BRILLIANT PUBLIC SCHOOL , SITAMARHI

(Affiliated up to +2 level to C.B.S.E., New Delhi)

Affiliation No. - 330419

XI-Physics MCQs

Session : 2014-15

Office: Rajopatti, Dumra Road, Sitamarhi(Bihar), Pin-843301
Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com
Ph.06226-252314, Mobile: 9431636758, 9931610902

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #1

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. Fermi is a unit of...
A. length
B. mass
C. time
D. electric flux

2. The horizontal component of a force of 10 N inclined at 30° to the vertical is...
A. 5 N
B. $5\sqrt{3}$ N
C. 3 N
D. $10/\sqrt{3}$ N

3. The acceleration due to gravity on Mars is 3.7 m/s^2. Compared with her mass and weight on the earth, an astronaut on Mars has...
A. less mass and less weight
B. more mass and more weight
C. the same mass and less weight
D. the same mass and more weight

4. To keep a vehicle moving at the speed v requires a force F. The power needed is...
A. F.v
B. $(1/2)F.v^2$
C. F/v
D. F/v^2

5. When the velocity of a moving object is doubled...
A. its acceleration is doubled
B. its momentum is doubled
C. its kinetic energy is doubled
D. its potential energy is doubled

6. The intermolecular potential is dependent on...
A. the shape of the molecules only
B. the molecular separation only
C. both the shape and the molecular separation
D. none of the above

7. A cable stretches by amount 'a' under a certain load. If it is replaced by a cable of the same material but half as long and half the diameter, the same load will stretch it by...
A. a/4
B. a/2
C. a
D. 2a

8. A certain person's heart beats 1.2 times per second and pumps 1.0×10^{-4} m^3 of blood per beat against an average pressure of 14 kPa. The power output of the heart is...
A. 1.2 W
B. 1.4 W
C. 1.7 W
D. 12 W

9. At which of the following temperatures would the molecules of a gas have twice the average kinetic energy they have at 20 °C
A. 40 °C
B. 80 °C
C. 313 °C
D. 586 °C

10. For monatomic gases, C_p/C_v is equal to...
A. 1.67 B. R
C. 1.67 R D. 1.5 R

11. Of the following the one that is a vector is...
A. electric charge
B. electric field
C. electric energy
D. potential difference
12. Diamagnetic materials are substances that...
A. create a strong magnetic field
B. are attracted by a magnetic field
C. are repelled by a magnetic field
D. have double magnetism
13. When a ferromagnet is inserted in a current-carrying loop, the magnetic field...
A. decreases slightly
B. decreases greatly
C. does not change
D. increases greatly
14. A light ray passes through a prism with an angle of incidence θ, an angle of deviation δ and an angle of emergence ε. Minimum deviation occurs when...
A. $\delta = \theta$
B. $\delta = \varepsilon$
C. $\theta = \varepsilon$
D. $\delta = \theta - \varepsilon$
15. The image a camera forms on the film is...
A. always real
B. always virtual
C. always erect
D. sometimes inverted
16. If for the planets in solar system, r is the radius of the orbit and T is the periodic time, then the ratio r^3/T^2 is...
A. 1
B. same for all planets
C. more for farther planets
D. less for farther planets
17. A boy swings from a rope 4.9 m long. His approximate period of oscillation is...
A. 0.5 s
B. 3.1 s
C. 4.4 s
D. 12 s
18. The primary effect when the source is moving is a change in...
A. frequency
B. amplitude
C. wavelength
D. both frequency and amplitude
19. The distance between a node and the immediate next antinode is...
A. λ
B. $\lambda/2$
C. $\lambda/3$
D. $\lambda/4$
20. A thin ring has mass M and radius R. Its moment of inertia about the axis passing through its center and perpendicular to its plane is...
A. MR^2
B. M^2R
C. M/R^2
D. M^2/R

21. Two satellites have periods P_1 and P_2, respectively. Their heights above the surface of the earth are h_1 and h_2, respectively. If $h_1 > h_2$, then...

A. $P_1 > P_2$

B. $P_1 = P_2$

C. $P_1 < P_2$

D. $P_1^2 > P_2^2$

22. A projectile is thrown in the direction making an angle θ with the horizontal. The projectile attains maximum height for θ equal to...

A. 0

B. π/4

C. π/2

D. π

23. A Carnot engine operates between 800K and 200K. If it absorbs 8 kJ of heat in each cycle, the work done by it per cycle is...

A. 1 kJ

B. 2 kJ

C. 2.7 kJ

D. 6 kJ

24. In a uniform segment of a circuit the current is proportional to the...

A. density of the segment

B. resistance of the segment

C. volume of the segment

D. potential difference at its ends

25. To charge a secondary cell, what is needed is...

A. a d.c. current

B. an a.c. current

C. fresh electrolyte

D. heating

26. Two parallel wires carry current in the same direction,...

A. they attract each other

B. they repel each other

C. they neither attract nor repel

D. they attract or repel depending on current type

27. If the maximum value of the induced e.m.f. is V_m and maximum r.m.s. current is $\sqrt{2}$ ampere for an a.c. circuit with resistance R, then the value of V_m in volt is equal to...

A. 2R

B. R

C. 1/R

D. $\sqrt{2}/R$

28. The wavelength of light plays no role in...

A. interference

B. diffraction

C. resolving power

D. polarization

29. The value of the stopping potential depends on...

A. the intensity of light

B. the frequency of light

C. the metal surface area

D. the charge on the electron

30. The only atom which has no neutron in the nucleus is...

A. hydrogen

B. helium

C. oxygen

D. polonium

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #2

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. In a tug-of-war match, one team is pulling with a force of 500 N. If they are exactly balanced by the other team, then the tension in the rope is...
A. 0
B. 250 N
C. 500 N
D. 1000 N
2. The time taken by the light to travel from Sun to earth is approximately...
A. 8 seconds
B. 8 minutes
C. 18 seconds
D. 18 minutes
3. A charge q is placed at the centre of the line joining two equal charges Q. The system of the three charges will be in equilibrium if q is equal to...
A. -(Q/2)
B. -(Q/4)
C. +(Q/4)
D. +(Q/2)
4. The velocity of sound in vacuum is 320 m/s. A pipe closed at one end has a length 1 m. Neglecting end corrections, the air column in the pipe can resonate for sound of frequency which is not equal to...
A. 80 Hz
B. 240 Hz
C. 320 Hz
D. 400 Hz
5. The thermodynamic coordinate that remains constant during an adiabatic process is...
A. temperature
B. pressure
C. density
D. entropy
6. _____ is not contained in the nucleus of an atom...
A. proton
B. electron
C. neutron
D. meson
7. As an airplane climbs...
A. its mass decreases
B. its mass increases
C. its weight decreases
D. its weight increases
8. The unit of the force constant is...
A. Nm
B. Nm^2
C. Nm^{-2}
D. Nm^{-1}
9. Brownian motion increases as...
A. the particle size increases
B. the particle size decreases
C. the viscosity of the medium increases
D. the temperature decreases.

10. Young's modulus is associated with...
A. volume elasticity
B. rigidity
C. shear elasticity
D. tensile elasticity
11. The force of adhesion is greater than the force of cohesion. This means that the angle of contact (θ) is equal to...
A. 180°
B. 120°
C. 90°
D. 45°
12. The temperature of an object is raised by 50°C. This is equivalent to an increase in its absolute temperature of...
A. 50 K
B. 323 K
C. 223 K
D. 82 K
13. The total electric flux is...
A. always positive
B. always negative
C. always zero
D. none of the above
14. If the field lines are evenly spaced, the field is...
A. uniform
B. zero
C. strong
D. weak
15. Relative to its object, a real image formed by a lens is always...
A. erect
B. inverted
C. smaller
D. larger
16. The highest proportion of gas in the Sun is that of...
A. hydrogen
B. helium
C. carbon dioxide
D. carbon monoxide
17. The product of the period and frequency of a harmonic oscillation is always equal to...
A. 1
B. π
C. 2π
D. A
18. A direct result of superposition of waves is...
A. resonance
B. a wavefront
C. a progressive wave
D. beating
19. In the absence of external force the velocity of the center of mass of a system of particles is...
A. zero
B. constant
C. maximum
D. minimum
20. Three particles of masses 1 kg, 2 kg and 1 kg are at the points whose position vectors are i + j, 2i - j and 3i + j, respectively. The position vector of their centre of mass is...
A. (6i + j)/4
B. 2i
C. (6i + j)/3
D. 8i

21. For an object above the earth's surface, if the distance of the object from earth's centre is 'd', then the acceleration due to gravity is proportional to...
A. d
B. d^2
C. 1/d
D. $1/d^2$
22. A perfectly reversible process...
A. exists
B. does not exist but is possible
C. is impossible
D. involves intermediate inequilibrium states
23. The unit of resistance is...
A. volt/second
B. ampere/second
C. volt.ampere
D. volt/ampere
24. The unit of magnetic flux density is...
A. weber
B. tesla
C. henry
D. faraday
25. The power factor of a circuit is equal to...
A. RZ
B. R/Z
C. X_L/Z
D. X_L/Z
26. Ozone layer absorbs all electromagnetic radiations having wavelength...
A. smaller than 3×10^{-7} m
B. smaller than 3×10^{-8} m
C. greater than 3×10^{-7} m
D. greater than 3×10^{-8} m
27. Stationary waves are produced by...
A. interference
B. diffraction
C. polarization
D. refraction
28. According to Planck's quantum theory, the emission of energy...
A. is continuous
B. is discontinuous
C. does not depend on wavelength
D. does not depend on frequency
29. When an electron jumps from an orbit of higher energy E_2 to the one with lower energy E_1, the frequency of the electromagnetic radiation emitted depends on...
A. E_2
B. E_1
C. $E_1 + E_2$
D. $E_2 - E_1$
30. After 10 years 75 g of an original sample of 100 g of a certain radioactive element has decayed. The half-life of the isotope is...
A. 5 years
B. 7.5 years
C. 20 years
D. 40 years

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #3

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. In simple harmonic motion, there is always a constant ratio between the displacement of mass and its...
A. speed
B. acceleration
C. period
D. mass

2. The wave intensity is proportional to the...
A. amplitude
B. square of amplitude
C. frequency
D. square of frequency

3. When a rigid body rotates about an axis and the external torque is zero, then for that body _____ is constant.

A. angular velocity
B. moment of inertia
C. linear momentum
D. angular momentum

4. If Q_1 is the heat absorbed by the working substance and Q_2 is the heat utilized in doing work, then the efficiency of the engine is given by...

