

Physics SSC (Part – II)
Guess Paper - 2022

Chapter 10

SIMPLE HARMONIC MOTION AND WAVES

MULTIPLE CHOICE QUESTIONS

1. In simple pendulum, motion force is provided by;
 - a. Air resistance
 - b. Tension in a string
 - c. Inertia
 - d. Weight of body
2. The example of shock absorber of vehicle is;
 - a. Simple harmonic
 - b. Vibratory
 - c. Damped motion
 - d. Linear motion
3. The SI unit of amplitude is;
 - a. Second
 - b. Hertz
 - c. Meter
 - d. Centimeter
4. The spring's constant is;
 - a. $k = -\frac{F}{x}$
 - b. $F = ma$
 - c. $w = mg$
 - d. $k = -\frac{x}{m}$
5. Formula for the time period of mass attached to spring is;
 - a. $T = 2\pi\sqrt{\frac{k}{m}}$
 - b. $T = 2\pi\sqrt{\frac{m}{k}}$
 - c. $T = 2\pi\sqrt{\frac{l}{m}}$
 - d. $T = 2\pi\sqrt{\frac{m}{4}}$
6. Frequency is equal to;
 - a. $f = \frac{1}{g}$
 - b. $f = \frac{1}{T}$
 - c. $f = kn$
 - d. $f = 2\pi\sqrt{\frac{l}{g}}$
7. The main categories of waves are;
 - a. 1
 - b. 2
 - c. 3
 - d. 4
8. The number of waves passing through a point in one second is called;
 - a. Frequency
 - b. Displacement
 - c. Wavelength
 - d. Amplitude
9. The example of longitudinal waves is;
 - a. Sound waves
 - b. Light waves
 - c. Radio waves
 - d. Water waves
10. The equation for time period of simple pendulum is;
 - a. $T = 2\sqrt{\frac{l}{g}}$
 - b. $T = 2\pi\sqrt{\frac{l}{g}}$
 - c. $T = 2\sqrt{\frac{g}{k}}$
 - d. $T = 2\pi\sqrt{\frac{g}{l}}$
11. Which wave do not require medium for its propagation?
 - a. Sound waves
 - b. Electromagnetic waves
 - c. Mechanical waves
 - d. All of them
12. In motion of a simple pendulum, restoring force is provided by;
 - a. Air resistance
 - b. Tension in a string
 - c. Force of gravity
 - d. Inertia
13. SI unit of frequency is;
 - a. Meter
 - b. Radian
 - c. Newton
 - d. Hertz
14. Ripple tank is used to study the characteristics of;
 - a. Mechanical waves
 - b. Light waves
 - c. Radio waves
 - d. Electromagnetic waves
15. The formula of Hooke's law is;
 - a. $F = kx$
 - b. $F = -kx$
 - c. $k = x/F$
 - d. $x = -Fk$
16. When water waves enter the region of shallow water, the wavelength;
 - a. Decreases
 - b. Increases
 - c. Becomes zero
 - d. Remain same
17. If the length of simple pendulum is doubled than its time period will be;
 - a. $\sqrt{2}$
 - b. $\frac{T}{\sqrt{2}}$
 - c. $2T$
 - d. $\frac{T}{2}$

SHORT QUESTIONS

1. Define vibratory motion.

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2. Define spring constant. Also write its formula.
3. Define restoring force.
4. Define simple pendulum. Write down equation of its time period.
5. If length of pendulum is doubled, what will be the change in its time period. (C.Q. 10.1)
6. What is simple harmonic motion? Write down characteristics of SHM.
7. Define time period and frequency.
8. What is difference between vibration and amplitude?
9. What is meant by damped oscillations?
10. Define wave. Write two basic categories of waves.
11. What is difference between electromagnetic wave and mechanical wave?
12. Differentiate between transverse waves and longitudinal waves.
13. What is meant by compressions and rarefaction?
14. Define crest and trough.
15. Define wave equation and derive its formula. / Prove that $v = f\lambda$.
16. What do you know about ripple tank?
17. What is construction of ripple tank?
18. Define reflection of waves.
19. Define rarefaction.
20. Define diffraction.

LONG QUESTIONS

1. What is SHM? Justify that the motion of mass attached to a spring system is simple harmonic.
2. What is SHM? Justify that the motion of simple pendulum is simple harmonic.
3. What is SHM? Justify that the motion of ball and bowl system is simple harmonic.
4. Describe the construction and working of ripple tank.
5. Describe the properties of waves using ripple tank.
6. The time period of simple pendulum is 2 sec. What will be its length on Earth? What will be its length on moon if $g_m = g_e/6$ where $g_e = 10 \text{ m/s}^2$.
7. A pendulum of length 0.99 m is taken to the moon by an astronaut. The period of the pendulum is 4.9 s. What is the value of g on the surface of the moon?
8. A simple pendulum completes one vibration in two seconds. Calculate its length when $g = 10 \text{ m/s}^2$.
9. If 100 waves pass through a point of medium in 20 seconds, what is the frequency and the time period of wave? If its wavelength is 6 cm, calculate the wave speed.
10. What is the wavelength of the radiowave transmitted by an FM station at 90 MHz where $1\text{M} = 10^6$, the speed of radiowave is $3 \times 10^8 \text{ m/s}$?

