

Physics and Chemistry

1. A simple pendulum has a period T inside a lift when it is stationary. The lift is accelerated upwards with constant acceleration ' a '. The period
 - a) decreases
 - b) increases
 - c) remains same
 - d) becomes infinite

2. 90dB sound is 'x' times more intense than 40dB sound, then x is
 - a) 5
 - b) 50
 - c) 10^5
 - d) 500

3. A star is moving away from the Earth with speed V . Change in wavelength ($d\lambda$) observed on Earth is
 - a) $\lambda V/C$
 - b) $\lambda V/(C+V)$
 - c) $\lambda C/(C+V)$
 - d) $\lambda C/V$

4. An open pipe emits a fundamental frequency n_0 when it emits the 3rd harmonic, the pipe can accommodate
 - a) 2 nodes 2 antinodes
 - b) 3 nodes 4 antinodes
 - c) 3 nodes 3 antinodes
 - d) 1 node 2 antinodes

5. In an adiabatic process
 - a) temperature remains constant
 - b) pressure remains constant
 - c) volume remains constant
 - d) there is no transfer of heat.

6. Carnot's heat engine takes 300J of heat from a source at 627°C and gives some part of it to sink at 27°C . Work done by engine in one cycle is
 - a) 200J
 - b) 300J
 - c) 150J
 - d) 120J

7. $15/16^{\text{th}}$ of a radioactive sample disintegrates in 2 hrs. Mean life of radioactive sample is approximately,
 - a) 30 min
 - b) 43 min
 - c) 21 min
 - d) 15min

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V6

8. Clear images of soft tissues can be well studied using
- MRI
 - X-rays
 - Ultrasonics
 - I.R rays
9. Particles which are not composite and hence truly elementary are
- mesons
 - protons
 - neutrons
 - leptons
10. A logic gate whose output will be in logic 0 state only when all inputs are in logic 1 state is called
- AND
 - OR
 - NOR
 - NAND
11. n type and p type semiconductors can be obtained by doping pure silicon respectively with
- Arsenic Phosphorous
 - Indium Aluminium
 - Phosphorous Indium
 - Aluminium Boron
12. In a CE amplifier $\beta=50$, $R_L=4K\Omega$, $R_i=500\Omega$. Power gain of the amplifier is
- 2×10^4
 - 2×10^2
 - 2×10^3
 - 2×10^1
13. Electrons are excited from $n = 1$ to $n = 4$ state. During downward transitions, possible number of spectral lines observed in Balmer series is
- 4
 - 3
 - 2
 - 1
14. IR region lies between
- radio waves and microwave regions
 - microwaves and visible
 - visible and UV region
 - UV rays and X-ray region.

5. A proton and an alpha particle are subjected to same potential difference V . Their de-Broglie wavelengths λ_p , λ_α will be in the ratio
- 2:1
 - $2\sqrt{2}:1$
 - 4:1
 - 1:2
6. 'Raman Shift' depends on
- incident wavelength
 - incident intensity
 - resolving power of the spectrograph used
 - molecular energy levels of the scatterer.
7. ${}_6\text{C}^{14}$ and ${}_7\text{N}^{15}$ are the examples of
- isotopes
 - isobars
 - isotones
 - mirror nuclei
8. In an interference experiment, intensity ratio at the bright to dark fringe is 9:1. Amplitudes of interfering waves are in the ratio
- 3:1
 - 9:1
 - 2:1
 - 4:1
19. In Young's double slit experiment, 1st dark fringe occurs directly opposite to a slit. Wavelength of light used is
- d^2/D
 - d/D
 - D^2/d
 - $2d^2/D$
20. Newton's ring pattern in reflected system, viewed under white light consists of
- equally spaced bright and dark bands with central dark spot
 - equally spaced bright and dark bands with central white spot
 - a few coloured rings with central dark spot
 - a few coloured rings with central white spot
21. It is difficult to observe diffraction in case of light waves, because
- light waves can travel through vacuum
 - speed of light is more
 - light waves are transverse in nature
 - wavelength of light is small.

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22. A calcite crystal is placed over a dot on a paper sheet and the crystal is rotated. On viewing through the calcite or sees
- A single stationary dot
 - two stationary dots.
 - two dots rotating about one another
 - one dot rotating about the other stationary dot-sometimes coinciding with it
23. Critical angle of the medium is 45° . Polarising angle of incidence at the surface of the medium is
- 45°
 - 38°
 - 22.5°
 - 54.7°
24. If only 2% of the main current is to be passed through a Galvanometer of resistance G , the resistance of shunt should be
- $G/50$
 - $G/49$
 - $50G$
 - $49G$
25. A small current carrying loop of area A behaves like a tiny magnet of magnetic moment M . Current in the loop is
- MA
 - A/M
 - A^2M
 - M/A
26. Two concentric circular coils, each having 10 turns with radii 0.2m and 0.4m carry currents 0.2A and 0.3A respectively in opposite direction. Magnetic field at the centre is
- $(2/3)\mu_0$
 - $(5/4)\mu_0$
 - $(1/4)\mu_0$
 - $(1/6)\mu_0$
27. Material of permanent magnet has
- high retentivity and high coercivity
 - low retentivity and high coercivity
 - low retentivity and low coercivity
 - high retentivity and low coercivity.
28. Power factor of a series LCR circuit is
- R
 - Z/R
 - R/Z
 - RZ

