS, LEVEL 5, 2023-2024

QUESTIONS and ANSWERS BOOKLET

OPTION/ TRADE: NETWORKING

SUBJECT/EXAM: TELECOMMUNICATION & AUDIO-VISUAL DEVICES

DURATION: 3 Hours

Read carefully the instructions on page 0 & 1.

TOTAL MARKS...../100

FOR EXAMINER'S USE ONLY

QUESTIONS	1	2	3	4	5	6	7	8	9	10	Total
Marks											

QUESTIONS	11	12	13	14	15	16	17	18	19	20	Total
Marks											

QUESTIONS	21	22	23	24	25	26	27	28	29	30	Total
Marks											

TSS NATIONAL EXAMINATIONS, LEVEL 5, 2023-2024

INSTRUCTIONS TO CANDIDATES (ANSWER BOOKLET)

1. A candidate should fill in the actual names and the Index number on the cover of this questions and answer booklet on the provided place.
2. It is illegal for a candidate to write any of names, Index number or school name inside the answer booklet.
3. No candidate should remove or tear any pages or part of it in the answer booklet.
4. A candidate should answer in the language in which the examination is set.
5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.
6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.
7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.
8. Write your answers on the 16 lined pages (From page 7 to page 22).
9. Use the last non-lined pages as draft.
10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

N.B: 1) After results publication, there is no remarking and no candidate is given his/her answer booklet for review. This answer booklet is a property of NESA.

2) Claims are only received online within 30 days after results publication. A link will be provided after results publication.

T061 Telecommunication & Audio-Visual Devices

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INSTRUCTIONS TO CANDIDATES (QUESTION PAPER)

This Exam paper is composed of Three Sections (A, B, and C). Follow the instructions given below, and answer the indicated questions for a total of 100 marks

Section **A**: Fourteen (**14**) questions, all **Compulsory**	**55 marks**
Section **B**: Among the five (**5**) questions, attempt any three (3)	**30 marks**
Section **C**: Among the two (**2**) questions, attempt any one (1)	**15 marks**

Allowed materials:

- Ruler
- Blue or black pen
- Calculator

Note:

Every candidate is required to carefully comply with the provided assessment instructions.

T061 Telecommunication & Audio-Visual Devices

SECTION A: Attempt all questions **(55 marks)**

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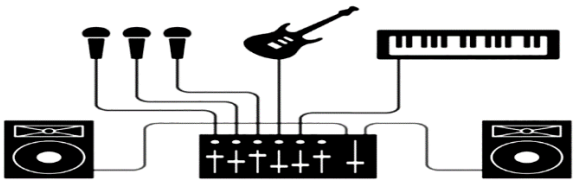
01. Define the following Communication techniques **(4 marks)**
a) Telegraphy **b)** Telemetry

02. Write in full words the following abbreviations: **(5 marks)**
a) XLR **b)** HDMI **c)** RCA **d)** VGA **e)** TRS

03. Observe the figure below and answer the related questions: **(4 marks)**

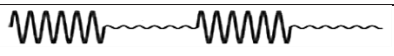
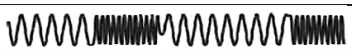
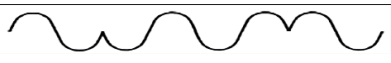
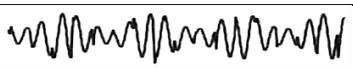


a) List all input device(s)
b) List all connected output device(s)
c) List all control device(s)

04. Match the terms in column A to their corresponding meanings in column B and write the answer to the provided space. **(5 marks)**

Column A	**Column B**
1. Radio-frequency identification (RFID)	A. is a networking hardware device that allows other Wi-Fi devices to connect to a wired network.
2. *A* radio communication system	B. is a wireless technology standard for exchanging data over short distances using short-wavelength UHF (ultra-high frequency) radio waves
3. Wireless access point	C. is uses electromagnetic fields to automatically identify and track tags attached to objects.
4. Bluetooth	D. is a special computer designed for technical or scientific applications.
5. A workstation	E. is an electronic device which produces radio waves with an antenna
	F. is sends signals by radio.

05. Name the following modulation techniques: **(4 marks)**

Modulation technique	
a. 	b 
c. 	d. 