Chapter 11

SOUND

MULTIPLE CHOICE QUESTIONS

1. Which is an example of a longitudinal wave?
 - a. Sound wave
 - b. Light wave
 - c. Radio wave
 - d. Water waves
2. How does sound travel from its source to your ear?
 - a. By changes in air pressure
 - b. By vibrations in wires or strings
 - c. By electromagnetic wave
 - d. By infrared waves
3. Which form of energy is sound?
 - a. Electrical
 - b. Mechanical
 - c. Thermal
 - d. Chemical
4. 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
5. The loudness of a sound is most closely related to its
 - a. Frequency
 - b. Time period
 - c. Wavelength
 - d. Amplitude
6. For a normal person, audible frequency range for sound wave lies 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
7. The intensity level of train siren is;
 - a. 150 dB
 - b. 130 dB
 - c. 120dB
 - d. 100 dB
8. The speed of sound at 0°C is;
 - a. 386 ms⁻¹
 - b. 83 ms⁻¹
 - c. 231 ms⁻¹
 - d. 331 ms⁻¹
9. The sound level of whisper is;
 - a. 10 dB
 - b. 30 dB
 - c. 40 dB
 - d. 70 dB
10. The intensity of rustling of leaves is;
 - a. 10 dB
 - b. 20 dB
 - c. 30 dB
 - d. 40 dB
11. The characteristics of sound by which we can distinguish between two sounds of same loudness and pitch is called;
 - a. Intensity
 - b. Quality
 - c. Loudness
 - d. Pitch
12. The speed of sound in air at 25°C is;
 - a. 1246 kmh⁻¹
 - b. 1264 kmh⁻¹
 - c. 1462 kmh⁻¹
 - d. 121462 kmh⁻¹
13. The unit of sound intensity is;
 - a. Wm
 - b. Wm⁻¹
 - c. Wm²
 - d. Wm⁻²
14. Which of these waves consist of compressions and rarefactions?
 - a. Radio waves
 - b. Sound waves
 - c. Television waves
 - d. X-Rays
15. The level of noise recommended in most countries work over eight hours a day is usually;
 - a. 82 – 90 dB
 - b. 83 – 90 dB
 - c. 84 – 90 dB
 - d. 85 – 90 dB
16. In general, the speed of sound is greater in;
 - a. Solids
 - b. Liquids
 - c. Gases
 - d. None of these
17. One bel is equal to;
 - a. 10 dB
 - b. 20 dB
 - c. 40 dB
 - d. 90 dB
18. The speed of sound in wood at 25°C in ms⁻¹ is;
 - a. 3980
 - b. 2000
 - c. 1290
 - d. 972
19. Sound level in dB is given by;
 - a. $10 \log \frac{I}{I_0}$
 - b. $\log \frac{1}{10}$
 - c. $10 \log \frac{10}{1}$
 - d. $\log \frac{10}{I}$
20. The speed of sound in distilled water at 25°C is;

- a. 7478 b. 74188 c. 1498 d. 1508
21. The sensation of sound persists in our mind in;
a. 0.01 s b. 0.1 s c. 0.02 s d. 0.2 s
22. The distance between two consecutive compressions and rarefaction is called;
a. Time period b. Frequency c. Wavelength d. Focal length
23. Vibrating bodies produces;
a. Transverse waves b. Electromagnetic waves c. Compressional waves d. Radio waves

SHORT QUESTIONS

1. Define sound waves.
2. Why sound waves are called mechanical waves?
3. Define loudness. On what factors the loudness of sound depends?
4. Define pitch. On what factors it depends?
5. Why voice of women is more shrill than men?
6. Define intensity of sound and write its SI unit.
7. What is meant by sound intensity level? Write its formula. / What is relation between intensity and loudness of sound?
8. What is meant by decibel scale?
9. Define echo. Is there any difference between echo and reflection of sound?
10. In which sound moves faster, in solids, liquids or gases?
11. What is difference between noise and musical sound?
12. What is meant by acoustics?
13. Define audible frequency range. What is its value for children and old people?
14. What is meant by ultrasound?
15. Write down uses of ultrasounds.
16. Write down uses of ultrasounds in medicine.
17. What is SONAR? / How depth of sea can be measured by ultrasonic?

LONG QUESTIONS

1. Define loudness of sound. What are the factors which affect the loudness of a sound.
2. What is intensity of sound and what is its unit? How sound intensity level can be calculated?
3. What are ultrasounds? Explain some of their uses in our daily life.
4. Calculate the intensity levels of the (a) faintest audible sound (b) rustling of leaves.
5. If at Anarkali Bazar Lahore, intensity level of sound is 80 dB, what will be the intensity of sound there?
6. A doctor counts 72 heartbeats in 1 min. Calculate the frequency and period of the heartbeats.
7. A student clapped his hands near a cliff and heard the echo after 5 s. What is the distance of the cliff from the student if the speed of the sound is taken as 346 m s^{-1} ?

