

Name: _____
Date: _____

MULTIPLE CHOICES. Choose the one alternative that best completes the statement or answers the question

1. Which is a cell organelle in human cells?

- A: testosterone
- B: centrosome
- C: chloroplast
- D: myozin

2. Which hormone is needed for most cells to take up glucose from the blood?

- A: thyroxine
- B: testosteron
- C: epinephrine (adrenaline)
- D: growth hormone
- E: insuline

3. Duplication of DNA molecules is called

- A: translation
- B: conjugation
- C: oxidative phosphorylation
- D: transcription
- E: replication

4. Which of the following is not needed for transcription?

- A: DNA
- B: promoter
- C: DNA polymerase
- D: RNA polymerase

5. One member of a couple is heterozygous for a recessively inherited disease. What is the chance that their child is going to be sick?

- A: 100%
- B: 75%
- C: 50%
- D: 25%
- E: 0%

6. Color blindness is an X chromosome linked recessive disease. In a couple the husband is colorblind, his wife has not got the mutation. What is the chance that their son is going to be colorblind?

- A: 100%
- B: 75%
- C: 50%
- D: 25%
- E: 0%

7. Which statement is true about viruses?

- A: antibiotics are useful against them
- B: some can have RNA as the material of inheritance
- C: they are living organisms
- D: they are unicellular

8. Which statement is true about meiosis?

- A: it happens in the ovaries and in the testis
- B: it produces diploid cells
- C: it happens in the heart
- D: does not happen in plants

9. Which protein in our blood is responsible for fighting bacterial infections?

- A: antimatter
- B: antigen
- C: antifever
- D: antibody
- E: antiglobulin

10. Which of the following is not a neurotransmitter?

- A: serotonin
- B: histon
- C: glutamine
- D: GABA
- E: dopamine

11. Which is part of the cell membrane ?

- A: RNA
- B: Phospholipids
- C: polysaccharides
- D: DNA

12. It is not true about white blood cells:

- A: they transport oxigen
- B: they participate in immune reactions
- C: they are produced in the bone marrow
- D: they fight infections

13. Blood poor in oxigen and rich in CO₂ arrives to the heart's:

- A: left ventricle
- B: right ventricle
- C: left atrium
- D: right atrium
- E: none of the above

14. Which part of the brain is responsible for hearing?:

- A: frontal lobe
- B: parietal lobe
- C: temporal lobe
- D: occipital lobe
- E: cerebellum

15. Which medicine should not be used for the diseases/symptoms below?:

- A: insulin for diabetes
- B: penicillin for influenza
- C: morphine for extreme pain
- D: viagra for erection problems
- E: aspirine for fever

16. Which is not true about the immune system?:

- A: T-cells mediate cellular immune response
- B: B-cells produce antibodies
- C: antibody types are IgA, IgB, IgC, IgD, IgE
- D: virus infected human cells are destroyed by T cells
- E: AIDS affects it

17. Which chromosome number abnormality is called Turner syndrome?:

- A: three 21st chromosome
- B: XXX (three X chromosome)
- C: XXY (two X, one Y chromosome)
- D: XYY (one X, two Y chromosome)
- E: X0 (one X only)

18. These parts of the digestive system normally contain bacteria:

- A: mouth
- B: stomach
- C: small intestine
- D: large intestine
- E. A and D

19. Which is not true for the hypophysis (pituitary gland)?

- A: the anterior pituitary produces growth hormone
- B: the posterior pituitary releases oxytocin and anti diuretic hormone (ADH/vasopressin)
- C: the anterior pituitary produces testis stimulating hormone (TSH)
- D: the anterior pituitary produces follicle stimulating hormone (FSH)
- E: the anterior pituitary produces luteinising hormone (LH)

20. It is not true for mitosis

- A: it is a cell division producing two genetically identical cells
- B: diploid cells are produced by mitosis
- C: centrosomes play important role in assembly of the mitotic spindle
- D: microtubules attach to chromosomes at their telomeres

