

Q1. On a rainy day, small oily films on water show brilliant colours. This is due to

- (a) Scattering
- (b) Interference
- (c) Refraction
- (d) Polarization

S1. Ans.(b)

Sol. When petrol is dropped on the road during a rainy day, a thin layer of oil will appear on the water surface. Both the top and bottom surfaces of this oil film can reflect light. If the path difference between two light rays is an integral times of the wavelength, there will be constructive interference.

Q2. Rainbow formation is due to

- (a) Absorption of sunlight by water droplets
- (b) Diffusion of sunlight through water droplets
- (c) Ionization of water droplets
- (d) Reflection, refraction and dispersion of light

S2. Ans.(d)

Sol. A rainbow is a meteorological phenomenon that is caused by reflection, refraction and dispersion of light in water droplets resulting in a spectrum of light appearing in the sky. It takes the form of a multicoloured circular arc. Rainbows caused by sunlight always appear in the section of sky directly opposite the sun.

Q3. Stars appears to move from east to west because

- (a) all stars move from east to west
- (b) the earth rotates from west to east
- (c) the earth rotates from east to west
- (d) the background of the stars moves from west to east

S3. Ans.(c)

Sol. Earth rotates or spins toward the east, and that's why the Sun, Moon, planets, and stars all rise in the east and make their way westward across the sky.

Q4. Which of the following is not caused by atmosphere refraction of light?

- (a) Twinkling of stars at night
- (b) Sun appearing higher in the sky than it is actually
- (c) Sun becoming visible two or three minutes before actual sunrise
- (d) Sun appearing red at sunset

S4. Ans.(d)

Sol. Twinkling of stars at night, Sun appearing higher in the sky than it is actually and Sun becoming visible two or three minutes before actual sunrise are caused by atmosphere refraction of light.



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Q5. One can distinguish a telescope from a microscope by observing

- (a) length
- (b) colour
- (c) size of the lens
- (d) None of these

S5. Ans.(c)

Sol. Telescope and microscope are two different optical instruments to view the objects easily.

Telescope are used to view the distant objects while very near objects can be viewed by using the microscope. The simple microscope is used for observing magnified images of objects.

It consists of a converging lens of small focal length. Compound microscope is a combination of two convex lenses. The telescope is also a combination of two lenses which is used for observing distinct images of heavenly bodies like stars, planets etc.

Q6. The principle due to which circular patches of light is seen under a tree during day time, is similar to that of image formation by a

- (a) concave lens
- (b) pinhole
- (c) photographic camera
- (d) convex lens

S6. Ans.(b)

Sol. A pinhole camera is a simple camera without a lens and with a single small aperture, effectively a light-proof box with a small hole in one side. Light from a scene passes through this single point and projects, an inverted image on the opposite side of the box. This is similar to that principle due to which circular patches of light is seen under a tree during day time.

Q7. When a strong beam of light is passed through a colloidal solution, the light will

- (a) Be scattered
- (b) Pass unchanged
- (c) Be absorbed
- (d) Be reflected

S7. Ans.(a)

Sol. When a beam of light is passed through a colloidal solution, then scattering of light is observed. This is known as the Tyndall effect. This scattering of light illuminates the path of the beam in the colloidal solution.

Q8. Mirage is an example of

- (a) refraction of light only
- (b) total internal, reflection of light only
- (c) refraction and total internal reflection of light
- (d) dispersion of light only

S8. Ans.(c)

Sol. The angle of incidence i is smaller than the angle of refraction r . Total internal reflection occurs when the incident angle i is larger than the critical angle c . The path of light when a mirage happens Its formation is a result of the refraction and the total internal reflection of light in the air.

Q9. The phenomenon of light associated with the appearance of blue colour of the sky is

- (a) interference
- (b) reflection
- (c) refraction
- (d) scattering

S9. Ans.(d)

Sol. The phenomenon of light associated with the appearance of blue colour of the sky is scattering of light.

The sky appears blue because in the sun light, the blue colour of light is scattered maximum and this scattered blue light enters our eyes and therefore, the sky appears blue in appearance.