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- Ver 9) An inductor LH is connected across 220V 50Hz supply. Peak value of current is approximately,
- the calcite or
- 0.5A
 - 0.7A
 - 1A
 - 1.4A
30. Plane polarised light is passed through an analyser and the intensity of emerging light is reduced by 75%. Optical vibrations make an angle θ with the axis of analyser. Then θ is
- 60°
 - 45°
 - 30°
 - 58°
31. A charge 10 nC is situated in a medium of relative permittivity 10. The potential due to this charge at a distance of 0.1 m is
- shunt
- 900V
 - 90V
 - 9V
 - 0.09V
32. Dielectric constant of a metal is
- is
- zero
 - infinite
 - finite
 - unpredictable
33. Distance between the two point charges is increased by 20%. Force of interaction between the charges
- A respec-
- increases by 10%
 - decreases by 20%
 - decreases by 17%
 - decreases by 31%
34. Potential energy of 2 charges 10 nC each separated by a distance of 0.09m in air is
- 10 μ J
 - 1 mJ
 - 10 mJ
 - 10 J
35. A metal plate of thickness $d/2$ is introduced in between the plates of a parallel plate air capacitor with plate separation of d . Capacity
- decreases 2 times
 - increases 2 times
 - remains same
 - becomes zero.

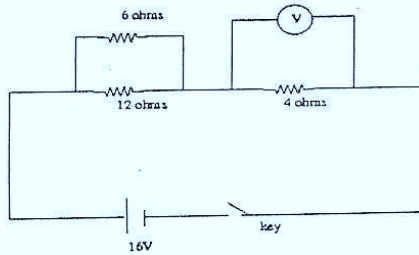
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36. Specific resistance of a conductor material increases with
- increase with area of cross section
 - decrease in length
 - decrease in area of cross section
 - increases with temperature
37. The resistance of mercury at 4.2K is-
- infinity
 - greater than at lab temperature
 - same as that of lab temperature
 - almost zero.
38. Temperature coefficient of resistance of platinum is $4 \times 10^{-3} / K$ at $20^\circ C$. Temperature at which increase in resistance of platinum is 10% its value at $20^\circ C$ is
- $25^\circ C$
 - $70^\circ C$
 - $45^\circ C$
 - $100^\circ C$

39. Ideal voltmeter connected as shown reads



- 16V
 - 12V
 - 4V
 - 8V
40. When a charged particle moves perpendicular to a uniform magnetic field, then
- its momentum changes total energy is same.
 - both momentum and total energy remain the same.
 - both momentum and its total energy will change
 - total energy changes. Momentum remains same.

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41. 0.04 m of glass contains the same number of waves as 0.05m of water, when monochromatic light passes through them normally. Refractive index of water is $\frac{4}{3}$. Refractive index of glass is
- $\frac{5}{3}$
 - $\frac{5}{4}$
 - $\frac{5}{2}$
 - $\frac{4}{5}$
42. Critical angle will be maximum, when light travels from
- Glass to air
 - Glass to water
 - Water to air
 - Diamond to air
43. A ray of light incident on one face of an equilateral prism at 60° enters and leaves the prism symmetrically. Refractive index of the prism material is
- 1.5
 - 1.62
 - 1.73
 - 1.8
44. In the spectrum of visible light produced by a prism dispersion is
- Uniform throughout the spectrum
 - Maximum in the middle decreases on either sides.
 - Maximum towards yellow
 - Maximum towards violet.
45. Convex lens of focal length f made of glass of Refractive index 1.5 is immersed in water of Refractive index $\frac{4}{3}$. Focal length is
- f
 - greater than f
 - less than f
 - $-f$
46. Two co-axial lenses of power $+4D$ and $-2D$ are placed in contact. The focal length of combination is
- 0.5m
 - 0.25m
 - 0.16m
 - 0.5m
47. Eddy currents are produced in a material when it is
- heated
 - placed in a time varying magnetic field.
 - placed in an electric field
 - placed in a uniform magnetic field.

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48. Transformer works on 220V. Its efficiency is 80%. Out put power is 8KW. Primary current is approximately,
- 35A
 - 18A
 - 22A
 - 45A
49. Quality factor of a series LCR circuit decreases from 3 to 2. Resonant frequency is 600Hz. Change in band width is
- zero
 - 100Hz increase
 - 100Hz decrease
 - 300Hz increase
50. A stone dropped from the top of the tower reaches ground in 4 sec. Height of the tower is ($g=10\text{m/s}^2$)
- 20m
 - 40m
 - 60m
 - 80m
51. Liquid crystal phase which are more close to the solid than to liquid is
- Nematic
 - Smectic
 - Lyotropic
 - Cholesteric
52. If the Earth shrinks in its size (radius) mass remaining the same, the value of g on its surface will
- increase
 - decrease
 - remains same
 - is reduced to zero.
53. Two rods of same area of cross section and lengths, and conductivities K_1 and K_2 are connected in series. Then in steady state conductivity of the combination is
- $(K_1+K_2)/(K_1K_2)$
 - $2K_1K_2/(K_1+K_2)$
 - $(K_1+K_2)/2$
 - $K_1K_2/(K_1 + K_2)$
54. The square of the resultant of two equal forces acting at a point is equal to three times their product. Angle between them is
- 30°
 - 45°
 - 60°
 - 90°

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