



Audio Production and Sound Reinforcement

T076

Marks:/100

TVET NATIONAL EXAMINATIONS

LEVEL 5, 2022-2023

MARKING GUIDE

OPTION/TRADE: MULTIMEDIA

SUBJECT/EXAM: Audio Production and Sound Reinforcement

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

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**

01. Choose the correct answers:

1. If the frequency of sound is below 20Hz it is known as/**1mark**

- a) Audible
- b) Infrasonic
- c) Ultrasonic
- d) None of the above

Answer: b) Infrasonic

2. Large amplitude of sound vibrations will produce **/1mark**

- a) Feeble sound
- b) Shrill sound
- c) Loud sound
- d) Gruff sound

Answer: c) Loud sound

3. Earthquake produces which kind of sound before the main shock wave begins **/1mark**

- a) Ultrasound
- b) Infra sound
- e) Audible sound
- d) None of the above

Answer: b) infra sound

4. Which one of the following factors determines the pitch of a sound? **/1mark**

- a. The amplitude of the sound wave
- b. The distance of the sound waves from the source
- c. The frequency of the sound wave
- d. The phase of different parts of the sound wave
- e. The speed of the sound wave

Answer: c. the frequency of the sound wave

5. This is defined as the number of cycles of a periodic wave occurring per unit time. **/1mark**

- a) Wavelength
- b) Period
- c) Frequency
- d) Amplitude

Answer: c) frequency

Reference: LU1.Design sound L.0 1.1: Classify the sound waves properties, Curriculum level 5, Page: 382 years: 2019 REMEMBERING

02. Define a sound reinforcement system. (5 marks)

Answer:

A sound reinforcement system is the combination of microphones, signal processors, amplifiers, and loudspeakers that makes live or pre-recorded sounds louder and may also distribute those sounds to a larger or more distant audience

Reference: LU: 3 connect the sound reinforcement system L.0 3.1: Select audio equipment and prepare the location, Curriculum level 5, Page: 392 year: 2019 REMEMBERING

03. What is the difference between AD and DA audio converters? (5 marks)

Answers:

AD: Stands for Analog to Digital; This is a converter which converts audio signals from analog digital signals **/2.5marks**

DA: Stands for Digital to Analog: This is a converter which converts audio signals from digital to analog signals **/2.5marks**

Reference: (LU 1, Record sound, LO 1.2, Configure digital recorder and digital audio workstation, Curriculum version 2019, page 403) Remembering

04. Answer by true(**T**) or false(**F**). **(5 marks)**

- a. Sound waves that humans can actually hear is between 0-20 Hz
- b. Slow and big attack is types of attack envelope of sound
- c. The unit for frequency is hertz.
- d. Sounds may be generally characterized by pitch, loudness, and quality.
- e. Timbre is combination of fundamental frequency, harmonics, and overtones that give each voice, musical instrument differ from other

Answer:

- a. False
- b. False
- c. True
- d. True
- e. True

05. What is the difference between mix balance and tonality? **(4marks)**

Answer:

Mix Balance: It is the process/act of adjusting the volume faders **/1mark** and making sure every instrument is at the appropriate or right volume for the track. **/1mark** **Tonality:** This the distribution of energy **/1mark** across the range of audible frequencies about 20Hz to 20Khz (The balance between bass, midrange and treble/high)/**1mark**

Reference: (LU 3, Master audio mix, LO 3.1, Analyse and diagnose the mix, Curriculum version 2019, page 411) Remembering

06. Differentiate audio fade in and fade out.

(4marks)

Answers:

Audio fade in: This is the gradual increase in volume/ 1mark from silence to peak/full volume. / **1mark**

Audio fade out: This is the gradual decrease in volume/ 1mark from peak/full volume to silence. / **1mark**

Reference: (LU 2, Edit audio, LO 2.1, Adjust the standard waveform audio, Curriculum version 2019, page 406) remembering

07. Complete the following sentences using one of the words in brackets:

(normalization, fades, waveform, multitrack session, clipboard, noise reduction, sound remover, compression, plugins). **(5 marks)**

A..... is an image that represents an audio signal or recording.

b.is the process of removing noise from an audio signal.

c. The process of lessening the dynamic range between the loudest and quietest parts of an audio signal is called...

d. In.....the editor panel provides several elements that help you mix and edit different tracks sessions.

e. A much faster way to get your feature is called.....