A. $1 - (Q_1/Q_2)$

B. $1 - (Q_2/Q_1)$

C. $(1 - Q_1)/Q_2$

D. $(1 - Q_2)/Q_1$

5. Two identical resistors in parallel have an equivalent resistance of 2 Ω. If the resistors were in series, their equivalent resistance would be...
A. 2 Ω
B. 4 Ω
C. 8 Ω
D. 16 Ω

6. The value of permeability of vacuum (μ) in tesla.m/ampere is...

A. 4×10^{-7}

B. $4\pi \times 10^{-7}$

C. 1.257×10^{-6}

D. 1.257×10^{6}

7. The power factor of a circuit in which $X_L = X_C$...

A. is 0
B. is 1

C. depends on X_L/X_C

D. depends on R

8. It is impossible to polarize...
A. white light
B. radio waves
C. X-rays
D. sound waves

9. The wave theory of light fails to explain...
A. interference
B. diffraction
C. polarization
D. black-body radiation

10. The beta- disintegration of a parent element produces a daughter element which in the periodic table is...
A. up by one step
B. down by one step
C. up by two steps
D. down by two steps
11. The unit of radioactive constant(λ) of the disintegrating element is...
A. m
B. m/s
C. s^{-1}
D. m^{-1}
12. The process of introducing impurity in an intrinsic semiconductor is called...
A. diffusion
B. doping
C. depletion
D. transition
13. Which of the following is dimensionless?
A. frequency
B. stress
C. coefficient of friction
D. gas constant
14. When the acceleration is zero, the final velocity of the object is...
A. zero
B. less than initial velocity
C. more than initial velocity
D. equal to initial velocity
15. The coefficient of static friction for steel on ice is 0.1. The coefficient of sliding friction therefore can be
A. 0.08
B. 0.1
C. 0.11
D. 1.1
16. If a shell fired from a cannon explodes in mid-air...
A. its total kinetic energy increases
B. its total kinetic energy decreases
C. its total momentum increases
D. its total momentum decreases
17. Avogadro suggested that the smallest particle of an element that can exist in free state is...
A. atom
B. molecule
C. neutron
D. ion
18. An iron wire 1 m long with a square cross section 2 mm on a side is used to support a 100-kg load. Its elongation is...
A. 0.0027 mm
B. 0.27 mm
C. 1.3 mm
D. 3.7 mm
19. Dimensions of coefficient of surface tension are...
A. $M^1L^1T^{-2}$
B. $M^1L^1T^1$
C. $M^1L^0T^{-2}$
D. $M^1L^0T^{-1}$
20. A sample of gas is compressed to half its original volume while its temperature is held constant. If the average speed of the gas molecules was originally v, then their new average speed is...
A. 4v
B. v
C. 2v
D. v/2

21. Generally, for a pure metal...

A. $C_p = C_v$

B. $C_v = 3R/2$

C. $C_p - C_v = R$

D. $C_v - C_p = R$

22. Two 50 µF capacitors are connected in parallel. The equivalent capacitance of the combination is...

A. 25 µF

B. 50 µF

C. 100 µF

D. 200 µF

23. Ferromagnetism is observed...

A. only in crystalline state

B. only in amorphous solid state

C. both in crystalline and amorphous state

D. in any state of the substance

24. The velocities of violet and red lights are V_v and V_r, respectively, then...

A. $V_v = V_r$ in glass

B. $V_v = V_r$ in vacuum

C. $V_v > V_r$ in glass

D. $V_v > V_r$ in vacuum

25. 1 astronomical unit is equal to...

A. 499 light seconds

B. 149597 km

C. 3×10^{10} km

D. 3×10^{10} m

26. The displacement of particles in a string stretched in the x-direction is represented by y. Among the following expressions for y, one that describes wave motion is...

A. $\cos kx \sin \omega t$

B. $k^2x^2 - \omega^2t^2$

C. $\cos^2(kx + \omega t)$

D. $\cos(k^2x^2 - \omega^2t^2)$

27. A boat which has a speed of 5 km/h in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of the river water in km/h is...

A. 1

B. 3

C. 4

D. $\sqrt{41}$

28. If one mole of monoatomic gas ($\gamma = 5/3$) is mixed with one mole ofa diatomic gas ($\gamma = 7/5$), the value of γ for the mixture is...

A. 1.40

B. 1.50

C. 1.53

D. 3.07

29. The ratio of the inertial mass to gravitational mass is...

A. 0.5

B. 0.2

C. 1

D. g/G

30. On increasing the mass of a body suspended at the end of a spring kept vertically, its period...

A. decreases

B. increases

C. does not change

D. may increase or decrease

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #4

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. When a rolling solid cylinder reaches the bottom of the slope, its linear velocity is...
A. $\sqrt{}$ gh
B. $\sqrt{}$ 2gh
C. mgh
D. $\sqrt{}$(4gh/3)

2. For ideal gas, the graph of PV → P is...
A. a parabola
B. a hyperbola
C. inclined with P-axis
D. parallel to P-axis

3. A spherical drop of mercury has a diameter of 6.0×10^{-3} m. If the surface tension of mercury is 0.5 N/m, then the pressure inside the drop will exceed the pressure outside by about...
A. 42 Pa
B. 330 Pa
C. 167 Pa
D. 170 Pa

4. A lift attendant has a mass of 70 kg. When the lift is going up with a constant acceleration of 1 m/s^2, the force acting upwards on him is...
A. zero
B. 70 N
C. 770 N
D. 700 N

5. A body is moved along a straight line by a machine delivering constant power. The distance moved by the body in time t is proportional to...
A. $t^{1/2}$
B. $t^{3/4}$
C. $t^{3/2}$
D. t^2

6. The angular velocity of a body is changed from ω_1 to ω_2 by changing its moment of inertia. If no torque acts on the body then the ratio of initial radius of gyration to the final radius of gyration is...
A. $\omega_1 : \omega_2$
B. $\omega_2 : \omega_1$
C. $\sqrt{\omega_1} : \sqrt{\omega_2}$
D. $\sqrt{\omega_2} : \sqrt{\omega_1}$

7. Two parallel plates carry opposite charges such that the electric field in the space between them is in upward direction. An electron is shot in the space and parallel to the plates. Its deflection from the original direction will be...
A. downwards
B. upwards
C. circular
D. none

8. Compton effect is associated to...
A. X-rays
B. β-rays
C. γ-rays
D. positive rays

9. If the magnitude of gravitational force is 1, the relative magnitude of strong force is...
A. 10^{-13} B. 10-38
C. 10^{38} D. 1013

10. In an elastic collision...
A. momentum is conserved but not kinetic energy
B. kinetic energy is conserved but not momentum
C. both momentum and kinetic energy are conserved
D. neither omentum nor kinetic energy is conserved
11. In a crystal the angles between the edges of the faces and between the faces themselves are...
A. right angles
B. acute angles
C. obtuse angles
D. constant
12. The equation of continuity indicates that the velocity of the fluid is greater at
A. narrow cross-section
B. broad cross-section
C. entry point
D. exit point
13. The internal energy of an ideal gas is dependent on...
A. its temperature only
B. its temperature and volume
C. its temperature and pressure
D. its temperature, pressure and volume
14. The field at any point on the surface of the conductor is...
A. zero
B. parallel to the surface
C. perpendicular to the surface
D. neither parallel nor perpendicular to the surface
15. A magnetic iron bar is strongly heated. Its magnetic field...
A. becomes stronger
B. becomes weaker
C. reverses its direction
D. does not change
16. The angle subtended by the secondary bow at the eye is about...
A. 41°
B. 47°
C. 53°
D. 60°
17. If M and L are respectively the mass and luminosity of a star, then $L = M^{\alpha}$, where...
A. $0<\alpha<1$
B. $\alpha<0$
C. $1<\alpha<2$
D. $2<\alpha<4$
18. 'T' is period of oscillation of an object performing SHM. Its potential energy is zero at some instant. The time taken to attain maximum potential energy is...
A. T
B. T/2
C. T/4
D. T/8
19. A sonar signal sent vertically downwards from a ship is reflected from the ocean floor and detected by a microphone on the keel 0.4 s after transmission. If speed of sound in water is 1500 m/s, the depth of the ocean in metre is...
A. 150
B. 300
C. 600
D. 7500
20. A car of mass M is turning a corner of radius r. The coefficient of friction between the wheels and the horizontal road surface is μ. The maximum speed with which the car can turn the corner without skidding is given by...
A. Mrg B. $\sqrt{Mrg}$ C. $\sqrt{\mu rg}$ D. $(\mu rM)/g$

21. The altitude of geostationary satellite above the earth's surface is approximately...
A. 35900 km
B. 42300 km
C. 11.2 km
D. 24040 km
22. In order to emit electromagnetic radiation, an object must be at a temperature...
A. above 0 K
B. above 0°C
C. above that of its surroundings
D. high enough for it to glow
23. A 200 m long copper wire has a resistance of 2 ohm. Its cross-sectional area is ... (take $\rho = 1.7 \times 10^{-8}$ ohm-meter)
A. 0.0017 mm^2
B. 1.7 mm^2
C. 3.4 mm^2
D. 5.3 mm^2
24. The unit of conductivity is...
A. ohm-meter
B. ohm/meter
C. mho-meter
D. mho/meter
25. When the lead-storage cell is completely discharged, the specific gravity of the electrolyte becomes
A. 1.285
B. 1.825
C. 1.5
D. 1.15

26. Two solenoids A and B have equal number of turns. The length of A is twice that of B and the cross-sectional area of A is half that of B. Other things being similar, the ratio of their inductances L_A/L_B is equal to...

A. 1
B. 2
C. 4
D. 1/4
27. In a resistive circuit, the power factor is...
A. π
B. 1
C. $\sqrt{2}$
D. $\sqrt{(1/2)}$
28. The impedance of a parallel RLC circuit at resonance is...
A. less than R
B. more than R
C. equal to R
D. any of the above
29. Longitudinal waves do not exhibit...
A. refraction
B. reflection
C. diffraction
D. polarization
30. If E_1 is the energy of a photon of ultraviolet light and E_2 that of a photon of red light, then...

A. $E_1/E_2 = 1$

B. E_1 is smaller than E_2

C. E_1 is greater than E_2

D. $E_1 - E_2 = 0$

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #5

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. T is the period of oscillation for a spring-mass system on earth. Its period on moon is...
A. T
B. 6T
C. T/6
D. √ 6T
2. In a stretched string, the speed of waves depends on...
A. the tension in the string
B. the amplitude
C. the wavelength
D. the acceleration due to gravity
3. For a plane curved path with radius of curvature R without slope the maximum safe velocity of the vehicle(v) is proportional to...
A. R
B. R^2
C. √R
D. 1/R

4. Two projectiles A and B are projected with same initial velocity. The direction of A makes an angle $\alpha_A = \pi/4$ with the horizontal.The direction of B makes an angle α_B with the horizontal. The range of A will be double that of B for α_B equal to...