Chapter 12

GEOMETRICAL OPTICS

MULTIPLE CHOICE QUESTIONS

1. Which of the following quantity is not changed during refraction of light?
 - a. its direction
 - b. Its speed
 - c. Its frequency
 - d. Its wavelength
2. 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
3. An object is placed at the center of curvature of a concave mirror. The image produced by the mirror is located
 - a. Out beyond the center of curvature.
 - b. At the center of curvature.
 - c. Between the center of curvature and the focal point
 - d. At the focal point
4. 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
5. The index of refraction depends on
 - a. The focal length
 - b. The speed of light
 - c. The image distance
 - d. The object distance
6. 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
7. Which type of image is produced by the converging lens of human eye if it views a distant object?
 - a. Real, erect, same size
 - b. Real, inverted, diminished
 - c. Virtual, erect, diminished
 - d. Virtual, inverted, magnified
8. Image formed by a camera is
 - a. Real, erect, same size
 - b. Real, inverted, diminished
 - c. Virtual, erect, diminished
 - d. Virtual, inverted, magnified
9. If a ray of light in glass is 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
10. The refractive index of diamond is
 - a. 1.52
 - b. 1.66
 - c. 2.21
 - d. 2.42
11. The speed of light in water is approximately
 - a. $3.3 \times 10^8 \text{ ms}^{-1}$
 - b. $2.3 \times 10^8 \text{ ms}^{-1}$
 - c. $2 \times 10^8 \text{ ms}^{-1}$
 - d. $2.6 \times 10^8 \text{ ms}^{-1}$
12. The critical angle of water is
 - a. 48.8°
 - b. 488°
 - c. 90°
 - d. 95°
13. The refractive index of ice is
 - a. 1.0
 - b. 1.31
 - c. 1.33
 - d. 2.42
14. Formula for focal length is
 - a. $f = R/2$
 - b. $f = R/3$
 - c. $f = R/4$
 - d. $f = R/5$
15. The change in the focal length of eye lens is called
 - a. Modification
 - b. Induction
 - c. Accommodation
 - d. Distinct vision
16. The types of spherical mirror are
 - a. 2
 - b. 4
 - c. 6
 - d. 8
17. The image formed by concave lens on screen is
 - a. Inverted and real
 - b. Inverted and virtual
 - c. Upright and real
 - d. Upright and virtual
18. If a ray of light in glass is incident on an air surface at an angle greater than critical angle, the ray will

- a. Refract only b. Reflect only c. Partially refract and partially reflect d. Diffract only
19. Refractive index of air is
a. 1.0 b. 1.31 c. 1.33 d. 1.36
20. The refractive index of water is
a. 1.00 b. 1.33 c. 2.21 d. 2.42
21. The equation of Snell's law is
a. $n = \frac{\sin r}{\sin i}$ b. $n = \frac{\sin i}{\sin r}$ c. $n = \frac{1}{\sin i}$ d. $n = \frac{1}{\sin r}$
22. _____ type of image is formed by a convex lens on screen
a. Inverted and real b. Inverted and virtual c. Upright and real d. Upright and virtual
23. Conditions for total internal reflection are
a. 2 b. 3 c. 4 d. 5
24. Types of reflection of light are
a. 2 b. 3 c. 4 d. 5
25. If the image is virtual then its distance from lens is taken
a. Positive b. Negative c. Double d. Half
26. Laws of reflection are
a. 2 b. 3 c. 4 d. 5
27. Wave theory of light is formulated by
a. Newton b. Faraday c. Bell d. Maxwell
28. The human eye has
a. Convex mirror b. Concave mirror c. Convex lens d. Concave lens
29. The refractive index of ethyl alcohol is
a. 2.42 b. 2.21 c. 1.36 d. 1.31
30. The power of lens is reciprocal of
a. Focal length b. Diopter c. Focal point d. Principle focus
31. Critical angle of glass is
a. 0° b. 42° c. 45° d. 90°
32. The refractive index of crown glass is
a. 2.42 b. 2.21 c. 1.66 d. 1.52

SHORT QUESTIONS

- Define reflection of light. Also write names of its types.
- Write laws of reflection.
- What are spherical mirrors?
- Differentiate between concave mirror and convex mirror with the help of diagram.
- Differentiate between pole and center of curvature.
- Define radius of curvature.
- Define principal axis and principal focus.
- Define focal length.
- Define mirror formula.
- What is difference between real image and virtual image?
- Define refraction of light.
- Describe laws of refraction.
- Define refractive index. What is its unit?
- What is total internal reflection?
- What is optical fiber? What is its working principle?

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16. What is core and cladding?
17. What is meant by lens? Enlist four types of lenses.
18. Differentiate between concave lens and convex lens.
19. What is optical center?
20. Define power of lens. What is its unit?
21. Define simple microscope. Write formula of its magnification.
22. Define resolving power and magnifying power.
23. Write uses of compound microscope.
24. Define telescope. Write formula of its magnification.
25. Define accommodation.
26. What is nearsightedness? How it can be corrected?
27. What is farsightedness? How it can be corrected?

LONG QUESTIONS

1. What is meant by refraction of light? Write down the laws of refraction of light.
2. What is compound microscope? Write about its construction. Also explain image formation in compound microscope with the help of ray diagram.
3. What is telescope? Write about its construction. Also explain image formation in telescope with the help of ray diagram.
4. How the image is formed in human eye?
5. The focal length of a convex mirror is 13.5 cm. 11.5 cm behind the image of the statue placed in front of it. Find the distance of the statue from the mirror.
6. A convex lens of focal length 6 cm is to be used to form a virtual image three times the size of object. Where must the lens be placed?
7. Nabeela uses a concave mirror when applying makeup. The mirror has a radius of curvature of 38 cm. (a) What is the focal length of the mirror? (b) Nabeela is located 50 cm from the mirror. Where will her image appear? (c) Will the image be upright or inverted?
8. Find the value of critical angle for water (refracted angle = 90°). The refractive index of water is 1.33 and that of air is 1.
9. An object 4 cm high is placed at a distance of 12 cm from a convex lens of focal length 8 cm. Calculate the position and size of the image. Also state the nature of the image.