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- 1. The bromine atom has an atomic number of 35 and a mass number of 80. Therefore, a bromine atom has _____ neutrons.**
 - A) 35
 - B) 45
 - C) 79
 - D) 80
 - E) 7
- 2. A mole of N₂**
 - A) contains 1.2×10^{24} atoms.
 - B) contains 1.2×10^{24} molecules.
 - C) contains 14 grams of nitrogen.
 - D) is 1.2×10^{24} grams of nitrogen.
 - E) none of the above
- 3. Which of the following is NOT true of atoms?**
 - A) The mass of an atom is mostly in the nucleus.
 - B) The mass number is the sum of the numbers of protons and neutrons.
 - C) Atoms are electrically neutral.
 - D) The nucleus contains protons and electrons.
 - E) Isotopes of an element have the same number of protons.
- 4. Which type of chemical bond is formed between two atoms by the sharing of two electrons, with one electron from each atom?**
 - A) ionic
 - B) covalent
 - C) metallic
 - D) coordinate covalent
 - E) none of the above
- 5. Which of the following is NOT true for the noble gases?**
 - A) They have low melting points and boiling points.
 - B) They have a great tendency to share or gain electrons to form a chemical bond.
 - C) They consist of single free atoms.
 - D) Their atomic radii increase with increasing molar mass.
 - E) Their valence shells are completely filled.

6. Which of the following types of bonding is the weakest?
- A) dipole-dipole force
 - B) covalent bond
 - C) ionic bond
 - D) hydrogen bonding
 - E) London dispersion force
7. What is the molarity of a KBr solution containing 2.38 g of KBr in 0.1 liters of solution? (Atomic masses: K=39; Br=80)
- A) 0.02 M
 - B) 0.2 M
 - C) 15.8 M
 - D) 2 M
 - E) 0.238 M
8. A chemical compound that acts as a proton acceptor is known as
- A) an Arrhenius acid.
 - B) an Arrhenius base.
 - C) a Bronsted-Lowry acid.
 - D) a Bronsted-Lowry base.
 - E) a reducing agent.
9. According to VSEPR theory, which one of the following molecules should have a *bent* shape?
- A) CO₂
 - B) CH₄
 - C) NH₃
 - D) H₂O
 - E) BH₃
10. Which formula represents a salt?
- A) NaF
 - B) HNO₃
 - C) KOH
 - D) Cl₂
 - E) H₂S
11. The precipitate formed when aluminum chloride is treated with sodium hydroxide is ____
- A) Al₂(OH)₃
 - B) AlOH
 - C) Al(OH)₃
 - D) Al(OH)₂
 - E) Al₃(OH)₂

12. What is the oxidation number of Cl in NaClO_4 ?

- A) +7
- B) +6
- C) +3
- D) +1
- E) -1

13. Which half-reaction correctly represents oxidation?

- A) $\text{Zn}^{2+} + 2\text{e}^- \rightarrow \text{Zn(s)}$
- B) $\text{Zn}^{2-} \rightarrow \text{Zn(s)} + 2\text{e}^-$
- C) $\text{Zn(s)} + 2\text{e}^- \rightarrow \text{Zn}^{2+}$
- D) $\text{Zn(s)} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$
- E) $\text{Zn}^{2+} \rightarrow \text{Zn(s)} + 2\text{e}^-$

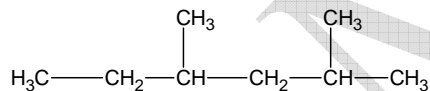
14. What is the pH of a 0.0001 M HCl solution?

- A) 1
- B) 8
- C) 4
- D) 3
- E) 10

15. The reaction between an alcohol and a carboxylic acid is an example of _____ .

- A) an addition
- B) a substitution
- C) a saponification
- D) an elimination
- E) an esterification

16. Select the correct IUPAC name for:

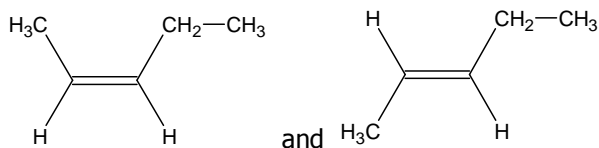


- A) 1,1,3-trimethylpentane
- B) 1-ethyl-1,3-dimethylbutane
- C) 3,5-dimethylhexane
- D) 3,5,5-trimethylpentane
- E) 2,4-dimethylhexane