Answers:

a. Wave form/ **1mark**

b. Noise reduction / **1mark**

c. Compression / **1mark**

d. Multitrack session / **1mark**

e. Normalization/ **1mark**

Reference: (LU 2, Edit audio, LO 2.1, Adjust the standard waveform audio, Curriculum version 2019, page 406) Understanding

08. Give any two (2) special effects which are used in audio editing. **(2 marks)**

Answers:

1. Compression / **1mark**
2. Noise reduction / **1mark**
3. Echo and delay/ **1mark**
4. Reverb / **1mark**
5. Modulation / **1mark**
6. Filter and EQ/ **1mark**
7. Limiter / **1mark**

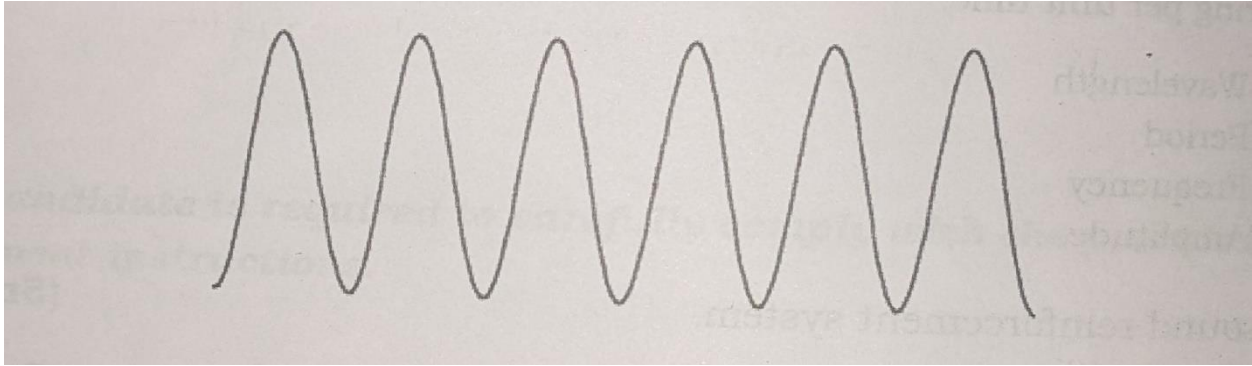
Reference: (LU 2, Edit audio, LO 2.2, Apply audio effects, Curriculum version 2019, page 407) Understanding

09. Give the types of sound wave. **(3marks)**

Answer:

Types of sounds waves are:

1. Longitudinal Sound Waves/ **1.5marks**
 2. Transverse Waves/ **1.5marks**
- 10.** Identify possible number of wave length (complete turn) found in the sound wave below: **(2marks)**



Answer:

There are **5** wave lengths (complete turn) /**2 marks**

11. Differentiate audio input transducer from audio output transducer.

(4 marks)

Answer:

- **Output transducer** is an audio electronic device that convert electrical signal to sound signal /**2 marks** While
- **Input transducer** convert sound signal to electrical signal /**2 marks**

Example:

- Output transducer. Output Speaker
- Input transducer: Microphone

Reference: LU: 3 connect the sound reinforcement system L.O 3.2: Connect audio devices, Curriculum level 5, Page: 393 year: 2019 APPLYING

12. How do you apply a compression effect to an audio recording in adobe audition?
(5marks)

Answers:

- ✓ Open adobe audition Import the recording(s)>Create a session (Multi/single track)/ **1mark**
- ✓ Load up a compressor / **1mark**
- ✓ Set the threshold, ration attack, release and output gain to your desired level / **3marks**

Reference: (LU 2, Edit audio, LO 2.2, Apply audio effects, Curriculum version 2019, page 407) applying

13. Show the steps of changing output hardware when you are editing in adobe audition. **(3 marks)**

Answers:

- Click on edit>Preferences / **1mark**
- Choose audio hardware / **1mark**
- Click on default output>Choose the output you want to the list of outputs / **1mark**

Reference: (LU 2, Edit audio, LO 2.3, Edit multitrack session, Curriculum version 2019, page 410) applying

