### MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices.

**i.** Which of the following is an example of simple harmonic motion?
   
   a) Motion of a simple pendulum  
   b) The motion of a ceiling fan  
   c) The spinning of the Earth on its axis  
   d) A bouncing ball on a floor

**ii.** If the mass of the bob of a pendulum is increased by a factor of 3, the period of the pendulum's motion will
   
   a) remain same  
   b) be increased by a factor of 2  
   c) be decreased by a factor of 2  
   d) be decreased by a factor of 4

**iii.** Which of the following devices can be used to produce both a transverse and longitudinal wave?
   
   a) a string  
   b) a ripple tank  
   c) a helical spring (Slinky)  
   d) a tuning fork

**iv.** Waves transfer
   
   a) energy  
   b) frequency  
   c) wavelength  
   d) velocity

**v.** Which of the following is a method of energy transfer?
   
   a) Conduction  
   b) Radiation  
   c) Wave motion  
   d) All of these

**vi.** In a vacuum, all electromagnetic waves have the same
   
   a) speed  
   b) frequency  
   c) amplitude  
   d) wavelength

**vii.** A large ripple tank with a vibrator working at a frequency of 30 Hz produces 25 complete waves in a distance of 50 cm. The velocity of the wave is
   
   a) 53 cms\(^{-1}\)  
   b) 60 cms\(^{-1}\)  
   c) 750 cms\(^{-1}\)  
   d) 1500 cms\(^{-1}\)

**ix.** Which of the following characteristics of a wave is independent of others?
   
   a) speed  
   b) frequency  
   c) Amplitude  
   d) wavelength

**x.** The relation between \( v, f \) and \( \lambda \) in a vacuum all electromagnetic waves have the same
   
   a) speed  
   b) frequency  
   c) amplitude  
   d) wavelength

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices.

i. Which is an example of a longitudinal wave?
(a) sound wave  (b) light wave
(c) radio wave   (d) water wave

ii. How does sound travel from its source to your ear?
(a) by change in air pressure  (b) by vibrating in wires or strings
(c) by electromagnetic wave   (d) by infrared waves

iii. Which form of energy is sound?
(a) electrical  (b) mechanical
(c) thermal    (d) chemical

iv. Astronauts in space need to communicate with each other by radio links because
(a) sound waves travel very slowly in space
(b) sound waves travel very fast in space
(c) sound waves cannot travel in space
(d) sound waves have low frequency in space

v. The loudness of a sound is most closely related to its
(a) frequency    (b) period
(c) wavelength   (d) amplitude

vi. For a normal person, audible frequency range for sound wave lie between
(a) 10 Hz and 10 KHz  (b) 20 Hz and 20 KHz
(c) 25 Hz and 25 KHz  (d) 30 Hz and 30 KHz

vii. When the frequency of a sound wave is increased, which of the following will decrease?

i. Wavelength    ii. Period   iii. Amplitude
(a) i only       (b) iii only
(c) i and ii only (d) i and iii only

ANSWERS

i. (a)    ii. (a)    iii. (b)    iv. (c)    v. (d)    vi. (b)    vii. (c)
MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices.

i. Which of the following quantities is not changed during refraction of light?
   (a) its direction                        (b) its speed
   (c) its frequency                       (d) its wavelength

ii. A converging mirror with a radius of 20 cm creates a real image 30 cm from the mirror. What is the object distance?
    (a) 5.0 cm          (b) 7.5 cm
    (c) 15 cm           (d) 20 cm

iii. An object is placed at the centre of curvature of a concave mirror. The image produced by the mirror is located.
     (a) out beyond the centre of curvature
     (b) at the centre of curvature
     (c) between the centre of curvature and the focal point
     (d) at the focal point

iv. An object is 14 cm in front of a convex mirror. The image is 5.8 cm behind the mirror. What is the focal length of the mirror?
    (a) 4.1 cm          (b) 8.2 cm
    (c) 9.9 cm           (d) 20 cm

v. The index of refraction depends on
   (a) the focal length                      (b) the speed of light
   (c) the image distance                    (d) the object distance

vi. Which type of image is formed by a concave lens on a screen?
    (a) inverted and real
    (b) inverted and virtual
    (c) upright and real
    (d) upright and virtual

vii. Which type of image is produce by the converging lens of human eye if it views a distant object?
     (a) real, erect and same size
     (b) real, inverted & diminished
     (c) virtual, erect & diminished
     (d) virtual, inverted & magnified

viii. Image formed on a camera is
      (a) real, inverted and diminished
      (b) virtual, upright and diminished
      (c) virtual, upright and magnified
      (d) real, inverted and magnified
If a ray of light in glass in incident on an air surface at an angle greater than the critical angle, the ray will
(a) refract only
(b) reflect only
(c) partially refract and partially reflect
(d) diffract only