17. The hydrocarbons with a triple covalent carbon-carbon bond are called

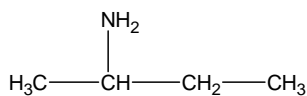
- A) alkanes
- B) alkenes
- C) alkynes
- D) alcohols
- E) aldehydes

18. Determine the relationship between the two molecules shown.



- A) constitutional isomers
- B) cis-trans isomers
- C) identical
- D) optical isomers
- E) none of the above

19. The compound below is classified as a _____.



- A) amide
- B) alcohol
- C) primary amine
- D) secondary amine
- E) tertiary amine

20. Cellobiose is a _____.

- A) protein
- B) disaccharide
- C) nucleic acid
- D) monosaccharide
- E) lipid

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1. Read the sentences below and then decide which option (a, b, c or d) best fits each space. Put a circle round the letter you choose.

1. The norovirus causes illness 24 hours to 48 hours after exposure, and can cause a sickness that ... three days. It is not life-threatening. It can be passed through food or touching infected surfaces.

- a. lasts to
- b. last to
- c. lasts up to
- d. last up to

2. Temperature can affect the sound of a musical instrument in a variety of ways, ... different for each instrument.

- a. although often
- b. with
- c. while
- d. which are

3. Why do traffic jams sometimes ... to appear out of nowhere?

- a. look
- b. occur
- c. seem
- d. happen

4. It is no secret that healthy natural environments ... healthy human lives.

- a. make up
- b. contribute to
- c. lead for
- d. result with

5. For humans, running a given distance requires 50 to 80 percent more energy than walking ... distance does.

- a. equivalent
- b. the same
- c. equal
- d. identical

6. The best available supply of nutrients in insects. Your most vital nutritional needs in a survival situation are protein and fat, and most insects ... rich in both.

- a. provide
- b. are rarely
- c. contain
- d. are

7. The ocean provides a dependable and affordable source of... for many.

- a. entertainment
- b. pollution
- c. recreation
- d. fishing

8. After a muscle fibre has worked intensely for ..., it begins to lose potassium, and that dampens the fibre's ability to contract.

- a. while
- b. a while
- c. time
- d. a time

9. The hospital is now discounting 10 standard operations and ... , ranging from having a baby and treating a cataract to undergoing a heart bypass.

- a. equipment
- b. visits
- c. medication
- d. procedures

10. A no-smoking program has ... overweight people reduce their risk of heart attacks or their need for surgery by 63%.

- a. helped
- b. help
- c. helping
- d. the help

2. These sentences have been divided into separate halves. Match the half sentences in the first column with the half sentences in the second column.

1.	Cholera spread rapidly	A	and become increasingly able to infect.
2.	The tip of the femur	B	as the person breathes in.
3.	Impulses are transmitted along	C	his chest condition.
4.	Nasal congestion can be relieved	D	motionless for hours.
5.	Bacteria can mutate suddenly	E	because of insanitary conditions in town.
6.	The chest expands	F	form in the pre-op area.
7.	The cold damp weather exacerbated	G	her condition required surgery.
8.	The doctors decided that	H	with antihistamines.
9.	Catatonic patients can sit	I	the neural pathways.
10.	The patient signed an informed consent	J	fits into a socket in the pelvis.

3. Read the sentences and decide which word/definition is the right answer.

Chickenpox is the common English name of:

- a. mumps
- b. varicella
- c. pertussis
- d. rubella

An otologist treats patients who have:

- a. cancer
- b. dental problems
- c. eating disorders
- d. ear problems

The heart has ... chamber(s).

- a. one
- b. two
- c. three
- d. four

Rhinoplasty is an operation performed on the:

- a. ribs
- b. nose
- c. knee
- d. ear

The spleen is part of the:

- a. musculoskeletal system
- b. respiratory system
- c. lymphatic system
- d. reproductive system

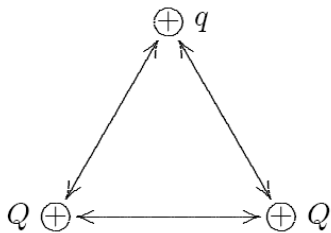
4. Write a short essay of about 200 words on the structure and function of the human digestive system.

