Step Academy official

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Choose the correct answer.

1. When water waves enter from deep water to shallow water:

(A) frequency of water waves increases

(B) time period of water waves decreases

(C) speed of water waves decreases

(D) wavelength of water waves increases

2.
A mass spring system has mass m attached to spring. What will be effect on its time period if its mass is increased four times?

(A) becomes double **(B)** becomes half **(C)** becomes four times **(D)** remains same

3.
If a body performing simple harmonic motion completes one vibration in 2 seconds, its frequency of vibration is:

(A) 2 Hz **(B)** 1 Hz **(C)** 0.5 Hz **(D)** 10 Hz

4. Time period of simple pendulum will be smallest at:

(A) Murree **(B)** Moon **(C)** Poles **(D)** Equator

5. Which of the following is longitudinal wave?

(A) X-rays **(B)** Light **(C)** String waves **(D)** Sound

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(A) X-rays **(B)** Light **(C)** String waves **(D)** Sound

7. A spring is stretched 5 cm by 20 N force, what is its spring constant k?

(A) 100 N/m **(B)** 400 N/m **(C)** 40 N/m **(D)** 4 N/m

8.
Time period of electrical vibrator of ripple tank is 0.5 s, water waves in ripple tank has speed of 10 m/s and amplitude of 5 cm. The frequency of the waves is:

(A) 50 Hz **(B)** 0.5 Hz **(C)** 200 Hz **(D)** 2 Hz

9. If amplitude of simple pendulum is doubled, what happens to its time period?

(A) becomes double **(B)** becomes half **(C)** becomes four times **(D)** remains same

10. Speed of sound in air at 0oC is 332 m/s. What is its speed in vacuum?

(A) Equal to 332 m/s **(B)** Greater than 332 m/s **(C)** Less than 332 m/s **(D)** Zero

11. Which of following properties of waves is directly related with loudness of sound?

(A) Frequency **(B)** Wavelength **(C)** Speed **(D)** Amplitude

12. Frequency of sound waves in air is doubled, its speed will:

(A) Become half **(B)** Become double **(C)** Become four times **(D)** Remain same

13.
Silent whistle is used to train dog. When trainer blow the whistle, human beings do not hear it but dogs do listen. Its possible frequency is:

(A) f > 20 Hz **(B)** f < 20 Hz **(C)** f < 20000 Hz **(D)** f > 20000 Hz

14. Threshold of hearing has _____ intensity level.

(A) 0 dB **(B)** 10-12 dB **(C)** 120 dB **(D)** 1 dB

15. Sound travels faster in _____.

(A) Rubber **(B)** Air **(C)** Water **(D)** Steel

16. Sounds having frequency _____ are called infrasonic waves.

(A) Greater than 20 Hz **(B)** Less than 20 Hz **(C)** 20 Hz **(D)** 20 kHz

17. Minimum distance of a person from obstacle for sound to hear echo is:

(A) 17 m **(B)** 34 m **(C)** 0.1 m **(D)** any distance above 50 m

18. Intensity of threshold of pain (loudest audible sound without pain to ears):

(A) 10-12Wm-2 **(B)** 10 Wm-2 **(C)** 1012 Wm-2 **(D)** 1 Wm-2

19. A magnifying glass has focal length of 5 cm then its magnifying power is:

(A) 5 **(B)** 6 **(C)** 6.2 **(D)** 7

20. A denser medium has refractive index of 1.5 then critical angle for it is:

(A) 41.8^o **(B)** 39.5^o **(C)** 30.0^o **(D)** 15.5^o

21. A virtual, erect and smaller than object, image is always formed by _____.

(A) Concave mirror **(B)** Convex lens **(C)** Plane mirror **(D)** Convex mirror

