

# Biophysics Sample test (1. LF UK)

Below you can try a sample credit test for biophysics:

**1** Blood pressure of 160 mmHg:

- ☐ is referred to as mean pressure
- ☐ is considered pathological
- ☐ is the normal physiological value of systolic pressure
- ☐ is the normal physiological value of diastolic pressure

**2** The digital tonometer is based on:

- ☐ oscillometric principle
- ☐ on changes in the resistance of the strain gauge wire
- ☐ on changes in the capacity of the strain gauge wire
- ☐ none of the above options are correct

**3** Where will the speed of sound be the highest?

- ☐ in air at a temperature of 0°C
- ☐ in water at a temperature of 0°C
- ☐ in air at a temperature of 20°C
- ☐ in steel

**4** Sample activity

- ☐ grows linearly with time
- ☐ decreases exponentially with time
- ☐ decreases linearly with time
- ☐ grows exponentially with time

**5** What are the units of absorbed dose?

- ☐ Gy
- ☐ Bq
- ☐ J.kg<sup>-1</sup>
- ☐ this quantity is dimensionless

**6** A laser device is a current of:

- ☐ photons
- ☐ electrons
- ☐ positrons
- ☐ helium nuclei

**7** Reynolds number

- ☐ gives the critical speed in [m.s<sup>-1</sup>]
- ☐ is a quantity with the sign R
- ☐ determines the limit value when turbulent flow turns into laminar flow
- ☐ depends only on the viscosity and speed of the liquid and on the lumen of the vessel

**8** Hypoxic tissue:

- ☐ sensitivity to radiotherapy does not depend on oxygen content
- ☐ is radioresistant
- ☐ is radiosensitive
- ☐ has a normal sensitivity to radiotherapy

**9** Positive contrast agents:

- ☐ absorb radiation more than the examined organ

- ☐ on the X-ray image they cause a saturated shadow
- ☐ cause clarification on the X-ray image
- ☐ are substances with low absorption capacity

**10** Betatron uses the acceleration principle

- ☐ positrons and electrons
- ☐ protons and neutrons
- ☐ electrons
- ☐ heavy charged particles

**11** The rheobase is:

- ☐ current frequency that is needed for irritation
- ☐ current value at which tissue damage occurs
- ☐ the highest current that can still be used safely
- ☐ the smallest current that causes irritation

**12** Bipolar limb lead II:

- ☐ connects right leg and right hand
- ☐ connects left arm and left leg
- ☐ connects right leg and left hand
- ☐ connects right arm and left leg

**13** Applies to the audiogram:

- ☐ is used to record audiometry results
- ☐ has a curve for the right and left ear separately
- ☐ the pain threshold is recorded in it
- ☐ the curve that is marked in the audiogram is called an isophone

**14** Where does periosteal pain occur?

- ☐ at the interface of soft tissue and bone
- ☐ at the interface of two soft tissues
- ☐ at the interface of two tissues with similar bioimpedance to ultrasound
- ☐ anywhere in the organism that is affected by ultrasound

**15** Cannot be measured by spirometry

- ☐ resting tidal volume
- ☐ vital capacity
- ☐ residual volume
- ☐ inspiratory capacity

**16** Effective half time

- ☐ is always shorter than the biological half-life
- ☐ is always longer than the biological half-life
- ☐ is longer in real conditions than in physical conditions
- ☐ does not match any of the above definitions

**17** Quantum physics attributes to microworld objects:

- ☐ particle and wave character
- ☐ only wave character
- ☐ only particle character
- ☐ none of the listed options

**18** What electrical properties does the cell membrane have if a high current passes through the tissues? frequencies?

- ☐ the current flows only through the extracellular space
- ☐ for electric current becomes through
- ☐ represents an infinite resistance to electric current
- ☐ bioimpedance is proportional to the weight of the extracellular fluid

**19** Doppler effect in sonography enables:

- ☐ distance measurement
- ☐ measurement of acoustic resistance
- ☐ detection of speed and direction of flow
- ☐ measurement of tissue echogenicity

**20** Applies to wavelength

- ☐  $\lambda = c \cdot f$
- ☐  $\lambda = c/f$
- ☐  $\lambda = f/c$
- ☐  $\lambda = 1/f$

**21** The cones are in different areas of the retina:

- ☐ of the same shape
- ☐ same shape but different core
- ☐ of different shape and do not have a nucleus on the periphery of the retina
- ☐ different shape

**22** Astigmatism is corrected:

- ☐ distractions
- ☐ toric glasses
- ☐ couplings
- ☐ bifocal glasses

**23** Low power laser can damage

- ☐ internal organs
- ☐ the skin
- ☐ mucous membrane
- ☐ sight

**24** Close point

- ☐ is the closest point that the eye can see sharply with maximum accommodation
- ☐ moves away from the eye with increasing age
- ☐ is the closest point that the eye can see clearly without accommodation
- ☐ gets closer to the eye with increasing age

**25** For X-ray imaging methods, we use:

- ☐ of the current of electrons emitted from the cathode and accelerated by the high voltage between the cathode and the anode
- ☐ fluorescence, which is caused by a stream of electrons after passing through the examined object
- ☐ braking radiation caused by the impact of a current of positively charged electrons emitted from the anode and accelerated by the high voltage between the cathode and the anode
- ☐ beta-radiation emitted by cobalt emitters

**26** State quantities do not include:

- ☐ pressure
- ☐ internal energy
- ☐ work
- ☐ temperature

**27** Indicate the correct unit of the Boltzmann constant

- ☐ J
- ☐  $\text{J} \cdot \text{K}^{-1}$
- ☐  $\text{J} \cdot \text{K}$
- ☐  $\text{J} \cdot \text{K} \cdot \text{kg}$

**28** Brassoid X-rays:

- ☐ has a continuous spectrum
- ☐ can have a continuous or line spectrum

- ☐ is created by the transition of electrons on the levels
- ☐ no answer is correct

**29** The Doppler effect does not occur

- ☐ in a situation where the transmitter and receiver move at the same speed in different directions
- ☐ in a situation where the transmitter and receiver are at rest
- ☐ in a situation where the transmitter and receiver are moving at the same speed in the same directions
- ☐ no answer is correct

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