Biology - Entrance examination sample test

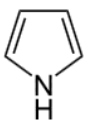
1	**Which organelle contains strong hydrolytic enzymes?** A) the ribosome C) the lysozome B) the vacuole D) the golgi complex
2	**The human abdominal cavity contains the:** A) spleen and duodenum C) lungs and trachea B) heart and pericardium D) thyroid gland
3	**Choose a typical plant cell organelle:** A) plastid C) Golgi apparatus B) nucleus D) endoplasmic reticulum
4	**The chromosomal mutations arise through:** A) the loss of one nucleotide C) the breaking apart of chromosome B) the interchange of one nucleotide with another D) the inclusion of a superfluous nucleotide
5	**Which one of the following <u>is not</u> a part of the cardiovascular system of the Vertebrates** A) arteries C) capillaries B) veins D) bronchioli
6	**Xrays were discovered during the late nineteenth century by:** A) Hooke C) Harvey B) Müller D) Roentgen
7	**The B- lymphocytes are responsible for:** A) diapedesis C) antibody defense B) agglutination D) detoxification
8	**Prokaryotes include** A) yeasts C) protozoa B) bacteria D) green algae
9	**RNA synthesis takes place in:** A) nucleus C) endoplasmic reticulum B) cytoplasm D) ribosomes
10	**The antigens of erythrocytes are called:** A) agglutinins C) agglutinogens B) erythrogenes D) antibodies
11	**A hematocrit is a measure of :** A) blood volume C) total number of blood cells B) volume percentage of red blood cells D) number of white blood cell
12	**The capacity of a nerve or muscle cell to respond a stimulus is called** ……
13	**Among the major milestones in human evolution we include:** A) development of muscles C) bilateral body symmetry B) enlargement of brain D) segmentation of body
14	**Which one of the following pairs is NOT properly matched:** A) cartilage – chondrocytes C) joints – periosteum B) muscles – fasciae D) bones – osteoblasts

15	**The human pulmonary circulation ends in the:** A) right atrium C) left ventricle B) right ventricle D) left atrium
16	**Which one of the following endocrine gland /hormone pairs does NOT match?** A) adenohypophysis- thyrotropin C) testicle – testosteron B) pancreas – glucagon D) neurohypophysis - lutropin
17	The genotype of a dominant homozygous individual is: A) AaBb C) AABB B) Aabb D) AaBB
18	**Slender extensions of the plasma membrane that increase the surface area for absorption are:** A) mitochondria D) vacuoles B) microvilli E) microfilaments C) microtubules
19	**The main control center for the heart is located in the:** A) cerebellum C) medulla oblongata B) brain cortex D) pons
20	**Integumentary glands, that empty their secretions into hair follicles of the skin are:** A) sebaceous glands C) ceruminous glands B) endocrine glands D) mammary glands