Chapter 13

ELECTROSTATICS

MULTIPLE CHOICE QUESTIONS

1. Capacitance is defined as;
 - a. CV
 - b. Q/V
 - c. QV
 - d. V/Q
2. The unit of electric intensity is;
 - a. ms^{-1}
 - b. Ns
 - c. Nm
 - d. NC^{-1}
3. If three capacitors of 3pF, 4pF and 5pF are connected in parallel with a battery of 6V. Total capacitance will be;
 - a. 6 pF
 - b. 12 pF
 - c. 14 pF
 - d. 17 pF
4. In series combination of capacitors, each capacitor will have same,
 - a. Voltage
 - b. Charge
 - c. Capacitance
 - d. Both a and b
5. The electroscope is an instrument which is used for;
 - a. Detecting charge
 - b. Detecting current
 - c. Detecting radiations
 - d. None of these
6. The value of k in Coulomb's law is;
 - a. $9 \times 10^9 Nm^2C^{-2}$
 - b. $9 \times 10^9 Nm^2C^{-2}$
 - c. $9 \times 10^9 Nm^2C^{-2}$
 - d. $9 \times 10^9 Nm^2C^2$
7. The unit of capacitance is
 - a. Ampere
 - b. Farad
 - c. Coulomb
 - d. Volt
8. The unit of charge is;
 - a. Ohm
 - b. Watt
 - c. Coulomb
 - d. Ampere
9. A positive electric charge;
 - a. Attracts other positive charges
 - b. Repels neutral charges
 - c. Attracts neutral charges
 - d. Repels other positive charges
10. One nano farad is equal to;
 - a. $1 \times 10^{-6} F$
 - b. $1 \times 10^{-9} F$
 - c. $1 \times 10^{-12} F$
 - d. $1 \times 10^{-18} F$
11. Coulomb's law is;
 - a. $F = k \frac{q_1 q_2}{r^2}$
 - b. $F = k \frac{q_1 q_2}{r^3}$
 - c. $F = k \frac{q_1 q_2}{r}$
 - d. $F = QE$
12. The equation of electric intensity is;
 - a. $E = \frac{v}{q_0}$
 - b. $E = \frac{k}{q_0}$
 - c. $E = \frac{F}{q_0}$
 - d. $F = \frac{w}{V}$
13. An instrument used for detecting charge is;
 - a. Stroboscope
 - b. Electroscope
 - c. Spectroscope
 - d. Microscope
14. The device used to store charge is called;
 - a. Resistor
 - b. Capacitor
 - c. Battery
 - d. Wire
15. In mica capacitor, the dielectric is;
 - a. Mica
 - b. Plastic
 - c. Paper
 - d. Aluminum
16. Combinations of capacitors are;
 - a. 2
 - b. 3
 - c. 4
 - d. 5
17. The electric lines of force were introduced by;
 - a. Newton
 - b. Einstein
 - c. Coulomb
 - d. Faraday
18. The SI unit of coulomb's constant is;
 - a. Nm^2C^{-2}
 - b. Nm^2C^2
 - c. Nm^2C^{-2}
 - d. Nm^2C^2
19. In parallel combination of capacitors, each capacitor will have same;
 - a. Voltage
 - b. Capacitance
 - c. Charge
 - d. Both b and c
20. Capacitors can be used to differentiate between high frequency and low frequency signals. Such circuit is called;
 - a. Series circuit
 - b. Parallel circuit
 - c. Filter circuit
 - d. None of these
21. One micro farad is equal to;

- a. $1 \times 10^{-3} \text{ F}$ b. $1 \times 10^{-4} \text{ F}$ c. $1 \times 10^{-5} \text{ F}$ d. $1 \times 10^{-6} \text{ F}$
22. One farad is equal to
- a. $10^{-6} \mu\text{F}$ b. $10^6 \mu\text{F}$ c. $10^{-3} \mu\text{F}$ d. $10^3 \mu\text{F}$

SHORT QUESTIONS

1. Define electrostatics.
2. Define charge and state its types.
3. Write down characteristics of charges.
4. What is meant by electrostatic induction?
5. Define electroscope. Write its construction.
6. Write down the uses of electroscope.
7. State Coulomb's law.
8. Define electric field.
9. Define electric field intensity. Write its formula and SI unit.
10. What are electric field lines?
11. Describe two properties of electric field lines.
12. Define electrostatic potential. Write down its formula and SI unit.
13. Define volt.
14. Define potential difference.
15. Define capacitor and dielectric.
16. Define capacitance and write its unit.
17. Define farad.
18. What is used as dielectric in paper capacitor?
19. What is mica capacitor?
20. What is variable capacitor?
21. Write uses of capacitors.