A. π/8
B. π/2
C. π/3
D. π/12
5. A frictionless heat engine can be 100% efficient only its exhaust temperature is...
A. equal to its input temperature
B. 0°C
C. less than the input temperature
D. 0 K
6. The resistance of conductor is R. The resistance of another conductor of identical material and equal length with twice the diameter is...
A. R/4
B. R/2
C. 2R
D. 4R
7. The magnitude of the magnetic field B at a point on the axis near the centre of the infinitely long solenoid having n turns per unit length and carrying a current I is given by...
A. $\mu_0 nI$
B. $\mu_0 I/n$
C. $(\mu_0 nI)/4\pi$
D. $\mu_0 I/4\pi n$
8. The impedance of a circuit does not depend on...
A. f
B. I
C. C
D. R
9. Shadows are never completely dark because of...
A. interference
B. diffraction
C. polarization D. reflection

10. Threshold frequency is the characteristic of...
A. the incident radiation
B. the emitted electrons
C. the metal
D. both radiation and the metal
11. In the hydrogen spectrum,the seriesv obtained in the visible region is...
A. Balmer series
B. Lyman series
C. Paschen series
D. Brackett series
12. Out of four different atoms: ${}_{46}A^{22}$, ${}_{48}B^{22}$, ${}_{46}C^{23}$, ${}_{44}D^{20}$, the pair of isotones is...
A. A and B
B. B and C
C. A and C
D. A and D
13. In a common-base circuit, the current gain is...
A. 0
B. 1
C. less than 1
D. greater than 1
14. The magnitude of the resultant of two forces is a minimum when the angle between them is...
A. 0°
B. 45°
C. 90°
D. 180°
15. Work done on the particle in uniform circular motion is...
A. always positive
B. always negative
C. always zero
D. directly proportional to the force
16. An 800-kg car moving at 80 kmph collides head-on with a 1200-kg car moving at 40 kmph. If they stick together, the wreckage now has an initial speed of...
A. 8 kmph
B. 40 kmph
C. 56 kmph
D. 60 kmph
17. Fluids possess...
A. only volume elasticity
B. rigidity and volume elasticity
C. only rigidity
D. volume elasticity and tensile elasticity
18. A water-proofing agent...
A. reduces angle of contact
B. increases angle of contact
C. decreases surface tension
D. increases surface area
19. A certain container holds 1 kg air at atmospheric pressure. When an additional 1 kg of air is pumped into the container at constant temperature, the pressure is...
A. 0.5 atm
B. 1 atm
C. 2 atm
D. 4 atm
20. If Q is the charge on either of the plates of the capacitor and V is the potential difference across the capacitor with capacitance C, what is not true is...
A. $C = Q/V$
B. $V \alpha Q$
C. Q/V = constant
D. VQ = constant

21. The origin of all magnetic fields lies in...
A. atoms of iron
B. magnetic domains
C. moving charges
D. permanent magnets
22. The effective atmosphere of sun is called...
A. photosphere
B. chromosphere
C. corona
D. stratosphere
23. A 4 litre gas cylinder contains neon gas at 12 kPa. Another cylinder with 8 litre capacity is at same temperature and contains argon gas at 24 kPa. When the two are connected, the total pressure will be...
A. 16 kPa
B. 18 kPa
C. 20 kPa
D. 36 kPa
24. Eddy currents can be of use in...
A. dynamo armatures
B. moving coil galvanometers
C. transformer cores
D. all of the above.
25. A tube closed at one end and containing air, produces the fundamental note of frequency 512 Hz when excited. If the tube is open at both ends, the fundamental frequency that can be excited in Hz is...
A. 1024
B. 512
C. 256
D. 128
26. The process by which a heavy nucleus splits into two nuclei is known as...
A. fusion
B. β-decay
C. fission
D. γ-emission
27. A uniform chain of length L and mass M is lying on a smooth table and one-third of its length is hanging vertically down over the edge of the table. If 'g' is the acceleration due to gravity, the work required to pull the hanging parton to the table is...
A. MgL
B. MgL/3
C. MgL/9
D. MgL/8
28. Out of the following which is the most elastic ?
A. rubber
B. glass
C. steel
D. plastic
29. Amagat's isothermal graphs are in the form of...
A. PV→T
B. PV→P
C. P→V
D. PV→V
30. An ideal heat engine absorbs heat at 127° and rejects heat at 77°. Efficiency of the engine is...
A. 12.5%
B. 28%
C. 68%
D. 39%

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #6

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. The equation applicable in the adiabatic process of n mole ideal gas is...

A. $\Delta U = nC_p\Delta T$

B. $\Delta U = nC_v\Delta T$

C. $\Delta Q = nC_v\Delta T$

D. $\Delta Q = nC_p\Delta T$

2. In a Carnot's engine, the working substance is...

A. ideal gas

B. steam

C. petrol

D. CO_2

3. Two particles A and b initially at rest, move towards each other under a mutual force of attraction. At the instant when the speed of A is v and the speed of B is 2v, the speed of centre of mass of the system is

A. zero

B. v

C. 1.5v

D. 3v

4. Imagine a light planet revolving around a very massive star in a circular orbit of radius R with a period of revolution T. The gravitational force of attraction between the planet and the star is proportional to $R^{(-5/2)}$, then T^2 is proportional to...

A. R^3

B. $R^{(7/2)}$

C. $R^{(3/2)}$

D. $R^{3.75}$

5. Electrical conductivity increases with the increase in temperature of...

A. P-type semiconductor

B. N-type semiconductor

C. intrinsic semiconductor

D. none

6. Amount of charge in coulomb required to deposit one gram equivalent of substance by electrolysis is...

A. 96500

B. 48×10^{-10}

C. 6×10^{24}

D. 9600

7. A camera lens is adjusted to f/4 and has an effective diameter of 2.0 cm. Its focal length is...

A. 0.2 cm

B. 1.6 cm

C. 2.0 cm

D. 8.0 cm

8. The self inductance of a long solenoid is directly affected by changes in all but...

A. the number of turns

B. the current

C. the area of cross section

D. the relative permeability of the core

9. Which of the following is not the unit of energy ?

A. joule

B. erg

C. newton.metre

D. dyne

10. All collisions conserve...
A. kinetic energy
B. momentum
C. both kinetic energy and momentum
D. neither of kinetic energy and momentum
11. If a rocket of initial mass m is to rise from its launching pad, its initial thrust must exceed...
A. mg/2
B. mg
C. 2mg
D. $mg^2/2$
12. 9 gram of water contains approximately...
A. 6×10^{23} molecules of water
B. 6×10^{23} atoms of oxygen
C. 6×10^{23} atoms of hydrogen
D. 3×10^{23} atoms of hydrogen
13. A cable can support a maximum load of W without exceeding the elastic limit. If it is replaced by a cable of same material but half as long and half the diameter, the elastic limit will not be exceeded by the new cable up to a load of...
A. W/4
B. W/2
C. W
D. 2W
14. Surface tension does not depend on...
A. surface area
B. the type of liquid
C. temperature
D. medium in contact with the liquid
15. -40° F is equal to...
A. -40° C
B. -8° C
C. -72° C
D. -104° C
16. The magnitude of the field within a conductor...
A. depends on the shape of the conductor
B. is always zero
C. is always positive
D. may be zero or positive
17. A permanent magnet does not exert force on...
A. an unmagnetized iron bar
B. a magnetized iron bar
C. a stationary electric charge
D. a moving electric charge
18. A primary rainbow cannot be seen by an observer looking up if the altitude of the Sun exceeds...
A. 10°
B. 20°
C. 22.5°
D. 40°
19. According to the descending order of temperature the stars are classified in to the orders O,B,A,F,G,K and M. Our Sun comes in the order...
A. A
B. B
C. G
D. K
20. Position of the centre of mass of a rigid body depends on...
A. its shape only
B. distribution of its matter only
C. both its shape and distribution of matter
D. its position relative to the earth.

21. Force is to linear motion as _____ is to rotational motion.
A. acceleration
B. torque
C. moment of inertia
D. angular momentum
22. A hole is drilled to the centre of the earth and a stone is dropped in to it. When the stone is at the earth's centre, compared to the values at the earth's surface...
A. its mass and weight both change
B. its mass and weight both are zero
C. its mass is unchanged and its weight is zero
D. its mass is zero and its weight is unchanged
23. For an IC engine, the thermal efficiency depends on...
A. the compression ratio
B. the speed of the piston
C. the temperature of working medium
D. the diameter of the cylinder
24. A 12-V potential difference is applied across a series combination of four 6-ohm resistors. The current in each resistor is...
A. 0.5 A
B. 2 A
C. 8 A
D. 18 A
25. The temperature at which the thermo emf becomes zero is known as the...
A. neutral temperature
B. absolute temperature
C. inverse temperature
D. thermoelectric temperature
26. A transformer uses the principle of...
A. self-induction
B. mutual induction
C. variable resistance
D. electrostatic attraction
27. If V and V_m are the instantaneous and maximum values, respectively , of voltage in an a.c. circuit, then the mean value of the voltage is...
A. $V_m \sin\omega t$
B. $\sqrt{2}\, V_m$
C. $V_m/\sqrt{2}$
D. none of the above
28. Electromagnetic waves having wavelengths greater than 200 m are called...
A. sky waves
B. ground waves
C. micro waves
D. X-rays
29. If θ_m is the angle of diffracted wave with the direction of incidence and d is the width of slit, then m^{th} order minima is obtained for $\sin\theta_m$ equal to...
A. $m\lambda/d$
B. $d\lambda/m$
C. md/λ
D. $m/\lambda d$
30. As a sample of a radioactive element decays, its half-life...
A. decreases
B. increases
C. remains the same
D. changes exponentially.