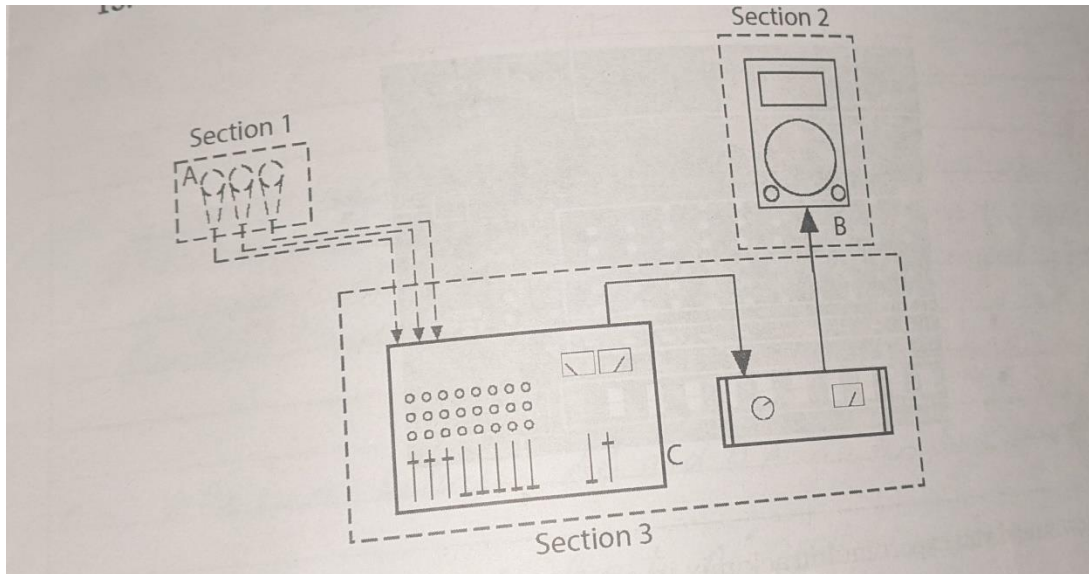
14. How do you apply audio normalization to the clips in adobe audition? **(3 marks)**

Answer:

- ✓ Open adobe audition> Import the clips you want to normalize / **1mark**
- ✓ Click on favorites menus/ **1mark**
- ✓ Choose the normalization preset you want (Normalize to -0.1dB or Normalize to -3dB) / **1mark**

15. The figure below indicates PA Sound System.

(10 marks)



a. Name the section 1, Section 2 and Section 3

b. Distinguish the use of instruments A, B and C

Answer:

a)

1: Input device

2: Audio Mixing and compressor

3: Output devices

b)

A: Microphone convert input sound signals to electrical signals

B. Studio monitor (speaker) convert electrical signal to sound signals C: Audio

mixer: used to mix one or two input signals change to output signals

Reference: LU: 2 Identify audio equipment and cables L.O 2.3. Classify audio transducers, Curriculum level 5, Page: 390 year: 2019 ANALYZING

16. Explain clearly at least five (5) types of loudspeakers.

(10 marks)

Answer:

five (5) types of loudspeakers are:

1. A full-range driver loudspeaker

A full-range driver is a speaker designed to be used alone to reproduce an audio channel without the help of other drivers, and therefore must cover the entire audio frequency range. /2marks

2. A subwoofer

A subwoofer is a woofer driver used only for the lowest-pitched part of the audio spectrum: typically, below 200 Hz for consumer systems, below 100 Hz for professional live sound, and below 80 Hz in approved systems. /2marks

3. A woofer

A woofer is a driver that reproduces low frequencies. /2marks

4. Mid-range speaker

Mid-range speaker is a loudspeaker driver that reproduces a band of frequencies generally between 1-6 kHz otherwise known as the 'mid' frequencies (between the woofer and tweeter). /2marks

5. A tweeter

A tweeter is a high-frequency driver that reproduces the highest frequencies in a speaker system. /2marks

6. Coaxial drivers

A coaxial driver is a loudspeaker driver with two or several combined concentric drivers. Coaxial drivers have been produced by many companies /2marks

7. Horn loudspeakers

Horn loudspeakers are the oldest form of loudspeaker system. /2Marks

Reference: LU: 3 connect the sound reinforcement system L.O 3.2: Connect audio devices, Curriculum level 5, Page: 393 year: 2019 ANALYZING

17. a. How hard knee and soft knee work when compressing an audio recording? **(6marks)**
- b. Differentiate parametric equalizer from graphic equalizer. **(4marks)**

Answer:

a) **Hard knee:** the gain reduction applied to the signal occurs as soon as the signal exceeds the level set by the threshold **/3marks. Hard knee compression** is a more immediate and obvious effect. **/1mark** Soft knee: the onset of gain reduction occurs gradually after the signal has exceeded the threshold, producing a more musical response (to some folks). **/2marks**

b) **Graphic equalizer** uses many narrow adjacent EQ bands to target specific frequencies/**1mark**. A graphic equalizer is the simpler type of audio equalizer, most often sporting multiple sliders or controls for boosting or cutting bands. **/1mark**

While

Parametric equalizer allows the user to change the width of each band for broader adjustment. **/1mark**

A parametric equalizer lets you control three aspects: level (boosting or cutting decibels), the exact frequency, and the bandwidth or range of each frequency. **/1mark**

Reference: (LU 3, Master audio mix, LO 3.2, Apply dynamic processing, Curriculum version 2019, page 412) Evaluating

18.a. Explain the following terms:

(5 marks)

- i. Bit rate
- ii. Bit depth
- iii. Sample rate
- iv. Sampling rate
- v. Audio file format

b. Justify why it is better to use glossy compressed formats rather than Lossless compressed formats.