Solutions

1 C
2 A
3 A
4 C
5 D
6 D
7 C
8 B
9 A
10 C
11 B
12 excitability
13 B
14 C
15 D
16 D
17 C
18 B
19 C
20 A

CHEMISTRY – Entrance examination sample test

1	**The density of aluminium is 2.70 g/cm^3. Express this value in units kg/m^3.** A) 0.27 kg/m^3 B) 2.7 kg/m^3 C) 27 kg/m^3 D) 2.7 $\times$ 10^3 kg/m^3	
2	**Find the correct statement:** A) Proton and neutron have the same charge. B) Electron and proton have the same mass. C) Proton and neutron have the same mass. D) Electron and neutron have opposite charges.	
3	**Identify the weak base:** A) 1% NaOH B) 0.1 mol/l KOH C) 1% NH_3 D) 2% $Ca(OH)_2$	
4	**Assign oxidation states to all atoms in $KMnO_4$:** A) K: +3 ; Mn +5; O: -2 B) K: -1 ; Mn -7; O: +2 C) K: +4 ; Mn +4; O: -2 D) K: +1 ; Mn +7; O: -2	
5	**$CH_3(CH_2)_7CH=CH(CH_2)_7COOH$ is formula of:** A) palmitic acid B) stearic acid C) arachidonic acid D) oleic acid.	
6	**Which one of the following pairs is not properly matched:** A) maltose – disaccharide B) sucrose - monosaccharide C) fructose – monosaccharide D) glycogen - polysaccharide	
7	**Write balanced equation for the following process: hydrogen sulfide burns in air to produce sulfur dioxide and water:**	
8	**Chloroform is a liquid that was used as a surgical anesthetic. If the density of chlorophorm is 1.49 g/ml, what is the volume of 25 g of chloroform?** A) 16.5 ml B) 37.25 ml C) 17 ml D) 37 ml	
9	**What is the chemical formula for the compound sodium iodate?** A) NaI B) $NaIO_3$ C) Na_2I D) NaIO	
10	**How many atoms of hydrogen are in 1 mole of water (H_20)?** A) 1.2 x 10^{25} atoms of hydrogen B) 1.20 x 10^{24} atoms of hydrogen C) 1.2 x 10^{26} atoms of hydrogen D) 1.2 x 10^{23} atoms of hydrogen	
11	**What is the molarity of a solution containing 72 grams of HCl in enough water to make 500 mL of solution?** A) 8 B) 4.8 C) 2.4 D) 4	
12	**The ionic compound containing Fe^{3+} and SO_4^{2-} would have the formula:** A) $FeSO_4$ B) Fe_2SO_4 C) $Fe_2(SO_4)_3$ D) $Fe_3(SO_4)_2$	
13	**Balance the following equation:** __ KOH + __ H_3PO_4 → __ K_3PO_4 + __ H_2O	
14	**Which is the correct name of a compound with formula H_3PO_4:** A) Phosphorous acid B) Phosphor (III) acid C) Phosphoric acid D) Sulphurous acid	
15	**Optically active molecules which rotate plane-polarized light in a counterclockwise direction are said to be:** A) levorotary B) of R configuration C) dextrorotary D) of S configuration	
16	**What is the name of the following compound?**  A) pyridine B) pyrimidin C) pyrrole D) piperdine	

17	**Name the following compounds:** A) $CH_3CH_2CH_2NH_2$ …… B) $CH_3CH_2NHCH_2CH_3$ ……..
18	**Calculate the pH of 0.1 mol/l HCl:**
19	**Give the name of the following compound:** $CH_3 – CHNH_2 – COOH$ ……
20	**Give the structural formula for methyl propyl ether:**

In calculations, you may use these approximations of basic constants (select those you need):

Atomic mass unit	1.66×10^{-27} kg
Avogadro constant	6×10^{23}
Elementary charge	1.6×10^{-19} C
Faraday constant	9.65×10^{4} C mol^{-1}
Gas constant	8.3 J K^{-1} mol^{-1}
Mass of electron	9.1×10^{-31} kg
Molar volume of gases	22.4 l

Relative atomic mass:

Oxygen	16
Hydrogen	1
Chlorine	35
Sodium	23
Potassium	39
Carbon	12

Solutions

1 D
2 C
3 C
4 D
5 D
6 B
7 $2\ H_2S + 3\ O_2 \rightarrow 2\ H_2O + 2\ SO_2$
8 C
9 B
10 B
11 D
12 C
13 $3\ KOH + __\ H_3PO_4 \rightarrow __\ K_3PO_4 + 3H_2O$
14 C
15 A
16 C
17 aminopropane, propylamine; diethylamine
18 1
19 alanine, aminopropanoic acid
20 $CH_3 –O–CH_2 –CH_2 –CH_3$