Q10. Lens is made up of

- (a) pyrex glass
- (b) flint glass
- (c) ordinary glass
- (d) cobalt glass

S10. Ans.(b)

Sol. The Latin name for lentil is lens culinaris, and this is the origin of the modern word, "lens". In addition to crown glass and flint glass, modern day lens makers use quartz crystals and acrylic plastic. These materials may be used in combination.

Q11. Which of the following is not a Vector quantity?

- (a) Speed
- (b) Velocity
- (c) Torque
- (d) Displacement

S11. Ans.(a)

Sol. A vector quantity has a direction and a magnitude, while a scalar has only a magnitude, Speed is a scalar quantity.

Q12. The dimensional formula for universal gravitational constant is

- (a) $[M^{-2}]$
- (b) $[M^{-1}L^3T^{-2}]$
- (c) $[M^{-1}L^3T^2]$
- (d) $[ML^2T^{-2}]$

S12. Ans.(b)

Sol. According to the newton's law of gravitation, the force of attraction between two objects of mass m_1 and m_2 can be given as $F = \frac{Gm_1m_2}{r^2}$, where G is the gravitational constant and r is the distance between the objects

$\therefore G = \frac{F \times r^2}{m_1 \times m_2}$, now on putting the dimensional formula of F, r, m_1 and m_2 in the given expression, we can get the dimensional formula for G as

$$\frac{[F] \times [r]^2}{[m_1][m_2]} = \frac{[MLT^{-2}] \times [L]^2}{[M][M]}$$
$$= [M^{-1} L^3 T^{-2}]$$

Q13. Decibel is used to measure the intensity of

- (a) Magnetic field
- (b) Sound
- (c) Light
- (d) Heat

S13. Ans.(b)

Sol. The decibel (dB) is used to measure sound level, but it is also widely used in electronics, signals and communication. The dB is a logarithmic way of describing a ratio. The ratio may be power, sound pressure, voltage or intensity or several other things.

Q14. A micron is equal to

- (a) 0.1 mm
- (b) 0.01 mm
- (c) 0.001 mm
- (d) 0.0001 mm

S14. Ans.(c)

Sol. 1 Microns is equal to 0.001 Millimeters.

Q15. Dimensional formula of latent heat

- (a) $M^0L^2T^{-2}$
- (b) MLT^{-2}
- (c) ML^2T^{-2}
- (d) ML^2T^{-2}

S15. Ans.(a)

Sol. Latent heat is given by energy per unit mass. The dimensional formula is $[M^0L^2T^{-2}]$.

Q16. Therm is the unit of

- (a) Power
- (b) Heat
- (c) Light
- (d) Distance

S16. Ans.(b)

Sol. The Therm (symbol, thm) is a non-SI unit of heat energy equal to 100000 British thermal units (Btu). It is approximately the energy equivalent of burning 100 cubic feet (2.83 cubic metres) – often referred to as 1 CCF – of natural gas.

Q17. Knot is measure of

- (a) The speed of ship
- (b) The curvature of spherical objects
- (c) Solar radiation
- (d) Intensity of earthquake shock

S17. Ans.(a)

Sol. A knot is one nautical mile per hour (1 knot = 1.15 miles per hour). The term knot dates from the 17th century, when sailors measured the speed of their ship by using a device called a "common log." This device was a coil of rope with uniformly spaced knots, attached to a piece of wood shaped like a slice of pie.



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Q18. The dimension of which of the following is the same as that of impulse?

- (a) Volume
- (b) Momentum
- (c) Torque
- (d) Change in the rate of momentum

S18. Ans.(b)

Sol. Dimensional formula for impulse and momentum are same MLT^{-1} .

Q19. Which among the following is the fundamental quantity?

- (a) volume
- (b) Time
- (c) Velocity
- (d) Force

S19. Ans.(b)

Sol. Time in physics is defined by its measurement: time is what a clock reads. In classical, non-relativistic physics it is a scalar quantity and, like length, mass, and charge, is usually described as a fundamental quantity.