22. Focal length of concave lens is _____.

(A) positive **(B)** negative **(C)** infinity **(D)** zero

23. Accomodation in eyes is done by:

(A) Pupil **(B)** Retina **(C)** Ciliary Muscle **(D)** Cornea

24. A concave lens has focal length of 5 cm.Find its power?

(A) 20 D **(B)** 0.2 D **(C)** -5 D **(D)** -20 D

25. Concave lens forms virtual, erect and enlarge image if object is placed _____:

(A) Between F and 2F **(B)** Before 2F **(C)** at F **(D)** Between F and C

26. Near point of a person lies at 40 cm from him. He is suffering from:

(A) Far sightedness **(B)** Near sightedness **(C)** Presbyopia **(D)** no disease

27.
Incident ray of light makes an angle of 30o with plane mirror.What is the angle of reflection of light ray?

(A) 30^o **(B)** 45^o **(C)** 60^o **(D)** 90^o

28. Radius of curvature of convex mirror is 20 cm, its focal length is:

(A) 40 cm **(B)** 10 cm **(C)** -10 cm **(D)** -20 cm

29. If the distance between charges is doubled, then force between them becomes:

(A) half **(B)** $1/4^{th}$ **(C)** double **(D)** 4 times

30. What is electrostatic force between two charges each of 1 mC separated by distance of 1m?

(A) 900 N **(B)** 9000 N **(C)** 9×10^9 N **(D)** 90 N

31. Which is a vector quantity?

(A) Electric field intensity **(B)** Electric potential **(C)** Potential difference **(D)** Capacitance

32.
If a capacitor stores charge of 10 C when potential difference of 5 V is applied, what will be charge on capacitor if 20 V are applied on it?

(A) 20 C **(B)** 30 C **(C)** 40 C **(D)** 10 C

33. If two capacitors are connected in series then capacitance of their combination:

(A) Increases **(B)** Decreases **(C)** Remains same **(D)** Always increases 4 times

34.
Which of following is touched with disc of charged electroscope but gold leaves of electroscope do not collapse?

(A) Paper rod **(B)** Steel rod **(C)** Copper rod **(D)** Graphite rod

35. Farad (F) is the unit of :

(A) Potential difference **(B)** Electric difference **(C)** Capacitance **(D)** Electric field intensity

36. How many electrons form 1C charge?

(A) 1.6×10^{-19} **(B)** 6.25×10^{-19} **(C)** 1.6×10^{19} **(D)** 6.25×10^{18}

37.
If the potential difference between plates of capacitors is reduced to half, then capacitance of the capacitor becomes:

(A) half **(B)** double **(C)** 1/4th **(D)** remains same

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(A) half **(B)** double **(C)** 1/4th **(D)** remains same

39.
If a charge of 2 C experiences force of 10N in the electric field of 5 C charge, electric field intensity at that point is:

(A) 5 N/C **(B)** 2 N/C **(C)** 10 N/C **(D)** 20 N/C

40. If 4 kilo - ohm and 2 kilo - ohm resistances are connected in parallel, their equivalent resistance is :

(A) 6 kilo - ohm **(B)** 1.3 kilo - ohm **(C)** 8 kilo - ohm **(D)** 2 kilo - ohm

41. Electron volts is NOT the unit of _____.

(A) electrical energy **(B)** work **(C)** electric potential **(D)** heat energy

42. With increase in temperature of thermistors, its resistance _____.

(A) increases **(B)** decreases **(C)** remain same **(D)** may increase or decrease

43.
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?

(A) 18 J **(B)** 180 J **(C)** 18 kJ **(D)** 1.8 kJ

44.
1 A current is passing through a conductor. How many electrons pass through its any cross-sectional area in one second?

(A) 1.6×10^{-19} electrons **(B)** 6.25×10^{-19} electrons **(C)** 1 electron **(D)** 6.25×10^{18} electrons

45. If current through a fixed resistance is doubled then energy dissipation is :

(A) doubles **(B)** half **(C)** 4 times **(D)** one fourth

46.
A current of 10 mA is flowing through a wire for 10 s. What is the amount of charge flowing through the wire?

(A) 10^{-3} C **(B)** 10^{-2} C **(C)** 10^{-1} C **(D)** 10 C

47. If voltage applied on the bulb is doubled then its power becomes:

(A) doubles **(B)** half **(C)** four times **(D)** one fourth

48. ohm - m is the unit of _____.