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #7

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. A current of 5 A passes along a wire of length 1.0 m. the wire is at right angles to a magnetic field of flux density of 0.15 T. The force acting on the wire is...
A. 0
B. 0.03 N
C. 0.75 N
D. 33 N

2. The end product of most radioactive decay series is usually some form of
A. carbon
B. helium
C. hydrogen
D. lead

3. The cause of surface tension is...
A. adhesive forces
B. cohesive forces
C. external forces
D. gravitational force

4. The unit 'poise' is...
A. dyne.sec/cm^2
B. dyne.cm/sec^2
C. newton.sec/m^2
D. dyne.sec/cm

5. Emission line spectrum will be obtained from...
A. candle flame
B. sodium lamp
C. Sun
D. white hot filament of an electric bulb

6. A hollow insulated brass sphere is positively charged. The electric potential inside the sphere is...
A. zero
B. greater than the potential at the surface
C. smaller than the potential at the surface
D. the same as that on the surface

7. The linear momentum of a body is $P = a + (bt^2/2)$. The force acting on the body is...
A. a + (bt/2)
B. a + bt
C. bt/2
D. bt

8. The weight of a body on the surface of earth is 100 N. Its weight at a depth half way to the centre of earth will be...
A. 50 N
B. 100 N
C. 25 N
D. 125 N

9. Two wires C and D of the length in the ratio 2 : 3, diameter in the ratio 2 : 3 and of the same material, are subjected to same force. Then the ratio of their extensions $l_c : l_d$ is...
A. 3 : 2
B. 2 : 3
C. 4 : 9 D. 8 : 27

10. The potential energy of a harmonic oscillator is maximum when the displacement is equal to...
A. zero
B. 1/2 amplitude
C. amplitude
D. 1/4 amplitude
11. When the forces acting on a body are in equilibrium, its...
A. velocity is zero
B. displacement is zero
C. acceleration is zero
D. momentum is zero
12. An object at rest may possess...
A. velocity
B. momentum
C. kinetic energy
D. potential energy
13. A nonconservative force does not give rise to...
A. thermal energy
B. kinetic energy
C. light energy
D. potential energy
14. Atoms forming a molecule attain the arrangement in which they obtain...
A. zero potential energy
B. minimum potential energy
C. maximum potential energy
D. none of the above
15. Bulk modulus of a liquid is...
A. higher than that for a solid
B. higher than that for a gas
C. lower than that for a gas
D. zero
16. The CGS unit of coefficient of viscosity is...
A. dyne.second/cm^2
B. newton.second/cm^2
C. dyne.$(second)^2/cm^2$
D. newton.second/cm
17. The volume of a gas sample is directly proportional to its...
A. Fahrenheit temperature
B. Celsius temperature
C. Kelvin temperature
D. pressure
18. The approximate relationship between the coefficient of linear expansion(α) and the coefficient of cubical expansion(γ) is...
A. $\gamma = \alpha^2$
B. $\gamma = \alpha^3$
C. $\alpha = 3\ \gamma$
D. $\gamma = 3\ \alpha$
19. When capacitors are in parallel...
A. they are all at the same potential
B. they are at different potentials
C. their capacitances are equal
D. the equivalent capacitance is zero
20. The earth's magnetic field at sea level is...
A. 3 x 10^{-9} T B. 3 x 109 T C. 3 x 10-5 T D. 3 x 105 T

21. Monoatomic gases give...
A. line spectra
B. band spectra
C. continuous spectra
D. line and band spectra
22. The centre of mass of a rigid body...
A. lies inside the body
B. lies outside the body
C. can be inside or outside of the body
D. may not exist
23. If 'l' is the length of a simple pendulum and 'T' its period, then 'g' is given by...
A. $(4\pi^2 l)/T^2$
B. $2\pi/(\sqrt{}\ l/t)$
C. $2\pi l/t$
D. $(4\pi l^2)/t^2$
24. The rate at which an object radiates electromagnetic energy does not depend on its...
A. surface area
B. mass
C. temperature
D. ability to absorb radiation
25. Which of the following is neither a basic physical law nor derivable from one?
A. Coulomb's law
B. Ohm's law
C. Kirchhoff's first law
D. Kirchhoff's second law
26. The power dissipated as heat in an a.c. circuit depends on its...
A. resistance
B. inductive reactance
C. capacitive reactance
D. impedance
27. Impedance is a maximum at resonance in...
A. a series RLC circuit
B. a parallel RLC circuit
C. all RLC circuits
D. no RLC circuit
28. Red shift indicates...
A. recession of star
B. approaching movement of star
C. that red light changes to violet
D. that violet light changes to red
29. The penetration power of beta particles is 1. Then the relative penetration power of gamma rays is...
A. 1
B. 100
C. 1/1000
D. 1000
30. In a common-base circuit the current gain is...
A. 0
B. 1
C. greater than 1
D. smaller than 1

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #8

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. Any motion along a trajectory distinct from a straight line is a motion with...
A. constant velocity
B. changing velocity
C. zero acceleration
D. changing acceleration
2. An object that has momentum must also have...
A. acceleration
B. impulse
C. kinetic energy
D. potential energy
3. The dimensions of strain are...
A. $ML^{-1}T^{-2}$
B. $ML^{-1}T^{-1}$
C. $M^0L^{-1}T^{-2}$
D. $M^0L^0T^0$
4. When the velocity of the molecules is zero, the temperature is...
A. 0°C
B. 273 K
C. -273°C
D. -273 K
5. The potential energy of a charged capacitor(charge=Q, potential difference=V, capacitance=C) is not represented by...
A. QV/2
B. $CV^2/2$
C. $Q^2/2C$
D. $CQ^2/2$
6. When light passes from vacuum into a medium A, the value of the constant in Snell's law is...
A. the absolute refractive index of A
B. the absolute refractive index of vacuum
C. 1
D. 0
7. Sun's distance from the earth is equal to...
A. 1 AU
B. 2 AU
C. 14 AU
D. $\sqrt{2}$ AU
8. For an object performing SHM, phase angle is the quantity represented by...
A. $2\pi f$
B. $2\pi ft$
C. $2\pi fT$
D. $2\pi f/T$
9. The speed needed to put a satellite in orbit does not depend on...
A. the radius of the orbit
B. the shape of the orbit
C. the value of 'g' at the orbit
D. the mass of the satellite
10. In an adiabatic process, what does not change is...
A. pressure
B. volume
C. temperature D. none of the above

11. Inductance is an opposition to...
A. increasing current
B. decreasing current
C. both increasing current and decreasing current
D. anything but current
12. The voltage lags behind the current by 1/4 cycle in...
A. a pure capacitor
B. a pure inductor
C. a pure resistor
D. a circuit with capacitance and inductance
13. If the distance between two slits and the distance between the slits and the screen are constant, then the fringe spacing is proportional to...
A. λ
B. $1/\lambda$
C. $\sqrt{\lambda}$
D. $1/\sqrt{\lambda}$
14. If V_0 is the stopping potential, f the frequency of radiation and W_0 is the work function of metal, then $(V_0 + W_0)$ is equal to...
A. hf
B. h/e
C. hf/e
D. f_0
15. The element whose nuclei contain the most tightly bound nucleons is...
A. He
B. C
C. Fe
D. U
16. An object weighing 0.10 kg is to be swung in a vertical circle of diameter 0.8 m. The minimum velocity needed would be...
A. 2.0 m/s
B. 3.0 m/s
C. 4.0 m/s
D. $2\sqrt{5}$ m/s
17. Light is incident upon a rectangular glass block at the polarizing angle. The fraction of light reflected as plane polarized light will be about...
A. zero
B. 10%
C. 50%
D. 100%
18. A lead bullet at 300 K is fired with the speed of 300 m/s. If the specific heat capacity of lead is 130 J/(kg K), then upon impact its temperature will reach a maximum value of...
A. 636 K
B. 646 K
C. 666 K
D. 676 K
19. A particle left no tracks in a cloud chamber, did not register on a Geiger-Muller tube and failed to make a zinc sulphide screen glow. It was most likely...
A. an electron
B. a proton
C. a neutron
D. an alpha particle
20. A fuse is rated at 10 A. In an A.C. circuit, the maximum instantaneous current it could handle would be about...
A. 7 A
B. 10 A
C. 14 A
D. 20 A

21. 1 micro curie = _____ Bacqueral
A. 3.7×10^{10}
B. 3.7×10^{7}
C. 3.7×10^{4}
D. 10^{6}
22. A particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration is given by $a_c = k^2rt^2$ (k = constant). The power delivered to the particle by the force acting on it is...
A. $2\pi mk^2r^2t$
B. mk^2r^2t
C. $mk^4r^2t^5/3$
D. 0
23. A ship of mass 3×10^{7} kg initially at rest is pulled by a force of 5×10^{4} N through a distance of 3 m. Assuming that the resistance due to water is negligible, the speed of the ship is...
A. 1.5 m/s
B. 60 m/s
C. 0.1 m/s
D. 5 m/s
24. The buoyancy depends on
A. the depth to which the body is immersed
B. the shape of the body
C. the mass of the body
D. the mass of the liquid displaced
25. Steam at 100°C is passed into 1.1 kg of water contained in a calorimeter with water equivalent 0.02 kg at 15°C till the temperature of the calorimeter and its content rises to 80°C. The mass of the steam condensed in kg is...
A. 0.130
B. 0.065
C. 0.260
D. 0.135
26. The sound waves that propagate in a metal bar may be...
A. longitudinal
B. transverse
C. torsional
D. either longitudinal or transverse
27. The fraction of available volume which is filled in case of hexagonal close-packing structure is...
A. 0.5
B. 0.74
C. 0.32
D. 0.90
28. A photoelectric cell converts...
A. electrical energy into light energy
B. light energy into electrical energy
C. light energy into sound energy
D. light energy into heat energy.
29. The sensitiveness of a moving-coil galvanometer can be increased by...
A. increasing the number of turns of the coil
B. decreasing the number of turns of the coil
C. decreasing the area of the coil
D. none of the above
30. If a star emitting yellow light starts moving towards the earth, its colour as seen from the earth will...
A. turn gradually red
B. turn gradually blue
C. remain yellow
D. turn bright yellow

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #9

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. The error in measuring the radius of a sphere is 2%. Then the error in the measurement of its volume is...
A. 8%
B. 6%
C. 2%
D. 9%
2. A magician is throwing rings into air in such a way that when a ring is at its maximum height he throws another ring. If the time difference between each throw is 1 sec then the height attained by the ring is...
A. 49 m
B. 49 cm
C. 9.8 m
D. 4.9 m
3. If the mass and force are doubled then the acceleration will...
A. double
B. become thrice
C. become four times
D. remain same as before
4. A string is tied to the neck of a bottle containing soda water and then whirled in a vertical circle. The bubbles will be found...
A. near the neck
B. at the bottom
C. at the centre
D. everywhere in the bottle
5. If the absolute temperature of a gas is doubled, then V_{rms} will become
A. 2 times
B. $\sqrt{2}$ times
C. 1/2 times
D. 4 times
6. When the temperature of a black body is lowered to half its original value then the amount of heat radiated will be reduced to...
A. 1/2
B. 1/4
C. 1/8
D. 1/16
7. A shell is fired from a cannon with a velocity V at an angle θ with the horizontal direction. At the highest point in its path it explodes into two pieces of equal mass. One of the pieces retraces its path to the cannon then the speed of the other immediately after the explosion is...
A. $3V\cos\theta$
B. $2V\cos\theta$
C. 3/2
D. $(\sqrt{3})V\cos\theta/2$
8. X-rays have energy of the order of...
A. 10 eV
B. 10^6 eV
C. infinity
D. zero
9. In Rutherford model of the atom, the path of an electron will be...
A. a straight line
B. parabolic
C. circular
D. spiral