LONG QUESTIONS

1. Describe the working of gold leaf electroscope.
2. How charge on a material can be detected by using an electroscope?
3. State and explain Coulomb's law? Also explain its mathematical form.
4. What is the capacitance of capacitors connected in series?
5. How capacitors can be connected in parallel combination? What will be their equivalent capacitance?
6. The force of repulsion between two identical positive charges is 0.8 N, when the charges are 0.1 m apart. Find the value of each charge.
7. Two charges repel each other with a force of 0.1 N when they are 5 cm apart. Find the forces between the same charges when they are 2 cm apart.
8. The electric potential at a point in an electric field is 10 V. If a charge of $+100 \mu\text{C}$ is brought from infinity to this point. What would be the amount of work done on it?
9. A point charge of $+2 \text{ C}$ is transferred from a point at potential 100 V to a point at potential 50 V. What would be the energy supplied by the charge?
10. A capacitor holds 0.03 coulombs of charge when fully charged by a 6 volt battery. How much voltage would be required for it to hold 2 coulombs of charge?

Chapter 14

CURRENT ELECTRICITY

MULTIPLE CHOICE QUESTIONS

1. The electric power of washing machine is
 - a. 50 W
 - b. 100 W
 - c. 750 W
 - d. 800 W
2. Formula of emf is equal to;
 - a. $E = J/Q$
 - b. $F = W/I$
 - c. $E = W/Q$
 - d. $E = Q/I$
3. Unit of resistance is;
 - a. Ampere
 - b. Volt
 - c. Ohm
 - d. Farad
4. Mathematical form of current is;
 - a. $I = 1/Q$
 - b. $I = Q/t$
 - c. $I = f/Q$
 - d. $I = VR$
5. In C.R.O the potential of grid is;
 - a. Positive
 - b. Neutral
 - c. Zero
 - d. Negative
6. Mathematical form of Ohm's law is;
 - a. $P = IV$
 - b. $V = IR$
 - c. $Q = It$
 - d. $W = Q/V$
7. One micro ampere is equal to;
 - a. 10^{-3} A
 - b. 10^{-6} A
 - c. 10^{-9} A
 - d. 10^{-12} A
8. The unit of electric power is;
 - a. Volt
 - b. Joule
 - c. Ampere
 - d. Watt
9. Electric power is equal to;
 - a. I^2V
 - b. IV^2
 - c. I^2R
 - d. IR^2
10. The rate of flow of charges is called;
 - a. Current
 - b. Volt
 - c. Ohm
 - d. Coulomb
11. In an electric circuit, when electron moves from low to high potential they will;
 - a. Lose energy
 - b. Gain energy
 - c. Gain potential
 - d. Lose their identity
12. The SI unit of emf is;
 - a. NC^{-1}
 - b. NC
 - c. C.J
 - d. JC^{-1}
13. 1 milliampere is equal to;
 - a. 10^{-3} A
 - b. 10^{-6} A
 - c. 10^{-9} A
 - d. 10^{-12} A
14. One watt is equal to;
 - a. Js
 - b. Js^{-1}
 - c. J^2s
 - d. Js^{-2}
15. An ideal voltmeter has a resistance;
 - a. Very low
 - b. Very high
 - c. None of these
 - d. Both of these
16. 1 kWh is equal to;
 - a. 3.6 MJ
 - b. 3.6 kJ
 - c. 3.6 J
 - d. $3.6 J^{-1}$
17. It blocks DC current but allows AC current to pass through the circuit;
 - a. Capacitor
 - b. Resistor
 - c. Specific resistance
 - d. Thermometer
18. Unit of current is;
 - a. Volt
 - b. Joule
 - c. Coulomb
 - d. Ampere
19. SI unit of potential difference is;
 - a. Ampere
 - b. Volt
 - c. Farad
 - d. Pascal
20. What is the voltage across a $6\ \Omega$ resistor when 3 A of current passes through it?
 - a. 2 V
 - b. 9 V
 - c. 18 V
 - d. 36 V
21. Specific resistance of copper is;
 - a. 1.99
 - b. 1.69
 - c. 1.50
 - d. 1.20
22. Potential of neutral wire is;

- a. 1 V b. 5 V c. 0 V d. 10 V
23. Specific resistance of metal Nichrome is;
- a. $100 \times 10^{-8} \Omega\text{m}$ b. $200 \times 10^{-8} \Omega\text{m}$ c. $300 \times 10^{-8} \Omega\text{m}$ d. $600 \times 10^{-8} \Omega\text{m}$

SHORT QUESTIONS

1. Define current. Also write its formula and SI unit.
2. Define ampere. Write down two smaller units of current.
3. What is meant by potential difference? Write its unit?
4. Define emf. Write its formula and SI unit.
5. State Ohm's law.
6. Define resistance. Also write its unit.
7. Define ohm.
8. What are ohmic and non-ohmic materials?
9. Define specific resistance / resistivity and write its formula.
10. Define conductors and give examples.
11. Why does current easily flow in conductors?
12. Why does resistance of conductor wire rise with temperature?
13. Define insulators and give example.
14. State Joule's law and write its mathematical form.
15. Define electric power. Write its formula and SI unit.
16. What is meant by kilo watt hour?
17. Prove that $1 \text{ kWh} = 3.6 \text{ MJ}$.
18. Differentiate between D.C and A.C.
19. What is fuse? Write its different ranges.

