

Physics and Chemistry

- 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
 - decreases
 - increases
 - remains same
 - becomes infinite
- 90dB sound is ' x ' times more intense than 40dB sound, then x is
 - 5
 - 50
 - 10^5
 - 500
- A star is moving away from the Earth with speed V . Change in wavelength ($d\lambda$) observed on Earth is
 - $\lambda V/C$
 - $\lambda V/(C+V)$
 - $\lambda C/(C+V)$
 - $\lambda C/V$
- An open pipe emits a fundamental frequency n_0 when it emits the 3rd harmonic, the pipe can accommodate
 - 2 nodes 2 antinodes
 - 3 nodes 4 antinodes
 - 3 nodes 3 antinodes
 - 1 node 2 antinodes
- In an adiabatic process
 - temperature remains constant
 - pressure remains constant
 - volume remains constant
 - there is no transfer of heat.
- 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
 - 200J
 - 300J
 - 150J
 - 120J
- $15/16^{\text{th}}$ of a radioactive sample disintegrates in 2 hrs. Mean life of radioactive sample is approximately,
 - 30 min
 - 43 min
 - 21 min
 - 15min

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8. Clear images of soft tissues can be well studied using
- a) MRI
 - b) X-rays
 - c) Ultrasonics
 - d) I.R rays
9. Particles which are not composite and hence truly elementary are
- a) mesons
 - b) protons
 - c) neutrons
 - d) leptons
10. A logic gate whose output will be in logic 0 state only when all inputs are in logic 1 state is called
- a) AND
 - b) OR
 - c) NOR
 - d) NAND
11. n type and p type semiconductors can be obtained by doping pure silicon respectively with
- a) Arsenic Phosphorous
 - b) Indium Aluminium
 - c) Phosphorous Indium
 - d) Aluminium Boron
12. In a CE amplifier $\beta=50$, $R_L=4K\Omega$, $R_i=500\Omega$. Power gain of the amplifier is
- a) 2×10^4
 - b) 2×10^2
 - c) 2×10^3
 - d) 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
- a) 4
 - b) 3
 - c) 2
 - d) 1
14. IR region lies between
- a) radio waves and microwave regions
 - b) microwaves and visible
 - c) visible and UV region
 - d) 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 and λ_α will be in the ratio
- a) 2:1
 - b) $2\sqrt{2}$:1
 - c) 4:1
 - d) 1:2
6. 'Raman Shift' depends on
- a) incident wavelength
 - b) incident intensity
 - c) resolving power of the spectrograph used
 - d) molecular energy levels of the scatterer.
7. ${}_6\text{C}^{14}$ and ${}_7\text{N}^{15}$ are the examples of
- a) isotopes
 - b) isobars
 - c) isotones
 - d) 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
- a) 3:1
 - b) 9:1
 - c) 2:1
 - d) 4:1
19. In Young's double slit experiment, 1st dark fringe occurs directly opposite to a slit. Wavelength of light used is
- a) d^2/D
 - b) d/D
 - c) D^2/d
 - d) $2d^2/D$
20. Newton's ring pattern in reflected system, viewed under white light consists of
- a) equally spaced bright and dark bands with central dark spot
 - b) equally spaced bright and dark bands with central white spot
 - c) a few coloured rings with central dark spot
 - d) a few coloured rings with central white spot
21. It is difficult to observe diffraction in case of light waves, because
- a) light waves can travel through vacuum
 - b) speed of light is more
 - c) light waves are transverse in nature
 - d) 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) A single stationary dot
 - b) two stationary dots.
 - c) two dots rotating about one another
 - d) 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
- a) 45°
 - b) 38°
 - c) 22.5°
 - d) 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
- a) $G/50$
 - b) $G/49$
 - c) $50G$
 - d) $49G$
25. A small current carrying loop of area A behaves like a tiny magnet of magnetic moment M . Current in the loop is
- a) MA
 - b) A/M
 - c) A^2M
 - d) 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
- a) $(2/3)\mu_0$
 - b) $(5/4)\mu_0$
 - c) $(1/4)\mu_0$
 - d) $(1/6)\mu_0$
27. Material of permanent magnet has
- a) high retentivity and high coercivity
 - b) low retentivity and high coercivity
 - c) low retentivity and low coercivity
 - d) high retentivity and low coercivity.
28. Power factor of a series LCR circuit is
- a) R
 - b) Z/R
 - c) R/Z
 - d) RZ

