

IE-341

Section 1, CRN: 30512/513/514

Section 2, CRN: 30515/516/517

Section 3, CRN: 46950/951/952

First Semester 1435-36 H (Fall-2014) – 3(2,1,2)

“HUMAN FACTORS ENGINEERING

Sunday, Nov. 30, 2014 (08/02/1436H)

Homework 2

Name:	Student Number:	Section:
	4	Sun / Mon / Wed

Place the correct LETTER in the box at the right of each question [0.5 Points Each]

1. **Alarms have a higher auditory vs. visual ... compatibility.**

- A. movement
- B. spatial
- C. general
- D. modality
- E. conceptual

2. **Which of the following is an example of an identification display?**

- A. traffic lane
- B. traffic sign
- C. temperature gauge
- D. emergency signal
- E. map

3. **The heartbeat oscilloscope is an example of a ... display.**

- A. static, qualitative display
- B. dynamic, identification display
- C. dynamic, representational display
- D. dynamic, warning
- E. static, representational display

4. **All of the following are auditory coding dimensions ...** ☐
 - A. duration, brightness, intensity
 - B. on-off pattern, frequency, contrast
 - C. on-off pattern, frequency, intensity
 - D. color, frequency, intensity
 - E. on-off pattern, frequency, shape

5. **The signal intensity for a SNR of 5.5 B and 15 dB noise source is...** ☐
 - A. +40 dB
 - B. -40 dB
 - C. +20.5 dB
 - D. +70 dB
 - E. -70 dB

6. **The frequency of a sound oscillating 240 times every 0.75 seconds is ...** ☐
 - A. 0.18 kHz
 - B. 0.32 kHz
 - C. 1.8 kHz
 - D. 3.2 kHz
 - E. 0.031 kHz

7. **What is a result of a “masking” sound; it is mostly related to the ... of sound?** ☐
 - A. sound can be heard higher in one ear than another; discriminability
 - B. the ear becomes more sensitive to certain frequencies than others; detectability
 - C. two more individual sound waves are combined together; identification
 - D. the signal’s threshold of audibility is raised; detectability
 - E. the signal can just be detected 50% of the time by people; localization

8. **The JND of sound is highly related to ...; increase in frequency JND means...** ☐
 - A. identification; a smaller increase in frequency is needed to detect a difference
 - B. identification; a greater increase in frequency is needed to detect a difference
 - C. detectability; a smaller increase in frequency is needed to detect a difference
 - D. detectability; a greater increase in frequency is needed to detect a difference
 - E. discriminability; a greater increase in frequency is needed to detect a difference

9. To increase speech intelligibility in the presence of noise it is better to use ☐

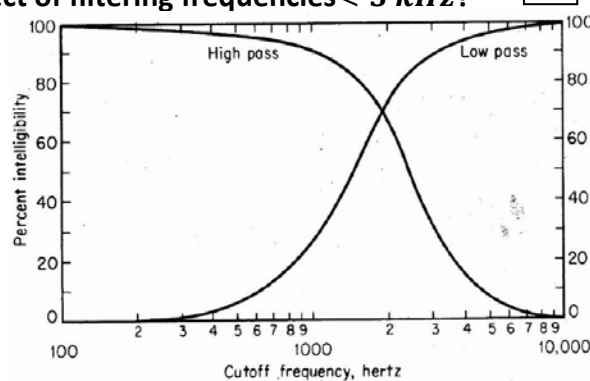
- A. meaningful sentences; less vocabulary
- B. monosyllables; less vocabulary
- C. non-sense phrases; more vocabulary
- D. meaningful sentences; more vocabulary
- E. non-sense phrases; less vocabulary

10. The ... is a [0 – 1] measure of speech intelligibility; it takes ... into consideration ☐

- A. preferred noise criteria; frequency
- B. articulation index; frequency
- C. signal-to-noise ratio; intensity
- D. preferred-octave speech interference level; frequency
- E. preferred noise criteria; intensity