(A) electric energy **(B)** specific resistance **(C)** electric potential **(D)** heat energy

49. Fuse is always connected in series with _____.

(A) Live wire **(B)** earth wire **(C)** neutral wire **(D)** shunt wire

50.
What is output of step-up transformer having turns ratio 1:50, if 50 V DC is a applied at its primary coil?

(A) 2500 V **(B)** 1 V **(C)** zero **(D)** 100 V

51. Direction of magnetic field inside permanent bar magnet is:

(A) from north to south **(B)** from south to north **(C)** from east to south **(D)** from west to north

52. Which of following parts is responsible for DC motor coil to rotate in one direction?

(A) load **(B)** slip rings **(C)** commutators **(D)** battery

53. Step up transformer increases:

(A) current **(B)** power **(C)** energy **(D)** voltage

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(A) current **(B)** power **(C)** energy **(D)** voltage

55. If magnet is moved towards coil is with uniform acceleration, magnitude of induced emf in the coil;

(A) increases **(B)** decreases **(C)** remains same **(D)** is zero

56. The device which converts mechanical energy in to electrical energy.

(A) motor **(B)** generator **(C)** thermocouple **(D)** battery

57. If a coil moves parallel to a uniform magnetic field, the induced emf will be:

(A) maximum **(B)** zero **(C)** negative **(D)** positive

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(A) maximum **(B)** zero **(C)** negative **(D)** positive

59.
If magnetic field in a conductor, passing perpendicularly through cardboard, is anticlockwise then direction of current in it due to free electrons is:

(A) out of page **(B)** into the page **(C)** upward **(D)** downward

60.
A transformer has 100 turns in the primary and 500 turns in the secondary, if 6 volts is applied across its primary the voltage induced across its secondary would be:

(A) 0 volts **(B)** 30 volts **(C)** 45 volts **(D)** 60 volts

61. According to Right hand palm rule fingers indicate:

(A) conventional current **(B)** Emf **(C)** magnetic force **(D)** magnetic field

62.
A conductor is placed horizontally, direction of current in it is in east, magnetic field is out of page, perpendicular to conductor. What is direction of magnetic force on the conductor?

(A) east **(B)** west **(C)** south **(D)** north

63. Which logic gate is similar to the function of two series switches?

(A) AND **(B)** OR **(C)** NAND **(D)** NOR

64. The logic equation for AND gate is:

(A) X = A.B **(B)** X = A+B **(C)** $X = \overline{A.B}$ **(D)** $X = \overline{A+B}$