SAMPLE 3

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MULTIPLE CHOICES. Choose the one alternative that best completes the statement or answers the question

1. Two particles, each with charge $+Q$, and a third particle, with charge $+q$, are placed at the vertices of an equilateral triangle as shown. The total force on the particle with charge $+q$ is:



- A. parallel to the left side of the triangle.
 - B. parallel to the right side of the triangle.
 - C. parallel to the bottom side of the triangle.
 - D. perpendicular to the bottom side of the triangle.
 - E. perpendicular to the left side of the triangle.
- 2. Let k denote $1/4\pi\epsilon_0$. The magnitude of the electric field at a distance r from an isolated point particle with charge q is:**
- A. kq/r .
 - B. kr/q .
 - C. kq/r^3 .
 - D. kq/r^2 .
 - E. kq^2/r^2 .
- 3. A 60 watt light bulb carries a current of 0.5 A. The total charge passing through it in one hour is:**
- A. 4200 C.
 - B. 3600 C.
 - C. 3000 C.
 - D. 2400 C.
 - E. 1800 C.
- 4. A current of 0.5 A exists in a 60 ohm lamp. The applied potential difference is:**
- A. 15 V.
 - B. 30 V.
 - C. 60 V.
 - D. 120 V.
 - E. 240 V.

5. The mass of an electron:

- A. is almost the same as that of a neutron.
- B. is negative.
- C. equals that of a proton.
- D. is zero if the electron is at rest.
- E. is much less than that of a proton.

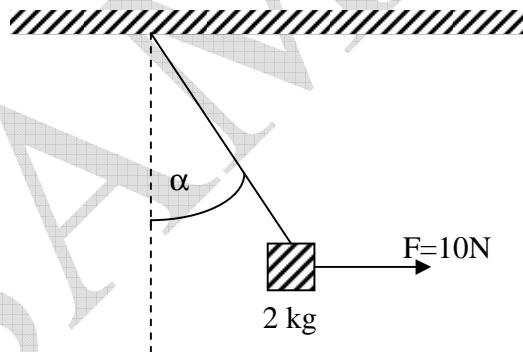
6. What is the SI unit of torque?

- A. $J \cdot s$.
- B. N .
- C. $J \cdot m$.
- D. $N \cdot m$.
- E. $J \cdot m \cdot s$.

7. The force required to hold an object of mass m and speed v a circular path of radius r is called the centripetal force and is given :

- A. $\frac{m \cdot v}{r^2}$.
- B. $\frac{m \cdot v^2}{r}$.
- C. $\frac{m}{r^2 \cdot v}$.
- D. $m \cdot v \cdot r^2$.
- E. $\frac{m \cdot \omega^2}{r}$.

8.



A 2 kg box hangs by a massless rope from a ceiling. A force slowly pulls the box horizontally to the side until the horizontal force is 10 newtons. The box is then in equilibrium as shown above. The angle that the rope makes with the vertical is closest to

- A. 15° .
- B. 30° .
- C. 45° .
- D. 60° .
- E. 75° .

9. Choose one from the answers which complete the sentence and makes it true.

The density of an ideal gas is

- A. directly proportional with the pressure and temperature.
- B. directly proportional with the pressure and molar mass.
- C. directly proportional with the molar mass and independent from the temperature.
- D. inversely proportional with the temperature and the molar mass.
- E. inversely proportional with the pressure and directly proportional with the molar mass.

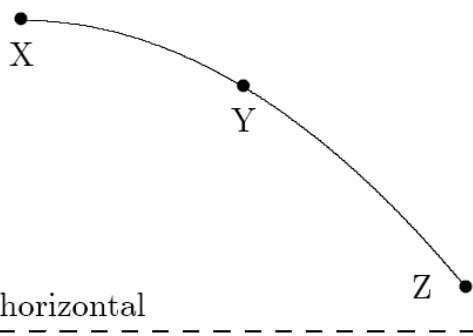
10. Temperature of 6 liter air increased from 27 C° to 135 C° at constant pressure. How large is its volume?