10. A double concave lens of glass, placed in a liquid of refractive index 2, will behave as...
A. diverging lens
B. concave mirror
C. converging lens
D. none of the above
11. Megawattday is the unit of...
A. power
B. force
C. energy
D. density
12. A particle executes SHM with its frequency f. The frequency with which its kinetic energy oscillates is...
A. f/2
B. f
C. 2f
D. 4f
13. If the acceleration due to gravity,g, is about 10 m/s^2 near the surface of the earth, then at the centre of the earth g would have an approximate value of...
A. zero
B. 5 m/s^2
C. 10 m/s^2
D. 20 m/s^2
14. A tuning fork vibrates at a frequency of f Hz. It is viewed through a stroboscopic disc having four equally spaced slots in it. In order for the vibrating tuning fork to appear stationary, the minimum number of revolutions per second at which the disc should be rotated is...
A. f/8
B. f/4
C. f/2
D. f
15. Which of the following materials has the greatest relative permittivity?
A. Air
B. Glass
C. Mica
D. Water
16. The distance between two consecutive antinodes is...
A. λ
B. λ/2
C. λ/3
D. λ/4
17. For an object below the earth's surface, if the distance of the object from earth's centre is 'd', then the acceleration due to gravity is proportional to...
A. d
B. d^2
C. 1/d
D. $1/d^2$
18. A type of process that does not need outside energy to reverse is one that occurs at constant...
A. temperature
B. pressure
C. volume
D. speed
19. Which of the following combinations of length(l) and cross-sectional area(A) will give a certain volume of copper the least resistance?
A. l and A
B. 2l and A/2
C. l/2 and 2A
D. none
20. Inside a solenoid, the magnetic field...
A. is zero B. is uniform
C. increases with distance from the axis D. decreases with distance from the axis

21. When the voltage are in phase in an a.c. circuit...
A. impedance is zero
B. reactance is zero
C. resistance is zero
D. phase angle is 90°
22. The distance between two consecutive bright fringes increases as...
A. the wavelength increases
B. the frequency increases
C. the wavelength decreases
D. the separation of two sources increases
23. Photoelectric effect can be explained on the basis of...
A. the wave theory of light
B. the theory of relativity
C. the theory of black-body radiation
D. none of the above
24. Acoustics is the branch of physics studying...
A. light
B. heat
C. sound
D. motion of planets
25. The prefix 'pico' represents...
A. 10^{-9}
B. 10^{-12}
C. 10^{9}
D. 10^{12}
26. The unit vector in the same direction as(-3i + 4j) is...
A. (-3/5)i + (4/5)j
B. -i + j
C. 3i - 4j
D. (-1/3)i + (1/4)j
27. An 800-kg car moving at 80 kmph overtakes a 1200-kg car moving at 40 kmph in the same direction. If the two cars stick together,the wreckage has an initial speed of...
A. 8 kmph
B. 40 kmph
C. 56 kmph
D. 60 kmph
28. For a fixed mass of gas in an isothermal process, the plot of V→(1/p) is...
A. a straight line
B. a parabola
C. a nonparabolic curve
D. a hyperbolic curve
29. When a vapour condenses into liquid...
A. it absorbs heat
B. it volves heat
C. its temperature rises
D. its temperature falls
30. For a rectangular glass slab, the entering ray and the emerging ray...
A. are parallel
B. form a right angle
C. form an acute angle
D. form an obtuse angle

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #10

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. A toy for firing a ball vertically consists of a spring which is compressed 0.10 m by an average force of 5.0 N. If a ball of mass 0.05 kg is placed on the spring and the spring released, the ball will reach a height of ...
A. 1.0 m
B. 1.2 m
C. 1.4 m
D. 1.6 m

2. A horizontal rope is fixed at one end. The other end is held in the hand and a wave motion is generated by moving the hand up and down repeatedly. A stationary wave is formed and it is observed that a small piece of ribbon tied to the rope is about half way between a node and an adjacent antinode. The movement of the ribbon
A. up and down
B. back and forth
C. a combination of A & B
D. impossible to determine

3. In an astronomical telescope, the objective lens forms an image that is...
A. real and erect
B. real and inverted
C. virtual and erect
D. virtual and inverted

4. The specific latent heat of vaporisation of water is 2.3×10^6 J/kg. The percentage of this energy that is necessary to overcome atmospheric pressure is...
A. 0
B. between 0 and 50%
C. 50%
D. between 50 and 100%

5. The electron-volt is a measure of...
A. charge
B. current
C. potential
D. energy

6. In which of the following units could Planck's constant be expressed?
A. joule
B. joule-hertz
C. joule-second
D. newton-second

7. The capacitance of a parallel plate capacitor would be decreased by...
A. increasing the separation of the plates
B. increasing the area of overlap of the plates
C. replacing the air between the plates by paper
D. replacing the air between the plates by mica

8. Two light sources have exactly the same frequency and are always exactly out of step with each other. This is an example of...
A. phase reversal
B. Huygen's principle
C. coherence
D. destructive interference

9. Two bodies of mass m_1 and m_2 are moving with equal kinetic energy.The ratio of their linear momentum $P_1 : P_2$ is...
A. $m_1 : m_2$
B. $m_2 : m_1$
C. $m_1^2 : m_2^2$
D. $\sqrt{m_1} : \sqrt{m_2}$

10. The force required to make the length of a wire three times its original length is ____ when the area of cross-section is unity and Y is the Young's modulus.
A. 2Y
B. 3Y
C. Y
D. Y/2
11. The first law of thermodynamics is a special case of...
A. law of conservation of momentum
B. law of conservation of energy
C. Boyle's law
D. Charles' law
12. If the velocity of sound in air at 0°C is 300 m/s, at what temperature will the velocity be 400 m/s?
A. 330°C
B. 485°C
C. 674°C
D. 1000°C
13. A ray of light incident on a 60° angled prism of refractive index $\sqrt{2}$, suffers minimum deviation. The angle of incidence is...
A. 75°
B. 0°
C. 45°
D. 60°
14. Two equal negative charges(-q) are fixed at two points (0,a) and (0,-a) on the Y-axis. A positive charge q is released from rest at the point (2a,0) on the X-axis. The charge q will...
A. execute SHM about the origin
B. move to the origin and remain at rest
C. move to infinity
D. execute oscillatory motion but not SHM.
15. Ball-point pen functions on the principle of
A. viscosity
B. Boyle's law
C. gravitational force
D. surface tension
16. A soap bubble has a radius of 3 cm. The surface tension of soap solution is 1.5×10^{-2} N/m. The excess of pressure (in N/m^2) is equal to...
A. 1
B. 2
C. 0.5×10^{-2}
D. 1.0×10^{-2}
17. In case of a prism, the angle of deviation is greater for...
A. violet
B. red
C. blue
D. green
18. A piece of copper and another of germanium are cooled from room temperature to 80K. The resistance of...
A. each of them increases
B. each of them decreases
C. copper increases and germanium decreases
D. copper decreases and germanium increases
19. Which of the following is always attractive?
A. Strong force
B. Electrostatic force
C. Magnetic force
D. None of the three
20. A non-conservative force does not give rise to...
A. thermal energy
B. kinetic energy
C. light energy
D. potential energy

21. If E_A is the energy required for the equilibrium separation of two hydrogen atoms in a molecule of hydrogen and E_M is the energy required for the equilibrium separation of two molecules of hydrogen, then
A. $E_A = E_M$
B. $E_A = E_M/(\sqrt{2})$
C. $E_A > E_M$
D. $E_A < E_M$
22. When pressure of 2.0 MPa is applied to a sample of kerosene, it contracts by 15%. The bulk modulus of kerosene is...
A. 1.7 MPa
B. 1.997 MPa
C. 2.003 MPa
D. 1.3 GPa
23. A wetting agent...
A. reduces angle of contact
B. increases angle of contact
C. increases surface tension
D. increases surface area
24. When a slab of insulating material is introduced in a capacitor, its capacitance
A. becomes zero
B. decreases considerably
C. increases considerably
D. does not change
25. For a constant-length pendulum, the periodic time depends on
A. amplitude
B. length
C. mass of pendulum
D. 'g'
26. The amplitude of a sound wave determines its...
A. pitch
B. loudness
C. overtones
D. resonance
27. The value of 'g' at pole is...
A. greater than that at the equator
B. smaller than that at the equator
C. equal to that at the equator
D. zero
28. Which of the following engines is the most efficient?
A. gasoline
B. diesel
C. gas turbine
D. Carnot
29. A 50-V battery is connected across a 10-ohm resistor and a current of 4.5 A flows. The internal resistance of the battery is...
A. 0
B. 0.5 ohm
C. 1.1 ohm
D. 5 ohm
30. In an LCR series circuit Q-factor is given by...
A. $1/\sqrt{LC}$
B. $\sqrt{(L/C)}$
C. $(1/R).\sqrt{(L/C)}$
D. $R/(\sqrt{LC})$

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #11

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. For an object performing SHM the magnitude of maximum velocity is given by...
A. $\omega \sqrt{(A^2 - y^2)}$
B. $\omega \sqrt{(y^2 - A^2)}$
C. ωA
D. $\omega^2 A$
2. The reciprocal of wavelength is called...
A. frequency
B. wave velocity
C. amplitude
D. wave number
3. _____ is for rotational motion as mass is for linear motion.
A. mass
B. torque
C. moment of inertia
D. inertia
4. If m is the mass of a planet, r is radius of its orbit, ω is the angular velocity and v is its linear velocity, then the force acting on planet is...
A. mrv^2
B. mr^2V^2
C. $mr\omega^2$
D. $mr^2\omega^2$
5. In a fuel cell the conversion of chemical energy into electrical energy takes place...
A. at both electrodes
B. at the anode only
C. at the cathode only
D. in the electrolyte
6. Which of the following is not the unit of magnetic flux?
A. weber
B. tesla-m^2
C. m^2kgs^{-1}
D. henry
7. Impulse is equal to...
A. momentum
B. change in momentum
C. change in momentum per unit time
D. change in momentum per unit mass
8. 1 kWh is equal to...
A. 746 W
B. 3.6×10^6 J
C. 3.6 hp
D. 746 kW
9. The atomic mass of copper is 64 and its density is 9.0 g/cm^3. The volume of one mole of atoms of copper is _____ g/cm^3.
A. 6.023×10^{23}
B. $(6.023 \times 9 \times 10^{23})/64$
C. $(6.023 \times 64 \times 10^{23})/9$
D. 64/9

10. Young's modulus for aluminium is 7 x 10^{10} Pa. The force needed to stretch, an aluminium wire with 2 mm diameter and 800 mm length, by 1 mm is...
A. 2.75 N
B. 275 N
C. 1.10 N
D. 275 kN
11. The MKS unit of coefficient of viscosity is...
A. poise
B. centipoise
C. Pa second^{-1}
D. Pa second
12. Electric charge is quantized. This means that the electric charge...
A. is not continuous
B. is continuous
C. is constant
D. has mass
13. A 2 kg ball moves with a speed of 8 m/s and collides with a 4 kg ball moving in the same direction with a speed of 2 m/s. After the collision, the heavier ball has a speed of 5 m/s. The collision results in a decrease in the total kinetic energy of translation of two balls of...
A. 0 J
B. 6 J
C. 12 J
D. 18 j
14. The result of combining two mutually perpendicular vibrations was first extensively studied by...
A. Huygens
B. Lissajon
C. Sabine
D. Newton
15. On a sunny day you may see very bright lines formed on the bottom of a swimming pool. The prime cause of these is...
A. absorption
B. diffraction
C. interference
D. refraction
16. A piece of glass which has been heated to a high temperature is left to cool. If the glass cracks, it will most likely be because of...
A. low thermal conductivity of glass
B. high thermal conductivity of glass
C. low specific heat capacity of glass
D. high specific heat capacity of glass
17. The charge to mass ratio of an electron is about 1.8 x 10^{11} C kg^{-1}. In a certain television tube, where the accelerating voltage is 1600V, the electrons have a speed just before striking the screen of approximately...
A. 16000 kms^{-1}
B. 20000 kms^{-1}
C. 24000 kms^{-1}
D. 28000 kms^{-1}
18. A mass spectrometer may be used to distinguish between...
A. different elements
B. different isotopes
C. identical isotopes bearing different charge
D. all of the above
19. If a train is to move with velocity of light, its length would be
A. infinite
B. unchanged
C. zero
D. half the original

20. A radio-station broadcasts at 30 m band. The frequency of electromagnetic waves transmitted from this station could be...