11. From figure below, what is the approx. effect of filtering frequencies < 5 kHz? ☐

- A. intelligibility = 90% (high-pass filter)
- B. intelligibility = 70% (low-pass filter)
- C. intelligibility = 10% (high-pass filter)
- D. intelligibility = 10% (low-pass filter)
- E. intelligibility = 90% (low-pass filter)

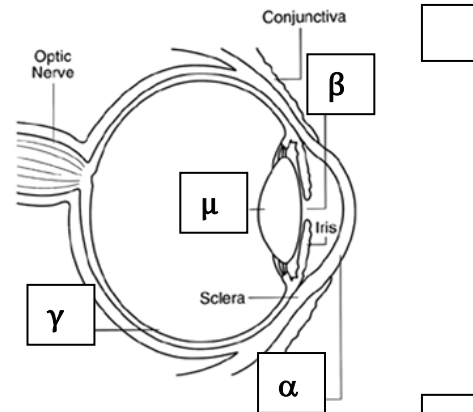


12. Arrange the following in decreasing negative effect on speech intelligibility: ☐

- A. reverberation; speeded speech; background voice
- B. reverberation; background voice; speeded speech
- C. background voice; reverberation; speeded speech
- D. background voice; speeded speech; reverberation
- E. speeded speech; background voice; reverberation

13. Label the diagram shown on the right

- A. α : cornea; β : pupil; μ : lens; γ : retina
- B. α : cornea; β : pupil; μ : retina; γ : lens
- C. α : pupil; β : cornea; μ : lens; γ : retina
- D. α : cornea; β : lens; μ : pupil; γ : retina
- E. α : lens; β : pupil; μ : retina; γ : cornea



14. Which of the following describes the purpose of the lens of the eye?

- A. Focuses light rays onto the retina
- B. Serves as an attachment point for the optic nerve
- C. Moves the eyeball
- D. It is a circular variable aperture that changes size according to the amount of light
- E. Serves as an attachment to the retina

15. The three types of ... photoreceptors are sensitive to the following three colors:

- A. rod; Blue, Green, Violet
- B. cone; Blue, Green, Red
- C. rod; Green, Orange, Yellow
- D. cone; Blue, Green, Yellow
- E. rod; Blue, Red, Violet

16. Equivalents of visual detectability, discriminability, and meaningfulness are ...

- A. legibility, readability, and visibility
- B. visibility, readability, and legibility
- C. visibility, legibility, and readability
- D. legibility, visibility, and readability
- E. readability, visibility, legibility

17. People who have $\frac{6}{4.5}$ acuity and can resolve 1 min. arc of detail at 20 feet have ... ☐

- A. normal vision
- B. myopia
- C. farsightedness
- D. higher-than-normal vision
- E. phoria

18. Which of the following is(are) an example(s) of an information sign(s)? ☐

- A. G and L
- B. L
- C. J
- D. H and K
- E. G



19. The ... visual code goes well with almost all others; but is not effective ... ☐

- A. brightness; due to masking weaker signals
- B. size; with limited space
- C. geometric shape; due to shape discrimination difficulty
- D. alphanumeric; due to letter/number confusion
- E. color; with color-defective people

20. The minimum acuity required to read a 40-pt size character from 60-ft distance is: ☐

- A. $\frac{20}{85}$
- B. $\frac{20}{86}$
- C. $\frac{20}{459}$
- D. $\frac{20}{38}$
- E. $\frac{20}{39}$

Rules:

- You must prepare and submit the homework **individually**.
- All work must be neatly typed and printed.
- Use **proper English**.
- Show all work.
- **BOX** your answer(s) and include the **units** (if applicable).
- **Due date:** the first class of Week 13 (beginning of class). NO late homework will be accepted.

$$VA = 3438 \frac{H}{D} \quad H_{ave} = \sum p_i \log_2 \left(\frac{1}{p_i} \right) \quad \% R = \left(1 - \frac{H}{H_{max}} \right) * 100$$