06. A simple sound wave can be described by its frequency and by its amplitude. Distinguish between frequency and amplitude of a soundwave **(3 marks)**

07. Read below statements and answer by true(**T**) or false(**F**): **(5 marks)**

a) Bluetooth - Is a wired technology standard for exchanging data over long distance using short-wavelength UHF (ultra-high frequency) radio waves from 2.400 to 5 GHz.

b) Infrared Transmission-Refers to energy in the region of the electromagnetic radiation spectrum at wavelengths longer than those of visible light, but shorter than those of radio waves.

c) Wi-Fi -Is the name of a popular wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections

d) WiMAX (Worldwide Interoperability for Microwave Access) - An IEEE 802.3 WWAN standard that provides wireless broadband access of up to 30 meters.

e) RFID:(Radio Frequency Identification: RFID uses electromagnetic fields to automatically identify and track tags attached to objects.

08. Contrast transmitter from receiver both devices used in telecommunication. **(3 marks)**

09. Read below statements and write only the letter corresponding to the correct answers: **(5 marks)**

i. It was developed by George Boole, and it is often used to refine the determination of system status or to set or clear specific bits.
A) **OR** B) **XNOR** C) **Boolean Logic** D) **AND**

ii. The _____ operation says that if and only if all inputs are one, the output will be one. The output will be zero if any of the input is zero.
A) **OR** B) **NAND** C) **NOR** D) **AND**

iii. The_____ operation says that if any input is one then the output will be one.
A) **NOT** B) **OR** C) **NOR** D) **XOR**

iv. _____ says that if the inputs are different then the output will be one.
A) **Gates** B) **Low** C) **XNOR** D) **XOR**

v. _____ simply changes the input to the opposite (0 to 1 or 1 to 0).
A) **Operator** B) **NOT** C) **AND** D) **OR**

10. Give any three (3) benefits of using Bluetooth over infrared. **(3 marks)**

11. Convert below IP addresses in decimal numbering system: **(3 marks)**

a) $(10101100.00010000.00011110.0011100)_2 = (\ldots\ldots)_{10}$

b) $(AC.16.1E.38)_{16} = (\ldots\ldots\ldots)_{10}$

12. Determine the value of k in the following binary arithmetic operation: **(3 marks)**

a) $100110_2 - k = 001010_2$

b) $k * 1101_2 = 1000001_2$

13. Describe steps of cleaning unnecessary files on disk **(3 marks)**

14. Find the solution: **(5 marks)**

a) $(1111011001.10)_2 - (1101011.001)_2$

b) $(11011001)_2 * (11011)_2$

Section B: Attempt any three (3) questions **(30 marks)**

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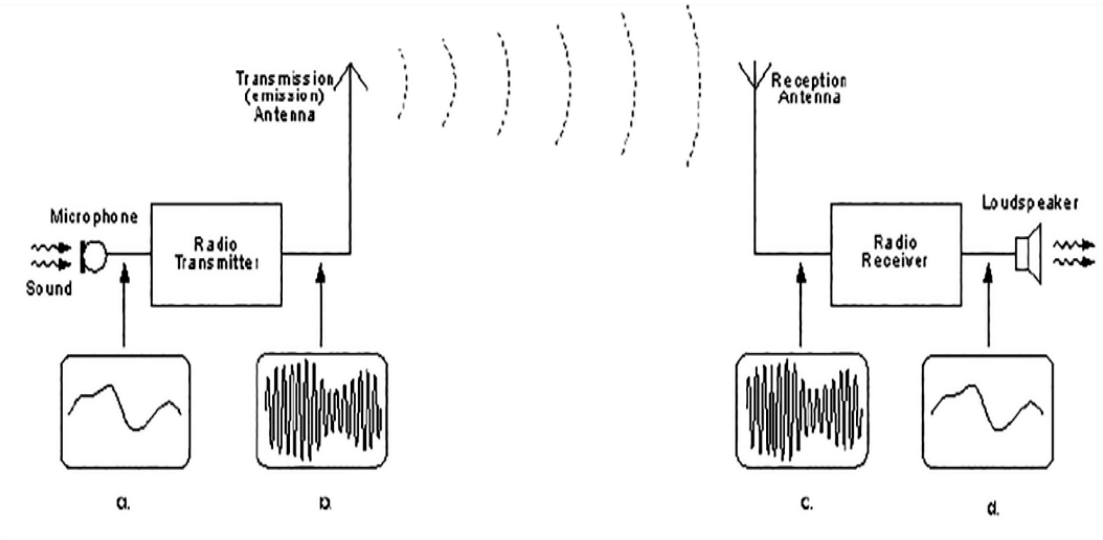
15. Compare wired microphone and wireless microphone and give three (3) advantages and two (2) disadvantages for each. **(10 marks)**