A. 10 MHz

B. 10 kHz

C. 3×10^{10} Hz

D. 11×10^{11} Hz

21. The energy generation in stars is due to...

A. fusion of heavy nuclei

B. fusion of light nuclei

C. chemical reaction

D. fission of heavy nuclei

22. Two resistances are joined in parallel whose resultant is 6/5 ohm. One of the resistance wires is broken and the effective resistance becomes 2 ohm. The resistance in ohm of the wire that got broken is...

A. 2

B. 3

C. 3/5

D. 6/5

23. When the distance between a source and a cliff is 'd', the time taken to hear the first echo of sound with velocity 'V' is...

A. V.d

B. 2V/d

C. 2d/V

D. d/V

24. Which of the following pairs of physical quantities have the same unit?

A. Force and power

B. Stress and strain

C. Young's modulus and pressure

D. Coefficient of viscosity and surface tension

25. The area enclosed by the displacement-time graph of a body thrown in air gives...

A. average speed

B. average velocity

C. acceleration

D. no significant physical quantity

26. A particle is moving eastwards with a velocity of 5 m/s. In 10 seconds the velocity changes to 5 m/s northwards. The average acceleration in this time is...

A. zero

B. $(1/\sqrt{2})$ m/s^2 towards northwest

C. $(1/\sqrt{2})$ m/s^2 towards northeast

D. (1/2) m/s^2 towards northwest

27. Swimming becomes possible because of _____ law of motion.

A. First

B. Second

C. Third

D. none of the three

28. A thin film of liquid is enclosed between two glass plates. It is difficult to separate the plates on account of...

A. Viscosity

B. Surface tension

C. Friction

D. Atmospheric pressure

29. The highest temperature that can be recorded by a mercury thermometer is...

A. 100°C

B. 157°C

C. 257°C

D. 357°C

30. A tuning fork originally in unison with another fork of frequency 260 Hz, produces 4 beats per second, when a little wax is attached to it. What is the frequency now?

A. 260 Hz B. 264 Hz

C. 256 Hz D. 262 Hz

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #12

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. A child pulls a toy car weighing 0.20 kg across a smooth floor by means of a string attached to it. If the string makes an angle of 60° to the floor and the child pulls with a force of 2.0 N, then the amount of work he does in pulling the car a distance of 5.0 m is...
A. 5.0 J
B. 10.0 J
C. 12.7 J
D. 17.3 j

2. The note middle C played on a piano always differs from middle C played on a violin because of a difference in...
A. frequency
B. wavelength
C. fundamentals
D. harmonics

3. chromatic aberration of a lens is caused by...
A. diffraction
B. diffusion
C. dispersion
D. interference

4. The molar gas constant is the same for all gases because, at the same pressure and temperature, equal volumes of gases have the same...
A. number of molecules
B. average kinetic energy
C. density
D. mass

5. A Hall probe is used to determine...
A. the magnetic moment of a coil
B. the susceptibility of a material
C. relative permittivity
D. magnetic flux density

6. In a nuclear fission reactor, graphite is often used for...
A. absorbing neutrons and controlling the reaction
B. slowing down neutrons
C. preventing the radiation from escaping into atmosphere
D. all the above

7. In a Newton's rings experiment, the thickness of the air space between the lens and the glass plate is 1.8×10^{-6} m for the sixth dark ring. The wavelength of the light used is...
A. 1.7×10^{-8} m
B. 3.0×10^{-7} m
C. 6.0×10^{-7} m
D. 6.0×10^{-5} m

8. If α denotes the current gain of a transistor in the common-base mode of operation and β denotes the current gain in the common-emitter mode, then α and β are related by...
A. $\alpha = \beta/(1 + \beta)$
B. $\alpha = (1 + \beta)/\beta$
C. $\alpha = (1 - \beta)/\beta$
D. $\beta = (1 + \alpha)/\alpha$

9. A certain metal has a work function of 2 eV. Taking Planck's constant $h = 6.6 \times 10^{24}$ J.s, charge on electron $e = 1.6 \times 10^{-19}$ C and velocity of light $C = 3 \times 10^{8}$ m/s, what is its approximate threshold frequency?
A. 5×10^{13} Hz
B. 5×10^{14} Hz
C. 5×10^{15} Hz
D. 2×10^{15} Hz

10. A monoatomic gas is allowed to expand adiabatically until its volume is eight times greater. Compared to the original pressure, the new pressure must be smaller by a factor of...
A. 4
B. 8
C. 16
D. 32
11. During a negative β-decay...
A. an atomic electron is ejected
B. an electron which is already present within the nucleus is ejected
C. a neutron in the nucleus decays emitting an electron
D. a part of the binding energy of the nucleus is converted into an electron
12. A parallel plate capacitor is charged and the charging battery is then disconnected. If the plates of the capacitor are moved farther apart by means of insulating handles...
A. the charge on the capacitor increases
B. the voltage across the plates increases
C. the capacitance increases
D. the electrostatic energy stored in the capacitor increases
13. Two bodies M and N of equal masses are suspended from two separate massless springs of spring constants K_1 and K_2, respectively. If the two bodies oscillate vertically such that their maximum velocities are equal, then the ratio of the amplitude of vibration of M to that of N is...

A. K_1/K_2

B. $\sqrt{(K_1/K_2)}$

C. K_2/K_1

D. $\sqrt{(K_2/K_1)}$

14. Two coherent monochromatic light beams of intensities I and 4I are superimposed. The maximum and minimum intensities in the resulting beam are...
A. 5I, I
B. 5I, 3I
C. 9I, I
D. 9I, 3I
15. A vessel contains oil (density = 0.8 g/cm^3) over mercury (density = 13.6 g/cm^3). A homogeneous sphere floats with half its volume immersed in mercury and other half in oil.The density of the material of the sphere in g/cm^3 is...
A. 3.3
B. 6.4
C. 7.2
D. 12.8
16. An organ pipe P^1 closed at one end vibrating in its first harmonic and another pipe P^2 open at both ends vibrating in its third harmonic are in resonance with a given tuning fork. The ratio of the length of P^1 to that of P^2
A. 8 : 3
B. 3 : 8
C. 1 : 2
D. 1 : 3
17. Two particles x and y have equal charges, after being accelerated through the same potential difference, enter a region of uniform magnetic field and describe circular paths of radii R_1 and R_2, respectively. The ratio of the mass of x to that of y is...

A. $(R_1/R_2)^{1/2}$

B. R_2/R_1

C. $(R_1/R_2)^2$

D. R_1/R_2

18. A feably prepared radioactive source of half life 2 h emits radiation of intensity which is 64 times the permissible safe level. The minimum time after which it would be possible to work safely with this source is...
A. 6 h B. 12 h
C. 24 h D. 128 h

19. A nuclear bomb explodes 200 km above the surface of moon. The sound of explosion on the moon will...
A. be heard before the flash of explosion is seen
B. be heard at the same time explosion occurs
C. be heard after the explosion
D. not be heard at all
20. A blue colour star is...
A. hotter than white star
B. cooler than white star
C. at the same temperature as white star
D. at 0 K temperature
21. The position of a particle at time t is $\sqrt{x} = 10 + t$, then...
A. velocity is constant
B. velocity α t
C. acceleration α t
D. acceleration is zero
22. The maximum height and range of a projectile are equal when the angle of projection is...
A. 45
B. 60
C. $\tan^{-1}(1/4)$
D. $\tan^{-1} 4$

23. A force of 140 N acts on a body of mass 100 kg. If the frictional force is 40 N, then the acceleration of the body is _____ m/s^2

A. 1
B. 180
C. 18
D. 1.8
24. The work done by centripetal force(F) on a particle of mass m moving round a circle of radius r with a uniform sped of v is
A. F x r
B. F x $2\pi r$
C. zero
D. F x v
25. When a sphere rolls without slipping the ratio of translational kinetic energy to total kinetic energy is...
A. 3 : 7
B. 1 : 1
C. 7 : 5
D. 5 : 7
26. When a satellite revolves round the earth in an orbit very close to earth its orbital velocity is...
A. 11.2 m/s
B. 11.2 km/s
C. 8 m/s
D. 8 km/s
27. The diameter of a water molecule is _____ A°.
A. 1.5
B. 2
C. 1
D. 3
28. To produce longitudinal extension we should exert force in...
A. one direction only
B. two directions
C. perpendicular to the body in all directions
D. parallel to the body
29. A metal sphere has a spherical cavity in it. When the ball is heated the volume of cavity will...
A. Increase B. Decrease
C. not change D. depend on mass of sphere
30. A weightless spring of force constant 5 N/m is cut into two equal halves and the two are connected in parallel. The equivalent force constant of the system in N/m is...
A. 5 B. 10
C. 15 D. 20