LONG QUESTIONS

1. State and explain Ohm's law.
2. How resistors are connected in series combination? What will be their equivalent resistance?
3. Explain the equivalent resistance of resistors connected in parallel combination? What are advantages of parallel combination?
4. A current of 3 mA is flowing through a wire for 1 minute. What is the charge flowing through the wire?
5. The resistance of a conductor wire is $10 \text{ M}\Omega$. If a potential difference of 100 volts is applied across its ends, then find the value of current passing through it in mA.
6. By applying a potential difference of 10 V across a conductor, a current of 1.5 A passes through it. How much energy would be obtained from the current in 2 minutes?
7. An incandescent light bulb with an operating resistance of 95Ω is labelled "150 W." Is this bulb designed for use in a 120 V circuit or a 220 V circuit?
8. Calculate the one month cost of using 50 W energy saver for 8 hours daily in your study room. Assume that the price of a unit is Rs. 12.

Chapter 15

ELECTROMAGNETISM

MULTIPLE CHOICE QUESTIONS

1. Which thing works on the principle of electric magnetic induction in hydroelectric power house?
 - a. Motor
 - b. Generator
 - c. Galvanic cell
 - d. Voltaic cell
2. The presence of magnetic field can be detected by;
 - a. Small mass
 - b. Stationary positive charge
 - c. Stationary negative charge
 - d. Magnetic compass
3. The ratio in a transformer is 1 : 100, it means that;
 - a. $V_s = V_p/100$
 - b. $N_s = 10 N_p$
 - c. $N_s = N_p/100$
 - d. $I_s = 10/I_p$
4. Michael Faraday belonged to;
 - a. Britain
 - b. U.S.A
 - c. K.S.A
 - d. Russia
5. Transformer is used for;
 - a. Increase voltage
 - b. Increase resistance
 - c. Both a and b
 - d. None of these
6. Transformer is used to change the value of
 - a. Charge
 - b. Energy
 - c. Power
 - d. Voltage
7. The principle of working of transformer is;
 - a. Self induction
 - b. Electromagnetism
 - c. Mutual induction
 - d. Electrostatics
8. One volt is equal to;
 - a. 1 JC
 - b. 1 JC^{-1}
 - c. 1 JC^{-2}
 - d. 1 NC^{-1}
9. A device which converts electrical energy into mechanical energy is called;
 - a. D.C Motor
 - b. Generator
 - c. Transformer
 - d. All of these
10. The laws of electromagnetic induction and electrolysis were presented by;
 - a. Simon Ohm
 - b. George Coulomb
 - c. Newton
 - d. Michael Faraday
11. A device which is used to increase alternating voltage is called;
 - a. Motor
 - b. Generator
 - c. Transformer
 - d. Voltmeter
12. The study of magnetic effects of current is called;
 - a. Electrostatics
 - b. Magnetism
 - c. Electricity
 - d. Electromagnetism
13. When number of turns in primary coil is greater than secondary coil. This transformer is called;
 - a. Step up
 - b. Step down
 - c. Step up down
 - d. Up and down
14. Step up transformer has;
 - a. $V_s > V_p$
 - b. $V_s < V_p$
 - c. $V_s = V_p$
 - d. $I_s = I_p$
15. An example of mutual induction is;
 - a. A.C Generator
 - b. D.C Motor
 - c. Transformer
 - d. Relay
16. Temporary magnet which causes the current to flow through a coil is;
 - a. Magnetic field
 - b. Electric intensity
 - c. Magnet
 - d. Electromagnet
17. On which principle induced emf is produced in the secondary coil.
 - a. Mutual induction
 - b. Self induction
 - c. Electric induction
 - d. Induced current
18. Which device is prepared by the principle of electromagnetism?
 - a. TV
 - b. Electric motor
 - c. CDs
 - d. Mobile phone
19. In DC motor, coil can rotate in magnetic field by an angle of;
 - a. 30°
 - b. 45°
 - c. 60°
 - d. 90°

SHORT QUESTIONS

1. Define electromagnetism.

2. State right hand grip rule for straight conductor. / How the direction of a magnetic field can be found in a straight conductor?
3. Define electromagnet.
4. State Fleming's left-hand rule.
5. Define electric motor.
6. On what principle, DC motor works?
7. Write down construction of DC motor.
8. Define electromagnetic induction.
9. Define magnetic field strength.
10. Define induced emf and induced current.
11. State Faraday's law of electromagnetic induction.
12. State Lenz's law.
13. Lenz's law is the manifestation of law of conservation of energy. Why?
14. Define AC generator. What is its working principle?
15. Define mutual induction.
16. What is transformer? What is its working principle?
17. What are uses of transformer?
18. What is step-up and step-down transformer?
19. What is meant by ideal transformer? Write its power equation.
20. What is a relay?

LONG QUESTIONS

1. Explain the working and construction of a DC motor.
2. Explain the working and construction of a AC generator.
3. Explain the working and construction of a transformer. Also explain, what is step-up and step-down transformer.
4. Explain Lenz's law. How it can be used to describe the direction of induced emf.
5. A transformer is needed to convert a mains 240 V supply into a 12 V supply. If there are 2000 turns on the primary coil, then find the number of turns on the secondary coil.
6. A step-up transformer has a turn ratios of 1 : 100. An alternating supply of 20 V is connected across the primary coil. What is the secondary voltage?
7. A step-down transformer has a turns ratio of 100 : 1. An ac voltage of amplitude 170 V is applied to the primary. If the current in the primary is 1.0 mA, what is the current in the secondary?

