

**AGA KHAN UNIVERSITY EXAMINATION BOARD  
SECONDARY SCHOOL CERTIFICATE**

**CLASS X**

**ANNUAL EXAMINATIONS 2022**

**Physics**

**Total Time: 1 hour 40 minutes**

**Total Marks: 50 (40-Theory & 10-Alternate to Practical)**

**INSTRUCTIONS**

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 50 only.
4. Question Distribution

|         |                              |
|---------|------------------------------|
| Theory  | Alternate to Practical (ATP) |
| 40 MCQs | 10 MCQs                      |

5. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

| Correct Way       | Incorrect Ways    |
|-------------------|-------------------|
| 1 (A) (B) (C) (D) | 1 (A) (B) (C) (D) |
|                   | 2 (A) (B) (C) (D) |
|                   | 3 (A) (B) (C) (D) |
|                   | 4 (A) (B) (C) (D) |

Candidate's Signature

6. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
7. DO NOT write anything in the answer grid. The computer only records what is in the circles.
8. The marks obtained on the 40 MCQs will be equated to the total marks of 65 for the theory examination results.
9. You may use a simple calculator if you wish.

**THEORY (Questions 1-40)**

1. Suppose a simple pendulum of 1 m length is placed at a location where the acceleration due to gravity is  $4.9 \text{ m/s}^2$ . The time period of the pendulum will be
  - A. 2.839 s.
  - B. 2.007 s.
  - C. 0.451 s.
  - D. 0.204 s.
  
2. To study the different properties of waves, the device used to produce water waves is a
  - A. bell jar.
  - B. ripple tank.
  - C. tuning fork.
  - D. resonance tube.
  
3. If the velocity of a wave is 100 m/s and the frequency is 50 Hz, then the wavelength of the wave will be
  - A. 0.5 m.
  - B. 2.0 m.
  - C. 50 m.
  - D. 5000 m.
  
4. When all of the potential energy of an oscillating pendulum is converted into kinetic energy then its displacement from the mean position will be
  - A. zero.
  - B. maximum.
  - C. equal to its length.
  - D. equal to its amplitude.
  
5. In mechanics, energy is transferred from one point to another point in the form of
  - A. waves.
  - B. particles.
  - C. tiny packets.
  - D. dark matters.
  
6. Usually the frequency of the female voice as compared to the male voice is
  - A. equal.
  - B. lower.
  - C. higher.
  - D. unmeasurable.

7. All of the following are examples of nuisance EXCEPT
- shock waves produced by a fighter plane.
  - off-beat sound produced by a drummer.
  - chirping of a nightingale in the forest.
  - excessive light produced in an event.
8. The loudness of a sound wave is related to the change in
- pitch.
  - velocity.
  - amplitude.
  - frequency.
9. If a concave mirror is covered with a thin layer of water, then focal length of the concave mirror
- increases.
  - decreases.
  - becomes infinite.
  - remains the same.
10. The lens converges the incident light rays on a single point is
- convex lens.
  - concave lens.
  - biconvex lens.
  - biconcave lens.
11. The given table shows possibilities of a lens with respect to its focal length and power.

|     | Focal Length | Power of the Lens |
|-----|--------------|-------------------|
| I   | Positive     | Positive          |
| II  | Positive     | Negative          |
| III | Negative     | Positive          |
| IV  | Negative     | Negative          |

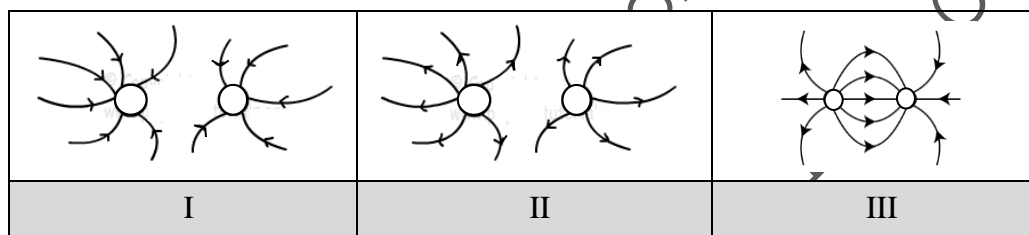
The condition(s) which can be TRUE for the lens is/ are

- I only.
- IV only.
- I and IV.
- II and III.