Q20. The dimensional formula of coefficient of viscosity is

- (a) $[MLT^{-1}]$
- (b) $[M^{-1}L^2T^{-2}]$
- (c) $[ML^{-1}T^{-1}]$
- (d) None of these

S20. Ans.(c)

Sol. Coefficient of viscosity is defined as tangential force required to maintain a unit velocity gradient between two parallel layers of liquid of unit area. Mathematically, Coefficient of viscosity (η) = Fr/Av (where F = tangential Force, A = area, r = distance between the layers, v = velocity).

$$\begin{aligned}\text{viscosity } (\eta) &= (MLT^{-2} \times L) / (L^2 \times LT^{-1}) \\ &= (ML^2T^{-2}) / L^3T^{-1} \\ &= ML^{-1}T^{-1}.\end{aligned}$$

Q21. A current carrying conductor is associated with

- (a) A magnetic field
- (b) An electric field
- (c) An electro-magnetic field
- (d) An electrostatic field

S21. Ans.(a)

Sol. For the magnetic field, the currents are one source of the magnetic, but this problem is more linked to the source of the current in the wire. For a conductor with finite conductivity, an electric field is needed in order to drive a current in the wire.

Q22. Farad is the unit of

- (a) Resistance
- (b) Conductance
- (c) Capacitance
- (d) Inductance

S22. Ans.(c)

Sol. The farad (symbolized F) is the standard unit of capacitance in the International System of Units (SI).

Q23. A good conductor while carrying current is

- (a) Negatively charged
- (b) Positively charged
- (c) Electrically neutral
- (d) Alternately charged positive and negative

S23. Ans.(a)

Sol. A good conductor while carrying current is negatively charged. In a conductive material, the moving charged particles which constitute the electric current are called charge carriers.

Q24. Electrostatic precipitator is used to control

- (a) Air pollution
- (b) Water pollution
- (c) Solid waste
- (d) Noise pollution

S24. Ans.(a)

Sol. Originally designed for recovery of valuable industrial-process materials, electrostatic precipitators are used for air pollution control, particularly for removing particles from waste gases at industrial facilities and power-generating stations.

Q25. The angle between the magnetic meridian and the geographical meridian and the geographical meridian at a place is

- (a) Dip
- (b) Declination
- (c) Latitude
- (d) Azimuth

S25. Ans.(b)

Sol. The vertical plane that passes through the true geographical North and South (or geographical axis of Earth) is known as the geographical meridian. The angle between the magnetic meridian and the geographic meridian at a place is called declination at that place.

Q26. A compass needle cannot be used to detect

- (a) Magnetic North-South direction
- (b) Polarity of a magnet
- (c) Strength of a magnet
- (d) Direction of magnetic field

S26. Ans.(c)

Sol. A compass needle cannot be used to detect Strength of a magnet.

Q27. Indicate the false statement about the resistance of a wire

- (a) It depend on material of wire
- (b) It is unrectly proportional to the length of wire
- (c) It is directly proportional to the area of cross-section of wire
- (d) Resistance of metallic wire increases with increase in temperature

S27. Ans.(c)

Sol. The resistance of a current carrying conductor is inversely proportional to the area of cross section of the conductor. The reason is because the resistance occurs due to the collision of electrons/charged particles. So resistance is inversely proportional to area of cross section of the conductor.

Q28. For which of the following substances, the resistance decreases with increase in temperature?

- (a) Pure silicon
- (b) Copper
- (c) Nichrome
- (d) Platinum

S28. Ans.(a)

Sol. Pure Silicon at room temperature has perhaps one conduction electron for every 10^{13} (that's ten trillion) atoms. Increasing the temperature of intrinsic semiconductors provides more thermal energy for electrons to absorb, and thus will increase the number of conduction electrons. Voila - decreased resistance.

Q29. The ratio of intensity of magnetisation to the magnetisation force is known as

- (a) flux density
- (b) susceptibility
- (c) relative permeability
- (d) none of the above

S29. Ans.(b)

Sol. In electromagnetism, the magnetic susceptibility is one measure of the magnetic properties of a material. The susceptibility indicates whether a material is attracted into or repelled out of a magnetic field.

Q30. When a bar magnet is cut into two equal halves, the pole strength of each piece

- (a) Becomes double
- (b) Becomes half
- (c) Becomes zero
- (d) Remains the same

S30. Ans.(d)

Sol. When a bar magnet is cut into two equal halves, the pole strength of each piece Remains the same.