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- Ver 99. An inductor $1H$ is connected across $220V$ $50Hz$ supply. Peak value of current is approximately,
- the calcite or
- a) $0.5A$
 - b) $0.7A$
 - c) $1A$
 - d) $1.4A$
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
- a) 60°
 - b) 45°
 - c) 30°
 - d) 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
- a) $900V$
 - b) $90V$
 - c) $9V$
 - d) $0.09V$
32. Dielectric constant of a metal is
- is
- a) zero
 - b) infinite
 - c) finite
 - d) unpredictable
33. Distance between the two point charges is increased by 20% . Force of interaction between the charges
- A respec-
- a) increases by 10%
 - b) decreases by 20%
 - c) decreases by 17%
 - d) decreases by 31%
34. Potential energy of 2 charges 10 nC each separated by a distance of 0.09 m in air is
- a) $10\ \mu\text{J}$
 - b) 1 mJ
 - c) 10 mJ
 - d) 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
- a) decreases 2 times
 - b) increases 2 times
 - c) remains same
 - d) becomes zero.

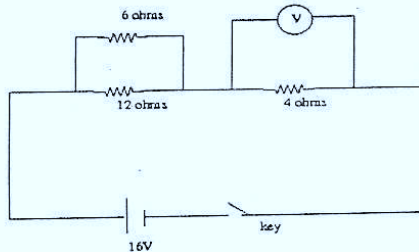
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36. Specific resistance of a conductor material increases with
- increase with area of cross section
 - decrease in length
 - decrease in area of cross section
 - increases with temperature
37. The resistance of mercury at 4.2K is-
- infinity
 - greater 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
- a) $\frac{5}{3}$
 - b) $\frac{5}{4}$
 - c) $\frac{5}{2}$
 - d) $\frac{4}{5}$
42. Critical angle will be maximum, when light travels from
- a) Glass to air
 - b) Glass to water
 - c) Water to air
 - d) 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
- a) 1.5
 - b) 1.62
 - c) 1.73
 - d) 1.8
44. In the spectrum of visible light produced by a prism dispersion is
- a) Uniform throughout the spectrum
 - b) Maximum in the middle decreases on either sides.
 - c) Maximum towards yellow
 - d) 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
- a) f
 - b) greater than f
 - c) less than f
 - d) $-f$
46. Two co-axial lenses of power $+4D$ and $-2D$ are placed in contact. The focal length of combination is
- a) 0.5m
 - b) 0.25m
 - c) 0.16m
 - d) -0.5m
47. Eddy currents are produced in a material when it is
- a) heated
 - b) placed in a time varying magnetic field.
 - c) placed in an electric field
 - d) 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°

$$s = 4$$
$$v = u + at$$
$$v =$$

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55. With the addition of impurities surface tension of a liquid
- increases
 - decreases
 - remains constant.
 - may increase or decrease depending on impurities
56. Viscosity decreases with increase in temperature is the reason for
- hot water moving faster than cold water
 - more viscous oils are used in motor cars during summer than in winter
- only (i) is correct
 - only (ii) correct
 - both (i) and (ii) are correct
 - both are wrong.
57. Moment of momentum of an electron revolving in second Bohr orbit of hydrogen is
- $2\pi h$
 - $h/2\pi$
 - h/π
 - $2h/3\pi$
58. The existence of excitation and ionisation energies in an atom is an evidence for
- stability of an atom
 - electrical neutrality of an atom
 - small size of the atom
 - stationary orbits in an atom.
59. Work function of a photosensitive metal is 3eV. The wavelength of incident radiations which can just eject photo-electrons from the metal is
- 600nm
 - 510nm
 - 414nm
 - 378nm
60. Three identical capacitors are first connected in series and then in parallel. The ratio of effective capacitances in the two cases is
- 9:1
 - 3:1
 - 1:3
 - 1:9
61. To dry ammonia gas the drying agent used is
- Con. H_2SO_4
 - P_2O_5
 - soda lime
 - anhydrous $CaCl_2$

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