65.
The electronic circuit that gives LOW (0) output when all its input are High (1)is called _____ gate.

(A) AND **(B)** OR **(C)** NAND **(D)** NOR

66.
The electronic circuit that gives HIGH (1) output when all its input are HIGH(1) is called _____ gate.

(A) AND **(B)** OR **(C)** NAND **(D)** NOR

67. If electric field is applied parallel to the direction of electron beam, the electrons will

(A) speed up **(B)** slow down **(C)** deflect **(D)** none

68. If magnetic field is applied parallel to the direction of electron beam, the electrons will:

(A) speed up **(B)** slow down **(C)** deflect **(D)** none

69.
The electronic circuit that gives LOW (0) output when one or more of its input are HIGH (1) is called _____ gate.

(A) AND **(B)** OR **(C)** NAND **(D)** NOR

70. Cathode rays are:

(A) electromagnetic rays **(B)** proton **(C)** electron **(D)** neutrons

71.
The electronic circuit that gives HIGH (1) output when one or more of its input are HIGH (1) is called _____ gate.

(A) AND **(B)** OR **(C)** NAND **(D)** NOR

72. There are _____ components of ICT.

(A) 3 **(B)** 4 **(C)** 5 **(D)** 2

73. Which one is a brain of computer?

(A) keyboard **(B)** monitor **(C)** CPU **(D)** wires

74. The set of instructions used and rules to design and use the information system is called:

(A) software **(B)** hardware **(C)** human resource **(D)** procedure

75. One of the famous word processing program is:

(A) MS Office **(B)** MS Excel **(C)** MS Word **(D)** MS Access

76. Which of the following is a data management software?

(A) MS Word **(B)** Text messenger **(C)** Photoshop **(D)** MS Access

77. Which of the following has greater storage for information?

(A) compact disc **(B)** floppy disc **(C)** digital video disc **(D)** universal serial bus

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79. Information travel in wire in telephone network of an office in the form of :

(A) electrical signal **(B)** light signal **(C)** sound signal **(D)** microwaves signal

80.
Which is the most suitable means of reliable continuous communication between an orbiting satellite and earth?

(A) IR signals **(B)** UV signals **(C)** Radio signals **(D)** any e.m. signals

81.
Which is the most suitable means of reliable continuous communication between an orbiting satellite and earth?

(A) radio waves **(B)** microwaves **(C)** sound waves **(D)** any light wave

82. Example of primary memory is:

(A) cache memory **(B)** USB **(C)** optical disc **(D)** hard disc

83. If half - life of a radioactive element is one year, percentage of sample decay after two years is:

(A) 50% **(B)** 75% **(C)** 25% **(D)** 2%

84. Beta (β) particles are fast moving:

(A) Electrons **(B)** photons **(C)** hydrogen nuclei **(D)** helium nuclei

85. One of the isotopes of uranium is U - 239 has atomic number 92. Its nucleon number is:

(A) 239 **(B)** 331 **(C)** 92 **(D)** 147

86. Which particle has large range in ai

(A) α - particles **(B)** β - particles **(C)** γ - particles **(D)** Neutron

87. Which of the following will be absorbed by the paper?

(A) Alpha particle **(B)** Beta particle **(C)** Gamma Rays **(D)** X - rays

88. In the reaction, $X + {}^{17}_{8}O \rightarrow {}^{14}_{7}N + {}^{4}_{2}He$, X is?

(A) ${}^{1}_{1}H$ **(B)** ${}^{2}_{1}H$ **(C)** ${}^{1}_{0}n$ **(D)** ${}^{1}_{-1}e$

89. When β - rays are emitted, the nuclear mass:

(A) Decreases by 4 units **(B)** Does not change **(C)** Increases by 2 units **(D)** Increases by 1 unit

90. Gamma rays from cobalt-60 are used for the treatment of :

(A) Circulation of blood **(B)** Cancer **(C)** Heart attack **(D)** Thyroid glands

Write short answers of the following questions.

1 .
Give an example of vibratory motion which is not simple harmonic motion. Give a reason of your selection.

2 . What will happen to acceleration of mass spring system if its mass is doubled?

3 .

A simple pendulum has time period of 4 seconds. Will its time period remain same or change, if its steel bob is replaced by wood bob of same size?

4 .
A simple pendulum has time period "T" in Murree. In Karachi, it has different time period. What would you do to make its time period same as it was in Murree?

5 .
Why do water waves refract at the boundary of shallow water and deep water in ripple tank experiment?

6 .
What is time period of mass spring system if mass attached to spring is 500 g and its spring constant is 20 N/m?

7 . Why does sound travel faster in solids than liquids and gases?

8 . Vibrating mobile phone on wooden table sounds louder than held in hand. Why?

9 .
Two singers are singing together simultaneously with intensity level 60 dB of each in a hall.Is the intensity level of sound is doubled?

10 . If pitch of sound is increased then what is its effect on speed of sound.

11 . If pitch of sound is increased then what is its effect on loudness of sound.

12 . Vibrating bodies produce sound. When a pendulum vibrates, we do not hear its sound. Why?

13 . How do curtains help to reduce loudness of sound?