- A. 30.00 liter.
- B. 4.08 liter.
- C. 8.16 liter.
- D. 16.32 liter.
- E. 32.64 liter.

11. A car, initially at rest, travels 20 m in 4 s along a straight line with constant acceleration. The acceleration of the car is:

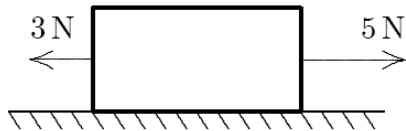
- A. 0.625 m/s².
- B. 1.25 m/s².
- C. 2.5 m/s².
- D. 5.0 m/s².
- E. 10.0 m/s².

12. A stone is thrown horizontally and follows the path XYZ shown. The direction of the acceleration of the stone at point Y is:



- A. ↓
- B. →
- C. ↘
- D. ↙
- E. ↗

13. The block shown moves with constant velocity on a horizontal surface. Two of the forces on it are shown. A frictional force exerted by the surface is the only other horizontal force on the block. The frictional force is:



- A. slightly less than 2 N, leftward.
- B. 2N, leftward.
- C. 2N, rightward.
- D. slightly more than 2N, leftward.
- E. slightly less than 2N, rightward.

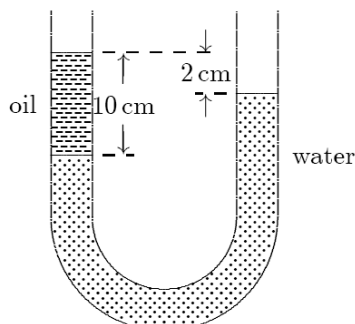
14. A man sits in the back of a canoe in still water. He then moves to the front of the canoe and sits there. Afterwards the canoe:

- A. is forward of its original position and moving forward.
- B. is forward of its original position and moving backward.
- C. is rearward of its original position and moving forward.
- D. is rearward of its original position and moving backward.
- E. is rearward of its original position and not moving.

15. A 10 kg block of ice is at rest on a frictionless horizontal surface. A 1.0 N force is applied in an easterly direction for 1.0 s. During this time-interval, the block:

- A. acquires a speed of 1 m/s.
- B. moves 0.10 m.
- C. acquires a momentum of 1.0 kg·m/s.
- D. acquires a kinetic energy of 0.1 J.
- E. none of the above.

16. The density of water is 1000 kg/m^3 . The density of the oil in the left column of the U-tube shown below is:

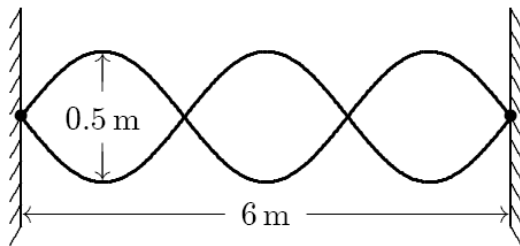


- A. 900 kg/m^3 .
- B. 800 kg/m^3 .
- C. 700 kg/m^3 .
- D. 600 kg/m^3 .
- E. 500 kg/m^3 .

17. In simple harmonic motion, the restoring force must be proportional to the:

- A. amplitude.
- B. frequency.
- C. velocity.
- D. displacement.
- E. displacement squared.

18. A standing wave pattern is established in a string as shown. The wavelength of one of the component travelling waves is:



- A. 0.25 m.
- B. 0.5 m.
- C. 1 m.
- D. 2 m.
- E. 4 m.

19. The heat of fusion of water is 333 kJ/kg. This means 333 J of energy are required to:

- A. raise the temperature of 1 g of water by 1 K.
- B. turn 1 g of water to steam.
- C. raise the temperature of 1 g of ice by 1 K.
- D. melt 1 g of ice.
- E. increase the internal energy of 1 g of water by 1 cal.

20. The magnitude of the charge on an electron is approximately:

- A. 10^{23} C.
- B. 10^{-23} C.
- C. 10^{19} C.
- D. 10^{-19} C.
- E. 10^9 C.