(5marks)

Answers:

a.

i) Bit rate: refers to the number of bits within a unit of playback time to represent a continuous medium (such as audio) and describes the character of the sample. Bit rate is the number of bits transmitted per second. **/ 1mark**

ii) Bit depth: refers to the number of possible values to represent a sample of the signal. Bit depth is the number of bits used to describe each sample.

/ 1mark

iii) Sample rate: is the number of times the audio is sampled per second.

/ 1mark

iv) Sampling rate: is the number of samples per second (or per other unit) taken from a continuous signal to make a discrete or digital signal. **/ 1mark**

v) Audio file format: is a file format for storing digital audio data on a computer system. The bit layout of the audio data (excluding metadata) is

called the audio coding format and can be uncompressed, or compressed to reduce the file size, often using lossy compression. /1 mark

b) It is better to use lossy compressed formats rather than lossless compressed formats due to the following reasons: Lossy compressed formats occupy less disk space /1 mark compared to lossless compressed formats due to their smaller file size. /1 mark

Lossy compressed formats are easy to transfer to storage media /1 mark, download or upload on social media. /2 marks

Reference: (LU 3, Master audio mix, LO 3.3, Integrate audio and output, Curriculum version 2019, page 414) evaluating

19. What criteria would you consider to place indoor speakers for a good sound? **(10marks)**

Answer:

The criteria to be considered when placing indoor speakers for a good sound are the following:

- **Initial placement:** Decide roughly where you will be positioned when listening, and then place your speakers so that they form an equilateral triangle with your listening position. /1mark
- **Speaker separation:** Try to get about 4 feet of separation for bookshelf speakers or 8 feet for floor standing speakers. If your speakers are too close, sounds will blend together and become muddy. If they are too far apart, there will be a gap between the two halves of the stereo image. /3 marks
- **Speaker height:** Position your speakers so that the tweeters are at roughly the same height as your ears. /1mark
- **Wall proximity:** Move your speakers at least 2-3 feet away from the nearest wall. This will minimize sound reflections, which can negatively impact playback clarity. /1mark

- **Adjust speaker angle (toe-in):** Angle your speakers inward so they're pointed towards the listener more specifically, at a point directly behind the listener's head. If you want good sound across a wider listening area, then decrease toe-in. **2 marks**
- **Room arrangement:** Make sure no objects stand between your speakers and your ears. Strive for symmetry in speaker and furniture arrangement. The goal here is to minimize sound reflections as much as possible. /2 marks

Reference: (LU 3, Connect the sound reinforcement system, LO 3.2, Select Connect audio devices, Curriculum version 2019, page 393) Evaluating

SECTION C: Attempt only one (1) question.