14 . In a busy street, traffic noise has intensity of 10-5Wm-2. Find the intensity level in decibel.

15 .
When you look at the front side of polished spoon, your image is inverted and from back of spoon, your image is erect. Explain why?

16 . Why are large convex mirrors fixed at blind turns of mountains?

17 . If a person is walking in pool, why do his legs appear shorter in water?

18 .
When white light passes through a prism, it disperses into its seven colours. Why does dispersion take place in prism?

19 .
Your grandfather uses spectacles to read newspaper. You see through the spectacles and you observe that objects behind it were inverted. Why was it so observed?

20 .
Rub plastic ruler with your hair.Place it near running water from tap. You see that thin stream of water is deflected. Explain why?

21 .

You take your car to service station to get it polished. After a while, you observe that your car attracts the dust. Why is dust attracted by the car?

22 .
The force between two point charges is 10N. If their charge is doubled and distance between them is reduce to half, what will be magnitude of force between them?

23 .
Why is it dangerous for construction workers to hold long steel pole upright during lightning weather conditions?

24 .
Do two capacitors of different plates area gain same or different amount of charge if connected with the same battery?

25 . What is resistance across open switch and close switch of a circuit?

26 .
You are given five resistances of different magnitudes. But you are asked to form a circuit whose resistance is smaller than any given resistance. How can you make such circuit with given resistances?

27 .
Two electric bulbs marked 100 W, 220 V and 200 W, 220 V have tungsten filaments of the same length. Which bulb will have thicker filament?

28 . Why is it dangerous to touch a live wire while standing on earth bare footed?

29 . Show that volt ampere is equal to watt (SI unit of power).

30 .
Two parallel straight conductors carrying current in same direction, attract each other? Explain why. What will you conclude if direction of current in conductors is opposite?

31 . Why output of transformer is zero if DC voltage is applied on its primary coil?

32 . Why step-up transmission is used fro long distance transmission?

33 . In what way split rings (commutators) in DC motor differ from slip rings in AC motor in working?

34 . What are free electrons?

35 .
All modern devices e.g, mobile phone, calculators, laptops etc use digital signals for their working. Why is digital signal used?

36 . What is the difference to produce a LOW (1) output for an OR gate and NAND gate?

37 . Draw a logic Circuit for the logic Equation?

38 . What is the difference between data and information?

39 .
What is the difference between primary and secondary memory? Why do we need both in computers?

40 . Why optical fiber is better than electric wire for communication process?

41 . What is the main difference between telephone and cellular phone?

42 . What is common in isotopes of an element and what is different in them?

43 . Why nuclei of atoms with atomic number greater than 82 emit radiations?

44 . Why range of β - particles is greater than α - particle in air with same energy?

45 . What fraction of a radioactive element will be left after 4 half - lives have elapsed?

46 . What particle does W denote?

47 . How long will a radioactive element take to decay completely?

48 .
When a nucleus $^{238}_{92}U$ absorbs a slow neutron, it subsequently emits two α-particles what is resulting element.

49 .
In 420 days, the activity of a sample of polonium (Po) to one eight of its initial value. What is the half - life of polonium?

50 .
What proportion of a radium sample would be decayed after 8000 years? (Half - life of radium is 1600 years)

Write detailed answers of the following questions.

1 .
What do you mean by oscillation? Define simple harmonic motion. What conditions for a body to perform SHM? Give examples of bodies which perform SHM.

2 . Define the term wave. Explain it with the help of an example. Differentiate between m

3 .
Define the term wave. Explain it with the help of an example. Differentiate between mechanical waves and electromagnetic waves.

4 .
Define longitudinal waves. Discuss its motion with the help of example. Also define the following terms for longitudinal: Refraction, Compression , Wavelength.

5 . Show that frequency and time period of waves are inverse of each other.

6 .
A simple pendulum has time period of 2 s. It is called second pendulum. Find the length of second pendulum on Earth and on Moon? (gm = g/6 = 1.6 m/s2)

7 .