The critical angle for a beam of light passing from water into air is 48.8 degrees. This means that all light rays with an angle of incidence greater than this angle will be
(a) absorbed
(b) totally reflected.
(c) partially reflected and partially transmitted
(d) totally transmitted

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices:

i. A positive electric charge
   (a) attracts other positive charge   (b) repels other positive charge
   (c) attracts a neutral charge       (d) repels a neutral charge

ii. An object gains excess negative charge after being rubbed against another object, which is:
   (a) neutral                       (b) negatively charged
   (c) positively charged            (d) either a, b or c

iii. Two uncharged objects A and B are rubbed against each other. When object B is placed near a negatively charged object C, the two objects repel each other. Which of these statements is true about object A?
    (a) remains uncharged           (b) becomes positively charged
    (c) becomes negatively charged   (d) unpredictable

iv. When you rub a plastic rod against your hair several times and put it near some bits of paper, the pieces of paper are attracted towards it. What does this observation indicate?
    (a) the rod and the paper are oppositely charged
    (b) the rod acquires a positive charge
    (c) the rod and the paper have the same charges
    (d) the rod acquires a negative charge

v. According to Coulomb’s law, what happens to the attraction of two oppositely charged objects as their distance of separation increases?
(a) increases  (b) decreases
(c) remains unchanged  (d) cannot be determined

vi. The Coulomb’s law is valid for the charges which are
(a) moving and point charges  (b) moving and non-point charges
(c) stationary and point charges  (d) stationary and large size charges

vii. A positive and a negative charge are initially 4 cm apart. When they are
moved closer together so that they are now only 1 cm apart, the force
between them is
(a) 4 times smaller than before  (b) 4 times larger than before
(c) 8 times larger than before  (d) 16 times larger than before

viii. Five joules of work is needed to shift 10C of charge from one place to
another. The potential difference between the places is
(a) 0.5V  (b) 0.2V
(c) 5V  (d) 10V

ix. Two charged spheres are separated by 2 mm. Which of the following
would produce the greatest attractive force?
(a) +1q and +4q  (b) −1q and −4q
(c) +2q and +2q  (d) +2q and −2q

x. Electric field lines
(a) always cross each other  (b) never cross each other
(c) cross each other in the region of strong field  (d) cross each other in the region of weak field

xi. Capacitance is defined as
(a) VC  (b) Q/V
(c) QV  (d) V/Q

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices:
i. An electric current in conductors is due to the flow of
(a) positive ions (b) negative ions
(c) positive charges (d) free electrons

ii. What is the voltage across a 6 Ω resistor when 3 A of current passes through it?
(a) 2 V (b) 9 V
(c) 18 V (d) 36 V

iii. What happens to the intensity or the brightness of the lamps connected in series as more and more lamps are added?
(a) increases (b) decreases
(c) remains the same (d) cannot be predicted

iv. Why should household appliances be connected in parallel with the voltage source?
(a) to increase the resistance of the circuit
(b) to decrease the resistance of the circuit
(c) to provide each appliance the same voltage as the power source
(d) to provide each appliance the same current as the power source

v. Electric potential and e.m.f
(a) are the same terms (b) are the different terms
(c) have different units (d) both (b) and (c)

vi. When we double the voltage in a simple electric circuit, we double the
(a) current (b) power
(c) resistance (d) both (a) and (b)

vii. If we double both the current and the voltage in a circuit while keeping its resistance constant, the power
(a) remains unchanged (b) halves
(c) four times (d) quarter

viii. What is the power rating of a lamp connected to a 12 V source when it carries 2.5 A?
(a) 4.8 W (b) 14.5 W
(c) 30 W (d) 60 W

ix. The combined resistance of two identical resistors, connected in series is 8 Ω. Their combined resistance in a parallel arrangement will be
(a) 2 Ω (b) 4 Ω
(c) 8 Ω (d) 12 Ω

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices.