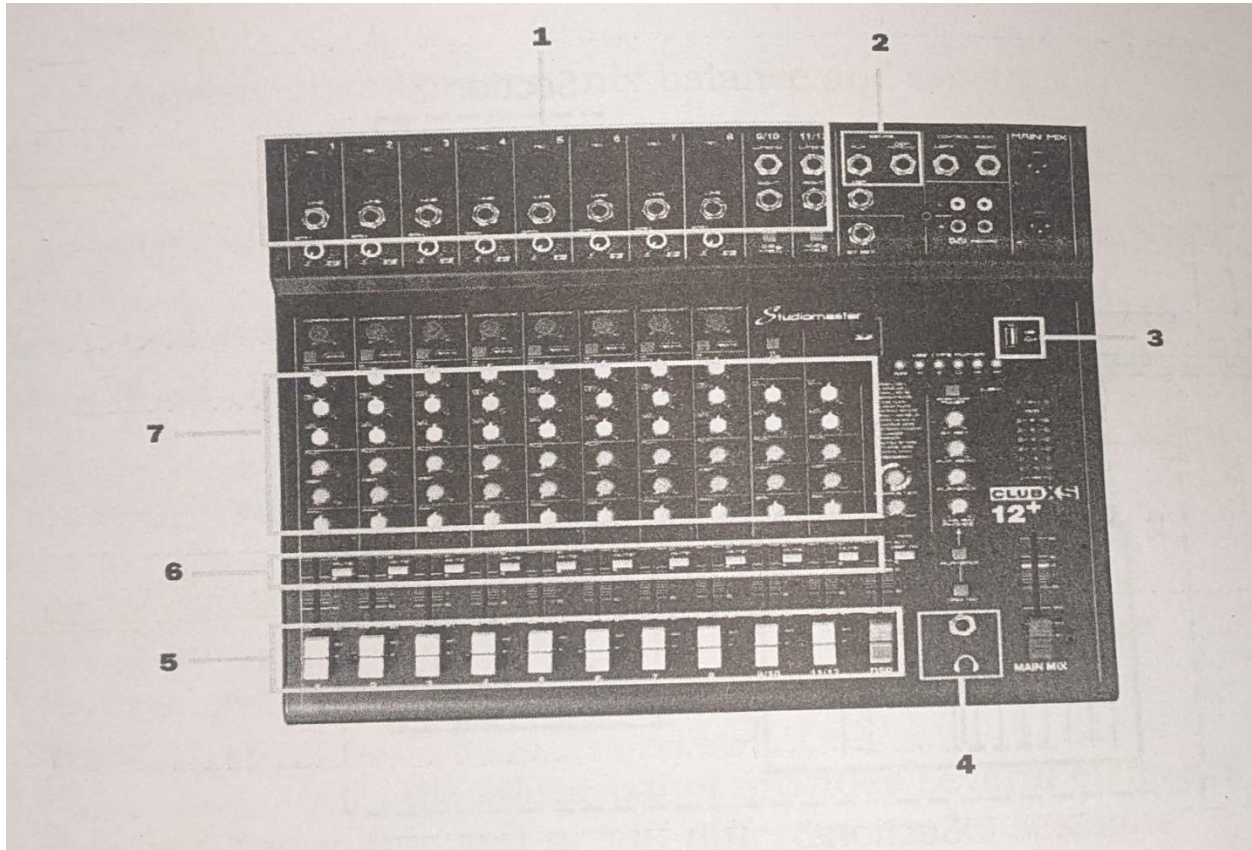
(15 marks)

20. a. What is an audio mixer?

(1mark)

b. Name the mentioned parts on the image below and discuss on the use of each part:

(14marks)



Answer:

a. **A sound mixer** is a device which takes two or more audio signals, mixes them together and provides one or more output signals. **/1mark**

b. 1. Audio input channel: This is where your microphone lead connects to the mixer. Signals that are coming in through this input are generally microphone level inputs (remember this as it will be important later).

/2marks

2. Output chassis connector: refer to the output chassis connector where speaker cable is plugged from loudspeaker. **/2marks**

3. Flash driver chassis connector refers to the connector located on audio mixer where the flash disk is plugged. **/2marks**

4. Phone jacket: refer to the phone plug to phone chassis connector used to connect audio mixer with head phone (head set) **/2marks**

5. Fader sliders: Fader sliders: This function lets you control the level (volume) of your signal leaving the track and going to the output(s) you have chosen in the Output section of the channel strip **/2marks**

6. Pre- fader listen: Turns the entire channel on or off **/2marks**

7. Equalization knob: Most mixers have at least two EQ controls (high and low frequencies), Good mixers have more advanced controls, in particular, Parametric equalization. See also: Audio equalization **/2marks**

Reference: LU: 3 connect the sound reinforcement system L.O 3.2: Connect audio devices, Curriculum level 5, Page: 393 year: 2019 CREATING

21. How would you export multitrack mix in adobe audition? **(15marks)**

Answers:

- -Choose File / 1mark> Export / 1mark> Multitrack Mix down/ 1mark.
- -Click one of the following depending on whether you want to export a selected portion of your audio, an entire session, or multiple clips,
- Time Selection / 1mark

- Entire Session / 1mark

- Selected Clips / 1mark

- -Specify a filename: The file name should be meaningful and memorable.

- -Choose a location you can remember/ 1mark -Choose the file format.
/ 1mark

- -Set the following options:
- Sample Type / 1mark
- Indicates the sample rate and bit depth. To adjust these options, click Change.
- New Sample Type / 1mark
- Indicates the resulting sample types of all the files in the panel after the conversion is applied.
- Format Settings/ 1mark
- Indicates data compression and storage modes; to adjust these, click Change.
- Mixdown Options / 1mark
- Let you mixdown tracks as separate files, or simultaneously output mono, stereo, and 5.1 mixdowns. To adjust these and other settings, click Change. / 2marks

END OF ASSESSMENT!