Chapter 16

BASIC ELECTRONICS

MULTIPLE CHOICE QUESTIONS

1. The output of OR gate will be 0 when,
 - a. $A = 0$ and $B = 0$
 - b. $A = 1$ and $B = 1$
 - c. $A = 0$ and $B = 1$
 - d. $A = 1$ and $B = 0$
2. The biggest achievement of electronics is;
 - a. Calculator
 - b. Transistor
 - c. Computer
 - d. Mobile phone
3. The cathode ray oscilloscope consists of main parts;
 - a. 2
 - b. 3
 - c. 4
 - d. 5
4. The equation of NOT operation is;
 - a. $X = A \cdot B$
 - b. $X = A + B$
 - c. $X = A - B$
 - d. $X = \bar{A}$
5. One byte is equal to
 - a. 4 bits
 - b. 6 bits
 - c. 8 bits
 - d. 10 bits
6. In C.R.O. the potential of grid is;
 - a. Positive
 - b. Zero
 - c. Neutral
 - d. Negative
7. The screen of C.R.O. is made up of material called;
 - a. Glass
 - b. Phosphor
 - c. Iron
 - d. Zinc
8. If $X = A + B$ then $X = 0$ when,
 - a. $A = 0$ and $B = 0$
 - b. $A = 1$ and $B = 1$
 - c. $A = 0$ and $B = 1$
 - d. $A = 1$ and $B = 0$
9. In tungsten filament, the potential given to produce the beam of electrons by thermionic.
 - a. 6 V
 - b. 7 V
 - c. 8 V
 - d. 9 V
10. The basic operations performed by a computer are;
 - a. Arithmetic operations
 - b. Logical operations
 - c. Non-arithmetic operations
 - d. Both a and b
11. Number of input terminals in NOT gate is;
 - a. 1
 - b. 2
 - c. 3
 - d. 4
12. Cathode rays have a charge;
 - a. Negative
 - b. Positive
 - c. Neutral
 - d. Both a and b
13. George Bole invented
 - a. Boolean algebra
 - b. Arithmetic algebra
 - c. Mean algebra
 - d. Geometry
14. The basic operation of NOT gate is called;
 - a. Inversion
 - b. Non-inversion
 - c. Both of these
 - d. None of these

SHORT QUESTIONS

1. Define Electronics.
2. What is meant by thermionic emission?
3. What is electron gun? What is composition of electron gun?
4. What is cathode ray oscilloscope?
5. What are uses of CRO?
6. Define analog and digital electronics with example.
7. Define analog and digital quantities with example.
8. Write the uses of digital electronics.
9. Differentiate between ADC and DAC.
10. What is meant by binary variables? Give their examples.
11. What is meant by Boolean algebra?
12. Define logic gates. Write two uses of logic gates.
13. What is truth table?

14. What is AND operation and AND Gate? Also draw its symbol, truth table and Boolean equation.
15. What is OR operation and OR Gate? Also draw its symbol, truth table and Boolean equation.
16. What is NOT operation and NOT Gate? Also draw its symbol, truth table and Boolean equation.
17. Why NAND gate is called universal gate?
18. What is NAND Gate? Also draw its symbol, truth table and Boolean equation.
19. What is NOR Gate? Also draw its symbol, truth table and Boolean equation.
20. What is use of burglar alarm?

LONG QUESTIONS

1. What is AND operation and AND Gate? Also draw its symbol, truth table and Boolean equation.
2. What is OR operation and OR Gate? Also draw its symbol, truth table and Boolean equation.
3. What is NOT operation and NOT Gate? Also draw its symbol, truth table and Boolean equation.
4. What is NAND Gate? Also draw its symbol, truth table and Boolean equation.
5. What is NOR Gate? Also draw its symbol, truth table and Boolean equation.



Chapter 17

INFORMATION AND COMMUNICATION TECHNOLOGY

MULTIPLE CHOICE QUESTIONS

1. A mega byte has how many kilo bytes?
a. 1000 b. 1004 c. 1014 d. 1024
2. Example of primary memory is;
a. Read only memory (ROM) b. Hard disk c. Audio cassette d. Floppy disk
3. 1 kb = _____?
a. 1024 byte b. 1024 kB c. 1024 MB d. None of these
4. One byte is equal to;
a. 4 bits b. 6 bits c. 8 bits d. 10 bits
5. Which is not a hardware device?
a. CPU b. Window c. Keyboard d. Mouse
6. In computer terminology the word machinery refers to;
a. Software b. Hardware c. Data d. Procedure
7. Working principle of telephone is similar to;
a. Type writer b. E-mail c. Computer d. Telegraph
8. Which of the following is not a storage device?
a. Hard disk b. Flash drive c. Key board d. Cassette
9. Telephone system has parts;
a. 2 b. 3 c. 4 d. 5
10. A CD can store over _____ of computer data.
a. 17 MB b. 17 GB c. 680 MB d. 680 GB
11. A device used to transport files from one computer to another;
a. CD b. Laser c. Flash drive d. Printer
12. When disc is made of soft elastic material then it is called;
a. Hard disk b. Floppy disk c. Compound disk d. Metallic disk
13. Radio waves are;
a. Infrared b. X-Rays c. Electromagnetic d. Mechanical
14. Microwaves are used in;
a. Radio b. TV c. Mobile Phone d. All of these
15. C.D stands for;
a. Computer disk b. Compound disk c. Compact disk d. All of these
16. The computer-based information system (CBS) is formed by;
a. 5 parts b. 4 parts c. 3 parts d. 2 parts
17. With broadband, information can be loaded in;
a. 1 min b. 1 sec c. 1 day d. 2 days
18. Which of these is not a web browser?
a. Chrome b. YouTube c. Mozilla Firefox d. Safari
19. Fax machine is also called;
a. Radio b. Computer c. Tele fassimile machine d. Telephone