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #13

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. Maximum reinforcement of two waves is obtained at points with phase difference of...
[A] nπ [B] nπ/2 [C] 2nπ [D] (2n + 1)π/2
2. If 'd' is the width of slit, the diffraction is greater for...
[A] larger d, larger λ [B] larger d, smaller λ
[C] smaller d, larger λ [D] smaller d, smaller λ
3. The SI unit of Planck's constant is...
[A] J [B] J/s [C] J.s [D] J/s.K
4. The energy of an electron depends on...
[A] its distance from the nucleus [B] the diameter of the nucleus
[C] its diameter [D] its charge
5. Which of the following is not the spectral series obtained in the hydrogen spectrum?
[A] Balmer series [B] Pascal series [C] Pfund series [D] Paschen series
6. The conductivity of a semiconductor can be changed by adding impurities and by...
[A] changing its size [B] changing its shape [C] changing its density [D] irradiation
7. A body falling from rest covers a distance h/2 in the last second of its fall. Then the height h from which it falls is...
[A] 9.8 m [B] 58.28 m [C] $100/\sqrt{2}$ m [D] $50/\sqrt{2}$ m
8. The two ends of a train moving with uniform acceleration pass a certain point with velocities v_1 and v_2. The velocity with which the middle point of the train passes the same point is...
[A] $\sqrt{(v_1^2 + v_2^2)/2}$ [B] $\sqrt{(v_1^2 - v_2^2)/2}$ [C] $\sqrt{(v_2^2 - v_1^2)/2}$ [D] $(v_1 + v_2)/2$
9. The angle which the vector 3i + 4j makes with X-axis is...
[A] 30° [B] 45° [C] $\tan^{-1}(4/3)$ [D] $\tan^{-1}(3/4)$
10. Two bodies of equal mass are in uniform circular motion with the same period.If r_1 and r_2 are the radii of their circular paths then the ratio of their centripetal force is...
[A] r_1^2 / r_2^2 [B] r_2^2 / r_1^2 [C] r_1 / r_2 [D] r_2 / r_1
11. A ball is dropped from a vertical height 'h' on the ground. If 'e' is the coefficient of restitution then the height to which the ball goes up after it rebounds for n-th time is...
[A] $h/(e^n)$ [B] $h/(e^{2n})$ [C] $h.(e^n)$ [D] $h.(e^{2n})$
12. Water falls on the blades of a turbine at the rate of 10 kg/s from a height of 10 m. The power delivered to the turbine is...(take g = 10 m/s^2)
[A] 1 W [B] 1 kW [C] 100 W [D] 100 kW
13. An electric fan has a blade of length l. The fan makes n rotations in one minute. The acceleration of a point on the tip of the blade is...
[A] $4\pi^2.l/n$ [B] $4\pi^2.l.n^2/(60 \times 60)$ [C] $4\pi^2.l.n^2/60$ [D] $4\pi^2.l/60n$
14. A body of mass m slides down an incline and reaches the bottom with velocity v. If a ring of same mass rolls down the same incline then the velocity of the ring at the bottom is...
[A] v [B] 2v [C] $v/\sqrt{2}$ [D] $(\sqrt{2})v$
15. The gravitational force between two particles of mass 2 kg each separated by a distance 2m is...
[A] 6.67×10^{-11} N [B] 0 [C] 3.335×10^{-11} N [D] 13.34×10^{-11} N
16. The period of revolution of a satellite in a circular orbit of radius r is T. The period of the same satellite in another circular orbit of radius 4r is...
[A] T/4 [B] T/8 [C] 2T [D] 8T
17. If K is Boltzmann's constant, the average kinetic energy of a molecule of a perfect gas is...
[A] 2/3 kT [B] 2.5 kT [C] 3.5 kT [D] 1.5 kT

18. The efficiency of a Carnot engine working between constant high temperature T_1 and constant low temperature T_2 is maximum when...

[A] T_1 and T_2 are high [B] T_1 is high and T_2 is low

[C] T_2 is high and T_1 is low [D] T_1 and T_2 equal

19. A cooking vessel must have...

[A] high thermal conductivity and high specific heat

[B] low thermal conductivity and low specific heat

[C] high thermal conductivity and low specific heat

[D] low thermal conductivity and high specific heat

20. The total energy of a particle executing SHM is 100 J.Then the maximum value of kinetic energy is...

[A] 50 J [B] 100 J [C] 25 J [D] 10 J

21. When a mass m is suspended from a spring its period of oscillation is one second. If the mass is reduced to m/2, the new period will be...

[A] 1 second [B] 1/2 second [C] $\sqrt{2}$ second [D] $1/(\sqrt{2})$ second

22. Which of the following quantities can be considered as the fundamental quantity of a wave?

[A] Velocity [B] Frequency [C] Wavelength [D] Amplitude

23. In a stationary wave, strain is...

[A] maximum at node [B] maximum at antinode

[C] minimum at node [D] equal at nodes and antinodes

24. Dimensions of momentum are...

[A] $M^1L^1T^1$ [B] $M^1L^1T^{-2}$ [C] $M^1L^{-1}T^{-2}$ [D] $M^1L^{-1}T^{-1}$

25. When a 1-N force acts on a 1-N object that is able to move freely, the object receives...

[A] a speed of 1 m/s [B] an acceleration of 1.02 m/s^2

[C] an acceleration of 1 m/s^2 [D] an acceleration of 9.8 m/s^2

26. The coefficient of static friction for steel on ice is...

[A] 0.1 [B] 0.1 N [C] 0.1 Nm [D] 0.1 $N.kg^{-1}$

27. The work done in moving an object from A to B against a non-conservative force

[A] cannot be recovered by moving it from B to A

[B] does not depend on the path taken between A and B

[C] is always entirely converted in to heat

[D] disappears forever

28. Car A has mass of 1000 kg and speed of 60 kmph. Car B has mass of 2000 kg and speed of 30 kmph. The kinetic energy of car A is...

[A] half that of car B [B] equal to that of car B

[C] twice that of car B [D] four times that of car B

29. Brownian motion increases as...

[A] the particle size increases [B] the viscosity of the medium increases

[C] the temperature increases [D] the temperature decreases

30. The equilibrium separation between the molecules corresponds to...

[A] maximum potential energy [B] minimum potential energy

[C] zero potential energy [D] zero kinetic energy

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ #14

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. Intermolecular forces are attractive when the separation of molecules is...
[A] more than the equilibrium separation [B] less than the equilibrium separation
[C] equal to the equilibrium separation [D] zero
2. The inter atomic potential is dependent on...
[A] the shape of the atoms only [B] the distance between the atoms only
[C] both the shape and the distance between the atoms [D] none of above
3. The shear stress that acts on an object affects its...
[A] length [B] width [C] volume [D] shape
4. The only elastic modulus that applies to liquids is...
[A] Young's modulus [B] Shear modulus [C] modulus of rigidity [D] bulk modulus
5. In the steady flow, the streamlines...
[A] do not exist [B] are fixed in number
[C] intersect one another [D] do not intersect one another
6. If the radius of a pipe is increased by 50%, the fluid velocity v becomes...
[A] (3/2).v [B] (2/3).v [C] (4/9).v [D] (9/4).v
7. The average speed of the molecules in a bottle of gas at pressure P and absolute temperature T is doubled. The new pressure and temperature are, respectively...
[A] 2P, 2T [B] 4P, 4T [C] 4P, 2T [D] 2P, 4T
8. In the equation, PV = constant, the value of the constant depends on...
[A] the temperature of the gas [B] the mass of the gas
[C] the temperature and the mass of the gas [D] the temperature and the pressure of the gas
9. For water, triple point occurs at...
[A] 76 mmHg, 273.16K [B] 76 mmHg, 273.16°C [C] 4.58 mmHg, 273.16K [D] 4.58 mmHg, 273.16°C
10. The density of water is maximum at...
[A] 0°C [B] 4°C [C] 30°C [D] 32°F
11. Dipole moment is...
[A] a scalar [B] a vector from -q to +q
[C] a vector from +q to -q [D] a vector perpendicular to the distance vector
12. If an ebonite rod is rubbed with fur...
[A] the rod gets electrified [B] the fur gets electrified
[C] both the fur and the rod get electrified [D] none gets electrified
13. For a magnet placed in a magnetic field, the maximum torque occurs when the axis of the magnet is...
[A] perpendicular to the field [B] parallel to the field
[C] inclined at 45° to the field [D] inclined at 180° to the field
14. Optical fibres use the principle of...
[A] refraction [B] total internal refraction
[C] total internal reflection [D] total internal absorption
15. When light travels in different materials...
[A] the wavelength remains constant [B] the frequency remains constant
[C] the velocity remains constant [D] none of three remains constant
16. If a star A is two magnitudes brighter than star B, we say that A is _____ times brighter than B.
[A] 2 [B] 2 x 2.512 [C] 2.512 x 2.512 [D] 100
17. If λ_0 is emitted wavelength, λ is measured wavelength and Z is the displacement of spectral line, then...
[A] $Z = (\lambda_0 - \lambda)/\lambda$ [B] $Z = (\lambda_0 - \lambda)/\lambda_0$ [C] $\lambda = \lambda_0 (Z + 1)$ [D] $\lambda_0 = \lambda(Z + 1)$

18. The magnitude of vector $2i - 3j + \sqrt{3}.k$ is...

[A] 2 [B] 3 [C] $\sqrt{2}$ [D] 4

19. The M.I. of a disc about an axis passing through its centre and perpendicular to its plane is 100 $gm.cm^2$. Then, its M.I. about its diameter is...

[A] 100 $gm.cm^2$ [B] 50 $gm.cm^2$ [C] 200 $gm.cm^2$ [D] 25 $gm.cm^2$

20. A ring , a disc and a sphere, all of same mass and radius, rotate with the same angular velocity about their diameter. Which has maximum rotational kinetic energy?

[A] Ring [B] Disc [C] Sphere [D] All have same kinetic energy

21. If the earth stops rotating, the value of 'g' will...

[A] increase [B] decrease [C] not change [D] become zero

22. A parrot resting on a floor of an air-tight box, which is being carried by a girl starts flying. The girl will feel that the box...

[A] is now lighter [B] is now heavier [C] shows no change in weight [D] is also flying

23. The thermal resistance of a metal block of length l, area of cross-section A and thermal conductivity k is...

[A] l/(k.A) [B] l.A/k [C] k.A/l [D] k.l/A

24. The equivalent thermal conductivity of a slab consisting of two parallel layers of two different materials of thermal conductivity K_1 and K_2 is...

[A] $K_1 + K_2$ [B] $K_1.K_2$ [C] $(K_1 + K_2)/2$ [D] $(2K_1 + K_2)/(K_1 + K_2)$

25. A sphere, a cube and a thin circular plate, all made of same material and of same mass are heated to a temperature of 100°C. Which of these cools faster when left in air at room temperature?

[A] Sphere [B] Circular plate [C] Cube [D] All of them at the same rate

26. No energy is transmitted in a...

[A] longitudinal progressive wave [B] stationary wave

[C] transverse progressive wave [D] electromagnetic wave

27. The velocity of sound in air is V. At what speed a source must travel towards a listener at rest so that the apparent frequency heard is double the true frequency of the source?

[A] V/2 [B] V/4 [C] 2V [D] 4V

28. A spring with force constant k is cut in half. Each of the new springs has a force constant of...

[A] k/2 [B] k [C] 2k [D] $\sqrt{2}.k$

29. A harmonic oscillator of mass 40 g has a period of 10 seconds. To reduce the period to 5 seconds, the mass should be changed to...

