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 x 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 x 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