Q31. Two stones of unequal masses are thrown vertically up with the same velocity. Which of the following will happen?

- (a) The heavier mass will reach greater height
- (b) The lighter mass will reach greater height
- (c) Both will reach the same height
- (d) Any of them may reach greater height

S31. Ans.(c)

Sol. Both will reach the same height, and that too in the same time. Once you have given equal velocity to both the balls, their motion becomes independent of their mass.

Q32. The centre of gravity of a sprinter during the race lies

- (a) ahead of his feet
- (b) behind his feet
- (c) at the centre of the body
- (d) to the left side of the body

S32. Ans.(a)

Sol. The centre of gravity of a sprinter during the race lies ahead of his feet.



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Q33. A person is hurt on kicking a stone due to

- (a) inertia
- (b) velocity
- (c) reaction
- (d) momentum

S33. Ans.(c)

Sol. A person is hurt on kicking a stone due to reaction.

Q34. Two stones of different masses are dropped simultaneously from the top of a building

- (a) smaller stone reaches the ground earlier
- (b) larger stone reaches the ground earlier
- (c) both the stones reach the ground at the same time
- (d) depends on the composition of the stone

S34. Ans.(c)

Sol. Both stones reach on the ground in the same interval of time and also with same velocity because earth attract all the object in the centre with same acceleration 9.8m/s .

Q35. What should a person on a freely rotating turn table do to decrease his (angular) speed?

- (a) Bring his hands together
- (b) Raise his hands up
- (c) Spread his hands outwards
- (d) Sit down with raised hands

S35. Ans.(c)

Sol. A person on a freely rotating turn table do to decrease his (angular) speed on Spread his hands outwards.

Q36. A boy sitting in an open car moving with the constant speed throws a ball straight up into the air. The ball falls

- (a) behind him
- (b) in front of him
- (c) into his hand
- (d) None of these

S36. Ans.(c)

Sol. Since the velocity is constant, the horizontal component of velocity for the car and the ball are the same. Therefore, they cover equal horizontal distances in the same time interval. Therefore the ball will land in the into his hand.

Q37. If the velocity-time graph of a particle is represented by $y = mt + c$, then the particle is moving with

- (a) constant speed
- (b) constant velocity
- (c) constant acceleration
- (d) varying acceleration

S37. Ans.(c)

Sol. If the velocity-time graph of a particle is represented by $y = mt + c$, then the particle is moving with constant acceleration.

Q38. A particle dropped from the top of a tower uniformly falls on ground at a distance a which is equal to the height of tower. Which of the following paths will be traversed by the particle?

- (a) circle
- (b) Parabolic
- (c) Great circle
- (d) Hyper-parabolic

S38. Ans.(b)

Sol. If a particle is dropped from the top of a tower uniformly falls on ground at a distance which is equal to the height of tower then a parabolic path will be traversed by a particle because when the particle is dropped that point is called the point of projection and when it reaches the ground that point is called the point of impact. Now, if the two points is met with one another the curve emerges is parabolic in nature. Hence, we can say that the path followed by the particle is of parabolic trajectories.

Q39. A sphere rolls down on two inclined planes of different angles but same height, it does so

- (a) in the same time
- (b) with the same speed
- (c) in the same time with the same speed
- (d) in the same time with the same kinetic energy

S39. Ans.(b)

Sol. The velocity of the sphere at the bottom depends on height and acceleration due to gravity. Both these values are constant. Therefore the velocity at the bottom remains the same from whichever inclined plane the sphere is rolled

Q40. Should cars have bumpers that collapse under impact?

- (a) Yes, since the offending car should get damaged and pay for the mistake
- (b) No, since it would be very expensive to get the car repaired
- (c) No, since the colliding car would then ram into the occupants and kill them
- (d) Yes, since they help to absorb the impact of a collision and keep the occupants safe

S40. Ans.(d)

Sol. Cars have bumpers that help to absorb the impact of a collision and keep the occupants safe.

Q41. Safety fuse wire used in domestic electrical appliances is made of metal of low

- (a) resistance
- (b) melting point
- (c) specific gravity
- (d) conductance

S41. Ans.(b)

Sol. A fuse wire is a single, small gauge made up of a tin coated copper wire material of low melting point, usually contained in a carrier of some sort, providing a weak point in an electrical circuit that will melt on overload and disconnect the electricity load. An alloy of lead and tin coated wire is used as the material of the fuse wire.