PHYSICS – Entrance examination sample test

1	**How much power does a television use if it draws 2.00 A on a 120 V line?**	
2	**The SI unit of pressure is:** **It can be expressed in base unit of the SI system as:** A) $kg.m^{-1}.s^{-2}$ B) $kg.m^{-2}.s^{2}$ C) $kg.m.s^{-2}$ D) $N.m^{-1}.s^{-2}$	
3	**The particle theory of light explains:** A) diffraction of light around a sharp edge B) the photoelectric effect C) refraction of light at a boundary D) none of the above	
4	**An ampere-hour or amp-hour (symbol A•h, Ah) is an alternative unit for:** A) electric charge B) electric current C) electric potential D) electric power	
5	**The current in a battery with cells connected in series equals the:** A) current in the individual cells B) the reciprocal of the sum of currents in individual cells C) sum of the currents of all cells D) potential of individual cells	
6	**A solid metal cylinder of diameter 32 mm and length 11 mm has a mass of 24 g. Calculate its density :**	
7	**Three identical resistors R are connected in parallel. Combined resistance is:** A) 9 R B) 3 R C) 1 R D) 1/3 R	
8	**The sound waves:** A) with frequency above 20 kHz are called ultrasonic waves B) with frequency above 20 kHz are called infrasonic waves C) that young, healthy adults can hear are in the range from approximately 20 kHz to 20 MHz D) with frequency below 20 kHz are called ultrasonic waves	
9	**Find the correct combination of physical quantity and dimension of unit:** A) acceleration-$kg.m.s^{-2}$ B) heat-$kg.m.s^{-2}$ C) velocity-$m.s^{-2}$ D) force-$kg.m.s^{-2}$	
10	**Common unit for specific heat capacity is:** A) J/(kg.°C) B) J/°C C) J D) J/mol	
11	**The ability of the surface of water to support a needle is an example of:** A) mass density B) surface tension C) stress D) diffusion	
12	**What is the energy of a photon of electromagnetic radiation with frequency 8.95×10^{10} Hz?**	
13	**Force** A) is a vector of quantity B) does not always cause motion C) may be different from weight D) all of the previous	
14	**The aircraft takes off 40 s after the start with a velocity of 300 km/hour. The acceleration on the runway is:** A) 2.1 $m.s^{-2}$ B) 3 $kg.m.s^{-2}$ C) 2 $kg.s^{-1}$ D) 8 $m.s^{-2}$	
15	**The principle stating that a change in pressure at any point in an enclosed fluid at rest is transmitted undiminished to all points in the fluid is:** A) Pascal's law B) Archimedes' principle C) Newton's law D) Bernoulli's principle	
16	**Calculate the average speed of a particle that travels a distance of 0.3 nm in a time of 2.0×10^{-18} s:**	

17	**All atoms of a given element have:** A) the same number of neutrons B) the same number of protons C) the same mass number D) the same number of electrons	
18	**A rock of mass 10.8 kg displaces 3200 cm^3 of water. What is the mass density of the rock?**	
19	**What is the change in gravitational potential energy of a stone (mass = 3 kg) lifted on the top of building (height = 20 m)?** A) 300 J C) 600 J B) 1200 J D) 1880 J	
20	**Velocity is the:** A) distance travelled per unit of time B) direction of travel and distance travelled per unit of time C) same as speed D) only the direction of speed	

In calculations, you may use these approximations of basic constants (select those you need):

Atomic mass unit	1.66×10^{-27} kg	Gas constant	8.3 J K^{-1} mol^{-1}
Avogadro constant	6×10^{23}	Gravitational acceleration	10 $m.s^{-2}$
Elementary charge	1.6×10^{-19} C	Molar volume of gases	22.4 l
Planck constant	6.6×10^{-34} J·s		

Solutions

1 240 W

2 Pa, A

3 B

4 A

5 A

6 2.71 g/cm^3; 2710 kg/m^3

7 D

8 A

9 D

10 A

11 B

12 5.9×10^{-23} J

13 D

14 A

15 A

16 1.5×10^8 m/s

17 B

18 3.38 g/cm^3; 3380 kg/m^3

19 B

20 B