16. A. Write in full words **(10 marks)**

a. ASK b) FSK c) DSL d) GPS e) RFID

B. According to the types of Telecommunication system, which type of telecommunication system shown by the following figure?



C. Demonstrate how Microwaves communicate.

17. Using 2nd compliment method, perform the following operations: **(10 marks)**

a) $(11001000)_2 - (10110100)_2$

b) $(54)_{10} - (-24)_{10}$

c) $(123)_{10} + (87)_{10}$

18. IBYIZA Hotel is a well reputed facility which hosts local and international meeting and provides accommodation for both locals and overseas visitors. It is located in KARONGI District, this hotel delivers several services including entertainment services, swimming pool services, fitness and spa services, restaurants and bars. Last year IBYIZA hotel was supposed to host a meeting organized by CAF with an offer of 500 million Frw. Unfortunately, IBYIZA Hotel didn't get that offer due to the lack of AV System which was one of the requirements for the offer. **(10 marks)**

So, the hotel is looking for a sound technician to assist in purchasing audiovisual equipment to facilitate the hotel in delivering good services and stay competitive with others.

The items to be purchased are: 3 RAM, 6 FLAT SCREENS, 8 COMPUTERS, 3 MIXERS, 4 SPEAKER, 3 PROJECTOR, 12 MICROPHONES and 10 MOUSES. And the price for each item is given below as follow: 1 RAM=9000Frw; 1 Flat SCREEN=200000Frw; 1 Computer=720000Frw; 1MOUSE = 5000Frw; 1speaker= 125000Frw; 1 projector= 12300000 Frw; 1 Mixer= 873000 Frw; 1 Microphone = 250000Frw

Use the above information to fill the following table in order to calculate the total price of materials.

Note: - Every trade discount is 3%
- Labor Price: Frw 800000

INGENZI BUSINESS COMPANY Ltd
DATE:23/04/2024

TO: IBYIZA HOTEL
DISTRICT: KARONGI
TEL: 078888888888

NO	Material specification	Quantity of matrial	Unit price of matrial in Frw	Total price of material in Frw
1				
2				
3				
4				
5				
6				
7				
8				
			Total	

TRADE DISCOUNT 3%: Frw……
NET AMOUNT: Frw……
Labor Price: Frw 800000
Grand Total: Frw……

19. Name and explain the following parts of mixer indicated by the numbers. **(10 marks)**

Section C: Attempt only one (1) question **(15 marks)**

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20. An alarm bell uses three sensors to determine whether it should sound or not. Two sensors A and B are inside the room while C is hidden somewhere outside the room. If either sensor A or B or both detect motion in the room and C never reported sensing motion outside, then the system knows that there is an intruder. An ON signal is sent to the bell and the bell rings loudly. Only authorized persons know where sensor C is hidden outside the room. To safely enter the room, they have to follow a procedure i.e. start by standing in front of C for the system to sense their presence before entering the room. In that case all the sensors A, B and C will have detected the presence of an authorized person, therefore, no signal will be sent to the alarm for it to ring. In essence, as long as C detects motion, the alarm assumes that the person entering the room is not an intruder. Draw a logic circuit that would represent the above scenario and do a truth table for it. **(15 marks)**

21. **a)** Simplify the following expression **(15 marks)**

$$Z = \bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + A\bar{B}C + ABC$$

b) Prove that:
ABC+A'+AB'C=A'+C

c) By using K-Map, find the final output S:
S= (0,1,2,3,4,6,7)

END OF ASSESSMENT

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