A pendulum of length 2 m is vibrating at a planet. It completes its one vibration in time 5s. What is value of g (gravitational acceleration) at this planet?

8 .
In a ripple tank of length 1.6 m, waves cover this length in 2 seconds. If distance between two consecutive troughs is 20 cm then find the number of waves, frequency of waves and their time period?

9 . What is sound? How is it produced? Explain with examples.

10 . What is the pitch of sound? How is it related with the frequency of sound?

11 . What is loudness of sound? On what factors does it depend?

12 .
Define reflection of sound. Explain the phenomenon of echo. Calculate the minimum distance between sound source and reflecting surface to hear echo. Which animals use echo locations?

13 .
SONAR (sound navigation and ranging system) sends ultrasounds signal towards sea bed. It is received back after 5.3 s. If speed of sound in sea water is 1550 m/s. Find the depth of sea bed.

14 .
What is reflection of lights?Define the following terms: Incident ray, reflected ray, normal, angle of incidence and angle of reflection. Describe laws of reflection.

15 . Define and explain the terms: resolving power and magnifying power.

16 .
What is compound microscope? Describe its construction and working. What is its magnifying power?

17 .
Two point charges of 1.2 pC and 2.5 pC are separated by 50 cm distance. Find the magnitude of force between two point charges?

18 .
90 J of work is done to move 2C charge between two points having potential difference. Point at lower potential has electric potential of 13 V. Find the electric potential of other point?

19 .
Two capacitors of capacitances 5 micro farad and 10 micro farad are connected in a parallel with a 20 V battery. Find total charge stored on the combination.

20 .
Two capacitors of capacitances 3 micro farad and 6 micro farad are connected in series with a 10 V battery. Find equivalent capacitance of the combination.

21 .
Two capacitors of capacitances 3 micro farad and 6 micro farad are connected in series with a 10 V battery. Find charge on each capacitor.

22 .
How resistance are connected in series combination? What are characteristics of series combination of resistances? Derive the formula for its equivalent resistance?

23 .
In a circuit, three bulbs are connected in series and in another circuit, three bulbs are connected in parallel combination. Magnitude of emf source for both circuits is same. How can you explain the difference in brightness of bulbs in both circuits?

24 . What is electric power? Derive its different formulae?

25 .
Differentiate between direct current and alternating current? Define the following terms for AC: (a) Cycle (b) time period (c) frequency

26 .
Discuss the magnetic field produced around a straight current carrying conductor. State and explain the rule by which the direction of the lines of force of magnetic field around a current carrying conductor can be determined.

27 . Show that induced current and induced emf in a circuit follow law of conservation of energy.

28 . Describe the purpose of transformer for AC in detail.

29 .
You want design a transformer to step down alternating voltage from 440 V to 220 V. What should be number of turns of secondary coil if primary coil has 1000 turns.

30 .
When 100 V AC is applied on primary of a step-up transformer, it gives 250 V AC as output on secondary coil. If 30 V AC is applied on primary coil of this transformer then what will be output on secondary coil?

31 . What is difference between analogue and digital electronics? Give examples.

32 .
Explain Information and communication technology. How many parts that come together in order to produce a Computer Based Information System (CBIS)?

33 . Explain the flow of information via wire.

34 . Explain the flow of information via radio signals.

35 . What are different storage devices for computers? Explain!

36 . What are word processing software and data managing software? What are their characteristics?

37 .
Define the following terms atomic number, atomic mass number, nucleon number? How is an atom represented symbolically? Find number of protons, number of neutrons, atomic number, atomic mass number, nucleon number from $^{13}_{6}X$. Which element is this?

38 . What is meant by background radiations? What are different sources of background radiations?

39 .
What do you mean by nuclear transmutation or nuclear decay? What are three basic radioactive decay processes and how do they differ from each other? Give examples.

40 .

What are three basic radioactive decay processes and how do they differ from each other?