SHORT QUESTIONS

1. Define data and information.
2. Define information technology.

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3. Define telecommunication.
4. What is meant by information and communication technology?
5. What are main components of CBIS?
6. What is meant by flow of information?
7. What is fax machine?
8. What is a cell phone?
9. What is optical fiber?
10. What is a computer?
11. What is CPU? What is its function?
12. Differentiate between hardware and software.
13. Differentiate between input devices and output devices.
14. Differentiate between primary memory and secondary memory.
15. Differentiate between RAM and ROM.
16. What is super computer?
17. What is floppy disk? Give two advantages of floppies?
18. What is a hard disk?
19. What is a flash drive?
20. Define word processing.
21. What is internet?
22. Write two services of internet. OR What is difference between browsing and e-mail?
23. Name some browsers being used now-a-days.
24. What is electronic mail?
25. What is E-commerce?
26. Define piracy.
27. What is meant by hacking?

LONG QUESTIONS

1. Describe the components of computer-based information system.
2. How light signals can be transmitted through optical fibers?
3. Differentiate between magnetic disk and hard disk.
4. What are storage devices? Differentiate between primary memory and secondary memory.

Chapter 18

ATOMIC AND NUCLEAR PHYSICS

MULTIPLE CHOICE QUESTIONS

- The half-life of plutonium $^{236}_{94}\text{Pu}$ in year is;
 - 0.858
 - 1.85
 - 2.85
 - 3.85
- To diagnose the brain tumor, it is used.
 - Iodine – 131
 - Phosphorus – 32
 - Cobalt – 60
 - Carbon - 14
- Half-life of carbon – 14 is;
 - 7530 years
 - 5730 years
 - 5370 years
 - 3750 years
- Generally an atom is represented by the symbol;
 - X
 - A_ZX
 - Z_AY
 - X^A
- Safe limit of radiation exposure in one year is;
 - 4 rem
 - 5 rem
 - 6 rem
 - 8 rem
- Half-life of hydrogen is;
 - 12.3 years
 - 5730 years
 - 30 years
 - 2.85 years
- Half-life of lead is;
 - 8.07 hours
 - 10.6 hours
 - 10.25 hours
 - 12.25 hours
- The number of neutrons in tritium is;
 - 1
 - 2
 - 3
 - 4
- The number of neutrons in $^{12}_6\text{C}$ is
 - 2
 - 6
 - 12
 - 18
- Isotopes of hydrogen are;
 - 2
 - 3
 - 4
 - 5
- Atomic number can be found by relation;
 - $Z - A$
 - $A + N$
 - $Z + N$
 - $Z + A$
- Half-life of Iodine – 131 is;
 - 10.5 days
 - 8.07 days
 - 12.5 days
 - 16.9 days
- The temperature at center of sun is;
 - 20 MK
 - 2 MK
 - 24 MK
 - 25 MK
- Alpha (α) particles have charge;
 - Negative
 - Positive
 - Neutral
 - None of these
- Half-life of radium-226 is;
 - 4000 years
 - 2800 years
 - 1620 years
 - 5730 years
- A proton is ____ times heavier than an electron.
 - 1836
 - 1863
 - 1870
 - 1800

SHORT QUESTIONS

- Define atom.
- What is meant by nucleus and nucleons?
- What is difference between atomic/charge number and atomic mass number.
- Define neutron number.
- Define isotopes. Give names of isotopes of hydrogen.
- Define natural radioactivity and radioactive elements.
- What is meant by background radiations?
- Define nuclear transmutations.
- Explain α decay with an example.

10. Explain β decay with an example.
11. Explain γ decay with an example.
12. Write two properties of α particles.
13. Write two properties of β particles.
14. Write two properties of γ particles.
15. What is meant by ionization effect and penetration power?
16. Write penetration power of α particles and γ ray photons.
17. Define half-life. Write down half-life of $^{14}_6C$.
18. State two uses of radioisotopes.
19. What is meant by traces?
20. Describe medical treatment of isotopes.
21. Briefly explain the carbon dating.
22. Define control chain reaction. OR How fission chain reaction can be controlled?
23. Define nuclear fusion and nuclear fission.

LONG QUESTIONS

1. What is nuclear transmutation? Describe three types of nuclear transmutations.
2. What is half-life? How half-life of a radioactive element can be determined?
3. Describe some uses of radio-isotopes.
4. What is nuclear fission reaction? How fission chain reaction can be controlled?
5. The half-life of is 7.3 s. A sample of this nuclide of nitrogen is observed for 29.2 s. **16N 7.** Calculate the fraction of the original radioactive isotope remaining after this time.
6. Technetium-99 m is a radioactive element and is used to diagnose brain, thyroid, liver and kidney diseases. This element has half-life of 6 hours. If there is 200 mg of this technetium present, how much will be left in 36 hours.
7. Half-life of a radioactive element is 10 minutes. If the initial count rate is 368 counts per minute, find the time for which count rates reaches 23 counts per minute.
8. Ashes from a campfire deep in a cave show carbon-14 activity of only one-eighth the activity of fresh wood. How long ago was that campfire made?

PARHAAKU
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