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12. The physical quantity that will remain unchanged during the refraction of light through a glass slab is
- A. velocity.
  - B. direction.
  - C. frequency.
  - D. wavelength.
13. An optical instrument that is used to magnify the image of small objects is called a
- A. telescope.
  - B. binocular.
  - C. microscope.
  - D. kaleidoscope.
14. The focal length of a concave lens is 10 cm. If an object 'X' is placed in front of the lens and the image of the object is formed at a distance of 5 cm, then the object 'X' would have been placed at a distance of
- A. 5 cm.
  - B. 10 cm.
  - C. 15 cm.
  - D. 20 cm.
15. In geometrical optics, the distance between the optical centre and the principal focus is known as
- A. focal length.
  - B. object distance.
  - C. image distance.
  - D. radius of curvature.
16. In geometrical optics, the power of a lens is defined as the reciprocal of its
- A. focal length in metres.
  - B. optical centre in metres.
  - C. principal axis in centimetres.
  - D. centre of curvature in centimetres.
17. The mirror(s) in which the size of an image is always smaller than the size of object is/ are
- I. plane mirror
  - II. convex mirror
  - III. concave mirror
- A. I only.
  - B. II only.
  - C. I and II.
  - D. II and III.

18. When excessive electric charges are build-up on the surface of a material, a fire or an explosion occurs due to the
- static position of the charges.
  - spark produced by the discharging of the surface.
  - availability of more space for the movement of charges.
  - production of equal number of positive and negative charges.
19. If the distance between two equal and opposite point charges becomes half, then the force of attraction between them will
- also becomes half.
  - increases two times.
  - increases four times.
  - increases eight times.
20. The diagram(s) show(s) the CORRECT representation of two negative point charges is/ are



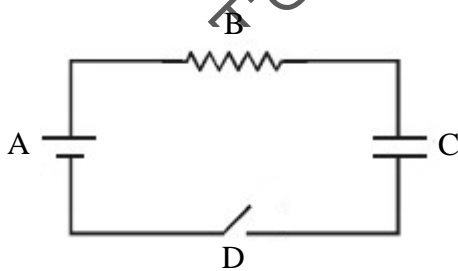
- I only.
  - II only.
  - I and III.
  - II and III.
21. A student inserted a dielectric between the plates of a parallel plate capacitor.
- Which of the following observations, s/he will notice, when s/he connects the capacitor with the power source?
- The charge on the capacitor will increase.
  - The capacitance of the capacitor will decrease.
  - The potential difference across the capacitor will increase.
  - The electric field between the capacitor plates will increase.
22. The electric force of attraction between two charged particles, each having a charge of  $1.6 \times 10^{-19}$  C, placed at a distance of 1 m is
- (Note: The value of the constant of proportionality is  $9 \times 10^9$  Nm<sup>2</sup>/C<sup>2</sup>.)
- $5.62 \times 10^{28}$  N.
  - $1.77 \times 10^9$  N.
  - $1.44 \times 10^{-9}$  N.
  - $2.30 \times 10^{-28}$  N.

23. Two capacitors of capacitance  $C_1 = 2 \mu\text{F}$  and  $C_2 = 4 \mu\text{F}$  are connected in parallel combination across a source of 9 V battery. The effective capacitance will be
- A.  $2 \mu\text{F}$ .  
 B.  $4 \mu\text{F}$ .  
 C.  $6 \mu\text{F}$ .  
 D.  $8 \mu\text{F}$ .
24. Asad has been given a task to install a fuse in an electric circuit. In order to complete the given task successfully, he connects the fuse with the correct wire in an appropriate combination.