Q42. If input frequency of a full wave rectifier be n , then output frequency would be

- (a) $\frac{n}{2}$
- (b) n
- (c) $\frac{3n}{2}$
- (d) $2n$

S42. Ans.(d)

Sol. Frequency is measured by how frequently the period is completed in one second. A Time period (denoted by "T") is the time needed for one complete cycle of vibration to pass in a given point. The output signal completes a period twice as fast as the input frequency.

Q43. A transformer works on the principle of

- (a) self induction
- (b) mutual induction
- (c) generator
- (d) inverter

S43. Ans.(b)

Sol. A transformer consists of two electrically isolated coils and operates on Faraday's principle of "mutual induction", in which an EMF is induced in the transformer's secondary coil by the magnetic flux generated by the voltages and currents flowing in the primary coil winding.

Q44. In AC circuits, AC meters measure

- (a) mean values
- (b) rms values
- (c) peak values
- (d) mean square values

S44. Ans.(b)

Sol. In AC circuits, AC meters measure rms values.

Q45. The best material for the core of a transformer is

- (a) stainless steel
- (b) mild steel
- (c) hard steel
- (d) soft iron

S45. Ans.(d)

Sol. In alternating current (AC) devices they cause energy losses, called core losses, due to hysteresis and eddy currents in applications such as transformers and inductors. "Soft" magnetic materials with low coercivity and hysteresis, such as silicon steel, or soft iron are used.

Q46. Which of the following circuit elements is used to 'block' DC in an electronic circuit?

- (a) Resistance
- (b) Capacitance
- (c) Inductance
- (d) None of these

S46. Ans.(c)

Sol. Capacitance is used to 'block' DC in an electronic circuit.

Q47. In the process of magnetization of a bar

- (a) the entire bulk of the bar gets magnetised
- (b) only the surface of the bar gets magnetised
- (c) only the ends of the bar get magnetised
- (d) only some parts of the other layers of the bar get magnetised

S47. Ans.(a)

Sol. In the process of magnetization of a bar the entire bulk of the bar gets magnetized.

Q48. The metal whose electrical conductivity is more, is

- (a) copper
- (b) aluminium
- (c) silver
- (d) lead

S48. Ans.(c)

Sol. Silver also has the highest thermal conductivity of any element and the highest light reflectance. Although it is the best conductor.

Q49. Water cannot be used to extinguish fire caused by electric current, because

- (a) it may cause electrocution
- (b) it may cause hydrolysis
- (c) it may cause electrolysis
- (d) it may spoil the wiring

S49. Ans.(a)

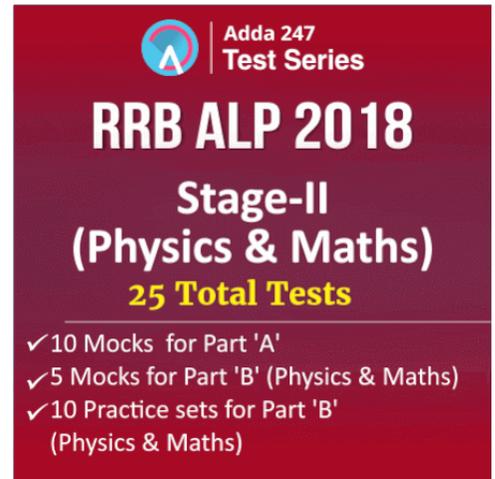
Sol. Water is not used for extinguishing fires caused due to electrical faults because water is good conductor of electricity. If water is poured on an electrical fire, the water could conduct electricity causing the person trying to extinguish the fire to experience an electric shock.

Q50. Superconductors are those elements

- (a) whose conductivity is intermediate between metals and insulators
- (b) whose resistance falls almost to zero at very low temperature
- (c) which turn into insulators at very low temperatures
- (d) which conduct electricity only at super-high temperature

S50. Ans.(b)

Sol. When the conductor is cooled to a temperature below its critical temperature, the electrical resistance drops to zero and that phenomenon is called superconductivity.



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