i. Which statement is true about the magnetic poles?
   (a) unlike poles repel    (b) like poles attract
   (c) magnetic poles do not affect each other
   (d) a single magnetic pole does not exist

ii. What is the direction of the magnetic field lines inside a bar magnet?
    (a) from north pole to south pole    (b) from south pole to north pole
    (c) from side to side    (d) there are no magnetic field lines

iii. The presence of a magnetic field can be detected
     (a) Small mass    (b) Stationary positive charge
     (c) Stationary negative charge    (d) Magnetic compass

iv. If the current in a wire which is placed perpendicular to a magnetic field increases, the force on the wire
    (a) Increase    (b) Decreases
    (c) Remains the same    (d) Will be zero

v. A.D.C motor converts
   (a) Mechanical energy into electrical energy
   (b) Mechanical energy into chemical energy
   (c) Electrical energy into mechanical energy
   (d) Electrical energy into chemical energy

vi. Which part of a D.C. motor reverses the direction of current through the coil every half-cycle?
    (a) the armature    (b) the commutator
    (c) the brushes    (d) the slip rings

vii. The direction of induced e.m.f in a circuit is in accordance with conservation of
     (a) mass    (b) charge
     (c) momentum    (d) energy

viii. The step-up transformer
      (a) increases the input current    (b) increases the input voltage
      (c) has more turns in the primary    (d) has less turns in the secondary coil

ix. The turn ratio of a transformer is 10. It means
    (a) I_s = 10 I_p    (b) N_s = N_p / 10
    (c) N_s = 10 N_p    (d) V_s = V_p / 10

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices:

i. The process by which electrons are emitted by a hot metal surface is known as
   (a) boiling                       (b) evaporation
   (c) conduction                   (d) thermionic emission

ii. The particles emitted from a hot cathode surface are
    (a) positive ions               (b) negative ions
    (c) protons                     (d) electrons

iii. The logical operation performed by this gate is
     (a) AND                        (b) NOR
     (c) NAND                       (d) OR

iv. AND gate can be formed by using two
    (a) NOT gates                  (b) OR gates
    (c) NOR gates                  (d) NAND gates

v. The output of a two-input NOR gate is 1 when:
    (a) A is 1 and B is 0           (b) A is 0 and B is 1
    (c) both A and B are 0          (d) both A and B are 1

vi. If X = A.B, then X is 1 when:
    (a) A and B are 1               (b) A or B is 0
    (c) A is 0 and B is 1            (d) A is 1 and B is 0

vii. The output of a NAND gate is 0 when
     (a) both of its inputs are 0    (b) both of its inputs are 1
     (c) any of its inputs is 0      (d) any of its inputs is 1

ANSWERS

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MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices:

i. In computer terminology information means
   (a) any data  (b) raw data
   (c) processed data (d) large data

ii. Which is the most suitable means of reliable continuous communication between an orbiting satellite and Earth?
   (a) microwaves (b) radio waves
   (c) sound waves (d) any light wave

iii. The basic operations performed by a computer are
   (a) arithmetic operations (b) non-arithmetic operations
   (c) logical operations (d) both a and c

iv. The brain of any computer system is
   (a) monitor (b) memory
   (c) CPU (d) control unit

v. Which of the following is not processing?
   (a) arranging (b) manipulating
   (c) calculating (d) gathering

vi. From which of the following you can get information almost about everything.
   (a) book (b) teacher
   (c) computer (d) internet

vii. What does the term e-mail stand for?
    (a) emergency (b) electronic mail
    (c) extra mail (d) external mail

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### MULTIPLE CHOICE QUESTIONS

Choose the correct answer from the following choices:

**i.** Isotopes are atoms of same element with different
(a) atomic mass (b) atomic number (c) number of protons (d) number of electrons

**ii.** One of the isotopes of uranium is $^{238}_{92}U$. The number of neutrons in this isotope is
(a) 92 (b) 146 (c) 238 (d) 330

**iii.** Which among the following radiations has more penetrating power?
(a) a beta particle (b) a gamma ray (c) an alpha particle (d) all have the same penetrating ability

**iv.** What happens to the atomic number of an element which emits one alpha particle and a beta particle?
(a) increases by 1 (b) stays the same (c) decreases by 2 (d) decreases by 1

**v.** The half-life of a certain isotope is 1 day. What is the quantity of the isotope after 2 days.
(a) one half (b) one quarter (c) one eighth (d) none of these

**vi.** When uranium (92 protons) ejects a beta particle, how many protons are left in the remaining nucleus?
(a) 92 protons (b) 91 protons (c) 238 protons (d) 89 protons

**vii.** Release of energy by the sun is due to
(a) nuclear fission (b) nuclear fusion (c) burning of gases (d) chemical reaction

**viii.** When a heavy nucleus splits into two lighter nuclei, the process would
(a) release nuclear energy (b) absorb nuclear energy (c) release chemical energy (d) absorb chemical energy

**ix.** The reason carbon-dating works is that
(a) Plants and animals are such strong emitters of carbon-14 (b) After a plant or animal dies, it stops taking in fresh carbon-14 (c) There is so much non-radioactive carbon dioxide in the air (d) When a plant or an animal dies.

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