[A] 10 g [B] 20 g [C] 80 g [D] 160 g

30. An example of a purely longitudinal wave is...

[A] a sound wave [B] an electromagnetic wave

[C] a water wave [D] a wave in a stretched string

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

J.E.E./ A.I.P.M.T. Foundation - XI Physics MCQ # 15

Time: 45 min **Student's Name:** **Roll No.:** **Full Marks: 30**

1. The quality, or timbre, of a musical sound is due to...
[A] its fundamental frequency [B] its overtone structure
[C] its amplitude [D] the presence of beats

2. If θ is the inclination and μ_s, the coefficient of static friction, then a cylinder can roll on the inclined plane without slipping for...
[A] $\mu_s \geq \tan\theta$ [B] $\mu_s \geq (\tan\theta)/3$ [C] $\mu_s \geq (1/\tan\theta)$ [D] $\mu_s \geq (1/3\tan\theta)$

3. The moment of inertia of a rigid body is...
[A] always constant [B] does not change generally
[C] depends on number of particles [D] different for different axes

4. Ball A is thrown horizontally and ball B is dropped from the same height at the same moment. Then...
[A] A reaches the ground first
[B] B reaches the ground first
[C] A has greater speed when it reaches the ground
[D] B has greater speed when it reaches the ground

5. If for the planets in the solar system, r is the radius of the orbit and T is the periodic time, then the ratio r^3/t^2 is...
[A] 1 [B] same for all planets [C] more for farther planets [D] less for farther planets

6. The adiabatic equation for the ideal gas, PV^γ = constant can also be written as...
[A] PV = γ [B] PT^γ = constant [C] $T^\gamma/P^{\gamma - 1}$ = constant [D] $PV^\gamma T^\gamma = R$

7. In any process, the maximum amount of mechanical energy that can be converted to heat...
[A] depends only on the intake temperature [B] depends only on the exhaust temperature
[C] depends on the compression ratio [D] is 100%

8. Electrical energy in the form of electric current is converted into _____ when a storage battery is charged.
[A] electrical [B] thermal [C] chemical [D] light

9. The power consumed by a resistance that obeys Ohm's law is given by...
[A] $P = V^2/R$ [B] $P = V^2R$ [C] P = IR [D] $P = IR^2$

10. Faraday's constant is...
[A] 96487 coulomb/g [B] 96487 coulomb/mole [C] 964870 coulomb/g [D] 964870 coulomb/mole

11. When the lead storage cell is fully charged, its voltage and specific gravity of electrolyte, respectively are...
[A] 2.1 V, 1.825 [B] 1.5 V, 1.825 [C] 2.1 V, 1.285 [D] 1.5 V, 1.285

12. A voltmeter should have a very ____ resistance and should be connected in ____.
[A] large, parallel [B] large, series [C] small, parallel [D] small, series

13. I_1 and I_2 are currents in primary and secondary coils respectively, of a step-up transformer. Then...
[A] I_1 is smaller than I_2
[B] I_1 is smaller than or equal to I_2
[C] I_1 is greater than I_2
[D] I_1 greater than or equal to I_2

14. If A is the area of a coil of N turns rotating with angular speed ω in a uniform magnetic field B, then the instantaneous value of e.m.f. generated in the coil is...
[A] NABω [B] NABω sint [C] NABω sinωt [D] NABω cost

15. In an LCR circuit resonance occurs at the frequency for which...
[A] $X_L > X_C$ [B] $X_L < X_C$ [C] $X_L - X_C = 0$ [D] $X_L = 0$

16. λ (wavelength) of visible light is...
[A] more than λ of ultraviolet light [B] more than λ of infra-red light
[C] less than λ of X-rays [D] more than λ of microwaves
17. The phase difference between two waves superimposing at a point for destructive interference to occur should be...
[A] nπ [B] 2nπ [C] (2n + 1)π/2 [D] (2n + 1)π
18. Diffraction in visible light is harder to observe because of...
[A] low frequencies [B] high velocity [C] visibility [D] short wavelength
19. The charge to mass ratio (specific charge) for an electron (in coulomb/kg) is approximately equal to...
[A] 1.76×10^{-11} [B] 1.76×10^{11} [C] 1.76×10^{-8} [D] 1.76×10^{8}
20. If V_s is the stopping potential and e is the charge on electron, the energy required by the electron to cross over this potential difference is...
[A] V_s/e^2 [B] V_s/e [C] $(V_s)^2/e$ [D] $V_s \cdot e$
21. The change of energy level is always accompanied by the emission or absorption of radiation depending upon the size of...
[A] the energy change [B] the atom [C] the nucleus [D] the electron
22. In the hydrogen spectrum, the series obtained in the ultraviolet region is...
[A] Balmer series [B] Lyman series [C] Paschen series [D] Pfund series
23. In an N-type semiconductor...
[A] free electron density exceeds hole density [B] hole density exceeds free electron density
[C] free electrons are absent [D] holes are absent
24. A diode allows electric current...
[A] to increase [B] to decrease
[C] to flow in one direction only [D] to flow alternately in both directions
25. Two forces 2i - 3j and _____ have a resultant 5i + 4j.
[A] 7i + j [B] -3i - 7j [C] 3i + 7j [D] 7i + 7j
26. If the magnitude of electromagnetic force is 1, the relative strength of strong force is...
[A] 10^{-2} [B] 10^{-1} [C] 10 [D] 10^{2}
27. During an interaction of two particles, the changes produced in velocity are always...
[A] constant [B] equal for both particles
[C] in opposite directions [D] in direct proportion to their weights
28. Which of the following is not a unit of power?
[A] joule.second [B] watt [C] horsepower [D] newton.meter/second
29. A 1 kg mass has a P.E. of 1 joule relative to the ground when it is at a height of about...
[A] 0.12 m [B] 1.0 m [C] 9.8 m [D] 32 m
30. An object in motion need not have...
[A] velocity [B] momentum [C] K.E. [D] P.E.

Brilliant Public School, Sitamarhi

Website: www.brilliantpublicschool.com; E-mail: brilliantpublic@yahoo.com

Answers to All MCQs

ANSWERS TO SET # 1

(1) A (2) A (3) C (4) A (5) B (6) C (7) D (8) C (9) C (10) A (11) B (12) C (13) D (14) C (15) A (16) B (17) C (18) C (19) D (20) A (21) C (22) C (23) D (24) D (25) A (26) A (27) A (28) D (29) B (30) A

ANSWERS TO MCQ # 2

(1) C (2) B (3) B (4) C (5) D (6) B (7) C (8) D (9) B (10) D (11) D (12) A (13) D (14) A (15) B (16) A (17) A (18) D (19) B (20) B (21) D (22) C (23) D (24) B (25) B (26) A (27) A (28) B (29) D (30) A

ANSWERS TO MCQ # 3

(1) B (2) B (3) D (4) B (5) C (6) C (7) B (8) D (9) D (10) A (11) C (12) B (13) C (14) D (15) A (16) A (17) B (18) C (19) C (20) B (21) A (22) C (23) A (24) B (25) A (26) A (27) B (28) B (29) C (30) B

ANSWERS TO MCQ # 4

(1) D (2) D (3) B (4) C (5) C (6) D (7) A (8) A (9) C (10) A (11) D (12) A (13) A (14) C (15) B (16) C (17) D (18) C (19) B (20) C (21) A (22) A (23) C (24) D (25) D (26) A (27) B (28) C (29) D (30) C

ANSWERS TO MCQ # 5

(1) A (2) A (3) C (4) D (5) D (6) A (7) A (8) B (9) B (10) C (11) A (12) D (13) C (14) D (15) C (16) A (17) A (18) B (19) C (20) D (21) C (22) B (23) C (24) B (25) A (26) C (27) D (28) C (29) B (30) A

ANSWERS TO MCQ # 6

(1) B (2) A (3) A (4) B (5) C (6) A (7) D (8) B (9) D (10) B (11) B (12) C (13) A (14) A (15) A (16) B (17) C (18) D (19) C (20) C (21) B (22) C (23) A (24) A (25) C (26) B (27) D (28) B (29) A (30) C

ANSWERS TO MCQ # 7

(1) C (2) D (3) B (4) A (5) B (6) D (7) D (8) A (9) A (10) C (11) C (12) D (13) D (14) B (15) B (16) A (17) C (18) D (19) A (20) C (21) A (22) c (23) A (24) B (25) B (26) A (27) B (28) A (29) B (30) D

ANSWERS TO MCQ # 8

(1) B (2) C (3) D (4) C (5) D (6) A (7) A (8) B (9) D (10) D (11) C (12) A (13) A (14) C (15) C (16) A (17) B (18) B (19) C (20) C (21) C (22) B (23) C (24) D (25) A (26) D (27) B (28) B (29) A (30) B

ANSWERS TO MCQ # 9

(1) B (2) D (3) D (4) A (5) B (6) D (7) A (8) B (9) C (10) C (11) C (12) C (13) A (14) B (15) D (16) B (17) A (18) A (19) C (20) B (21) B (22) A (23) D (24) C (25) B (26) A (27) C (28) A (29) B (30) A

ANSWERS TO MCQ # 10

(1) A (2) A (3) B (4) B (5) D (6) C (7) A (8) C (9) D (10) A (11) B (12) B (13) C (14) A (15) D (16) B (17) A (18) D (19) A (20) D (21) C (22) D (23) A (24) C (25) D (26) B (27) A (28) D (29) C (30) C

ANSWERS TO MCQ # 11

(1) C (2) D (3) C (4) C (5) A (6) D (7) B (8) B (9) B (10) B (11) D (12) A (13) D (14) B (15) D (16) A (17) C (18) D (19) C (20) A (21) B (22) B (23) C (24) C (25) D (26) B (27) C (28) B (29) C (30) C

ANSWERS TO MCQ # 12

(1) D (2) D (3) C (4) A (5) D (6) B (7) C (8) A (9) B (10) D (11) C (12) D (13) D (14) C (15) C (16) B (17) C (18) B (19) D (20) A (21) B (22) D (23) A (24) C (25) D (26) D (27) D (28) B (29) A (30) D

ANSWERS TO MCQ # 13

(1) C (2) C (3) B (4) A (5) B (6) D (7) B (8) A (9) C (10) D (11) D (12) B (13) B (14) D (15) A (16) D (17) D (18) B (19) C (20) B (21) D (22) B (23) A (24) A (25) D (26) A (27) A (28) C (29) C (30) B

ANSWERS TO MCQ # 14

(1) A (2) B (3) D (4) D (5) D (6) C (7) B (8) C (9) C (10) B (11) B (12) C (13) A (14) C (15) B (16) C (17) C (18) D (19) B (20) A (21) A (22) C (23) A (24) A (25) B (26) B (27) A (28) C (29) A (30) D

ANSWERS TO MCQ # 15

(1) B (2) B (3) D (4) C (5) B (6) C (7) D (8) C (9) A (10) B (11) C (12) A (13) C (14) C (15) C (16) A (17) D (18) D (19) B (20) D (21) A (22) B (23) A (24) C (25) C (26) D (27) C (28) A (29) A (30) D