Which of the following options shows Asad's action?

|   | Wire         | Combination          |
|---|--------------|----------------------|
| A | Live wire    | Series combination   |
| B | Neutral wire | Series combination   |
| C | Live wire    | Parallel combination |
| D | Neutral wire | Parallel combination |

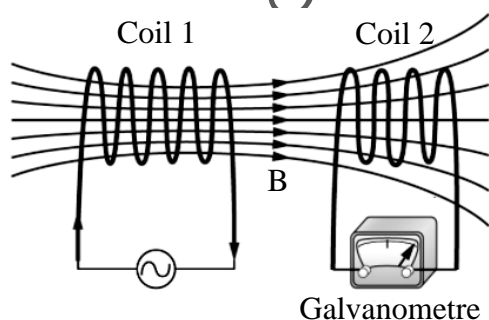
25. The wire that has zero potential and connects an electric appliance to the ground is called a/ an
- A. live wire.  
 B. fuse wire.  
 C. earth wire.  
 D. neutral wire.
26. A student is given two metallic wires made of the same material but with different lengths. As compared to the long wire, the short wire will have
- A. no resistance.  
 B. low resistance.  
 C. high resistance.  
 D. equal resistance.
27. Identify the dry cell in the given electric circuit.



28. The physical quantity that affects the resistance of a metallic conductor is
- time.
  - mass.
  - length.
  - number of moles.
29. The plastic or rubber insulation around current carrying wire may damages, when the voltage and current becomes

|   | Voltage          | Current          |
|---|------------------|------------------|
| A | high             | low              |
| B | low              | high             |
| C | remains the same | high             |
| D | low              | remains the same |

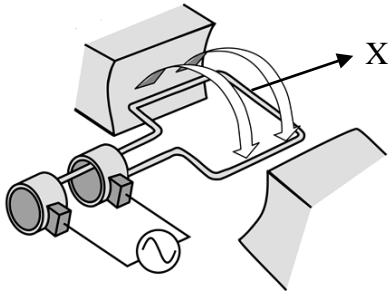
30. If the electrical resistance of a light bulb is  $200\ \Omega$  and the voltage across its both ends is 220 V, then the electric power consumed by the bulb in 2 s will be
- 484 W.
  - 242 W.
  - 91 W.
  - 2.2 W.
31. Which of the following physical quantities is NOT generated by the electromotive force, when an alternating current generator is connected to a closed circuit?
- Electric field
  - Electric current
  - Electric voltage
  - Electric resistance
32. In electromagnetism, the phenomenon shown in the given diagram is



- self-induction.
- mutual induction.
- magnetic induction.
- electrostatic induction.

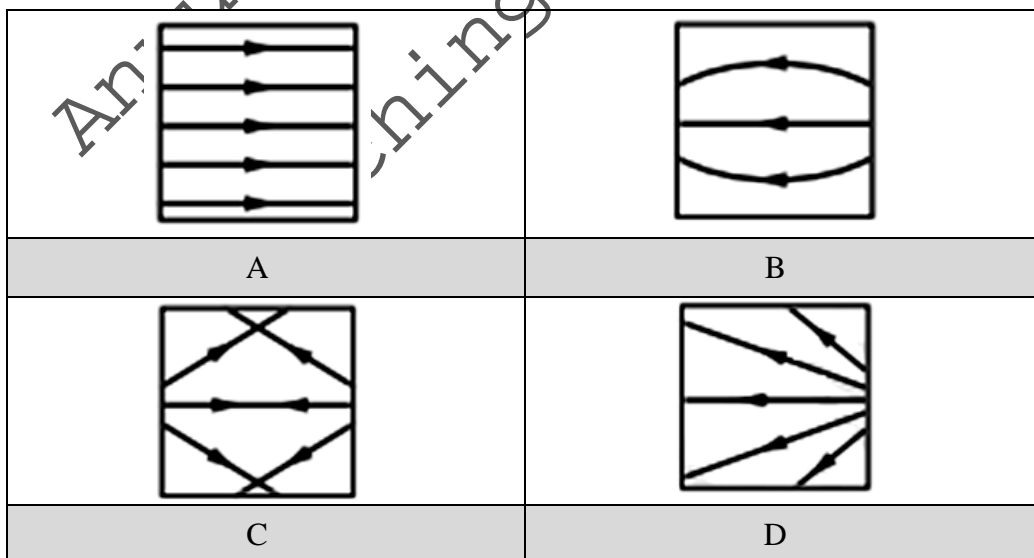
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33. The given diagram shows an alternating current generator.



Identify the component X in the given diagram.

- A. Coil
  - B. Slip rings
  - C. Carbon brushes
  - D. Permanent magnet
34. Suppose, a current is flowing in two closed parallel wires in the opposite direction.
- In this case, the wires will
- A. repel each other.
  - B. attract each other.
  - C. have no effect upon each other.
  - D. cancel out their individual magnetic fields.
35. When electric current passes through a metallic conductor, a magnetic field is produced.
- With reference to the given statement, which of the following images depicts an invalid representation of the magnetic field?





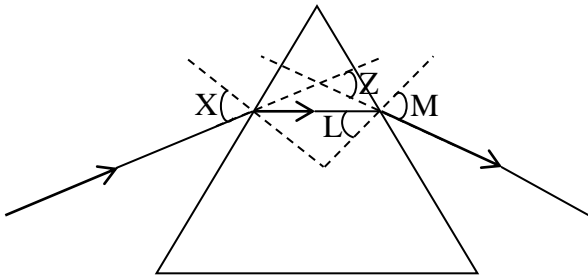
36. If an electron beam passes between two oppositely charged plates, then the beam will deflect
- A. towards positive plate.
  - B. towards negative plate.
  - C. neither positive nor negative plate.
  - D. towards negative plate then towards positive plate.
37. The electronic device used in the picture tube of a twenty-year old television set was a
- A. cathode rays tube.
  - B. light emitting diode.
  - C. liquid crystal display.
  - D. plasma screen display.
38. If an electron gun has high negative potential, then it will repel
- A. protons.
  - B. neutrons.
  - C. positrons.
  - D. electrons.
39. If one of the inputs in an AND gate is '0' then the output will be
- A. - 1
  - B. 0
  - C. 1
  - D. 2
40. Which of the following is NOT an example of the three basic operations of Boolean algebra?
- A. AND
  - B. NOR
  - C. NOT
  - D. OR

**ALTERNATE TO PRACTICAL (ATP: Questions 41-50)**

41. A metallic bob is attached with a simple pendulum. Suppose the amplitude of the pendulum increases after every ten oscillations. With the increase in the amplitude of the pendulum, the time period of the pendulum will
- A. decrease.
  - B. also increase.
  - C. remain the same.
  - D. vary unpredictably.

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42. If a wave has velocity of 10 m/s and a wavelength of 2 m, then the frequency of the wave will be
- A. 5 Hz.
  - B. 8 Hz.
  - C. 12 Hz.
  - D. 20 Hz.
43. The path of a ray of light passing through a glass prism is shown below.



Which of the following angles in the given diagram shows the CORRECT representation of the angle of deviation?

- A. X
  - B. L
  - C. M
  - D. Z
44. Faiza, a student of grade X has been given a task to find the image of an object that should be real, inverted and of the large in size by using a convex lens.
- To complete the given task, Faiza should place the object
- A. at the principal focus.
  - B. at the centre of curvature.
  - C. beyond the centre of curvature.
  - D. between the principal focus and the centre of curvature.
45. If the refractive index of water is taken as 1.33, then the speed of light in water will be
- (Note: The speed of light in air is  $3 \times 10^8$  m/s.)
- A.  $4.43 \times 10^7$  m/s.
  - B.  $2.25 \times 10^8$  m/s.
  - C.  $3.99 \times 10^8$  m/s.
  - D.  $4.33 \times 10^8$  m/s.
46. If the number of bulbs are increased in a parallel circuit, then the
- A. brightness of the bulbs decreases.
  - B. voltage across each bulb increases.
  - C. brightness of the bulbs also increases.
  - D. voltage across each bulb remains the same.

47. A student of class X has fixed a galvanometre resistance of  $6 \Omega$  and a shunt resistor of  $3 \Omega$  in the galvanometre. The student is asked by the teacher to find the resistance of the combination.

Which of the following options represents the resistance of the galvanometre?

- A.  $2 \Omega$
  - B.  $3 \Omega$
  - C.  $6 \Omega$
  - D.  $9 \Omega$
48. When an electric current is passing through a circular metallic wire, then the magnetic field lines at the centre of circular loop produced due to the current will be in
- A. straight line.
  - B. circular line.
  - C. elliptical line.
  - D. parabolic line.
49. For an AND gate having four input values, the total number of truth table entries required is
- A. 4
  - B. 8
  - C. 16
  - D. 32
50. Suppose an OR gate has four inputs. If one of the inputs is at high and the other three are at low, then the resultant output will be
- A. low.
  - B. high.
  - C. zero.
  - D. vary unpredictably.

Please use this page for rough work

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