

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS X**




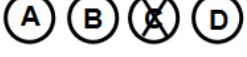
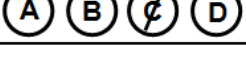
**ANNUAL EXAMINATIONS (THEORY) 2023**

**Physics Paper I**

**Time: 1 hour 10 minutes    Marks: 40**

**INSTRUCTIONS**

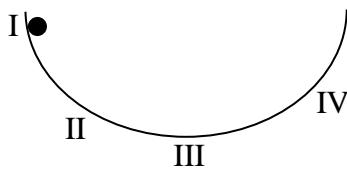
1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

| Correct Way |   | Incorrect Ways |   |
|-------------|---|----------------|---|
| 1           |  | 1              |  |
|             |   | 2              |  |
|             |   | 3              |  |
|             |   | 4              |  |

**Candidate's Signature**

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a simple calculator if you wish.

1. In the given diagram, if the ball starts its motion from point I, then the kinetic energy will be minimum at point



- A. I.  
B. II.  
C. III.  
D. IV.
2. If a stone is dropped into a water pond, then the type of waves formed on the surface of the water is called
- A. sine waves.  
B. transverse waves.  
C. longitudinal waves.  
D. compressional waves.
3. If a sound wave is travelling through a solid object at a speed of 200 m/s with a frequency of 10 Hz, then the wavelength of the sound will be
- A. 20 m.  
B. 190 m.  
C. 210 m.  
D. 2000 m.
4. If the length of an inextensible string of a simple pendulum is 2 m, then the time period of the simple pendulum is
- (Note: The value of acceleration due to gravity is  $9.8 \text{ m/s}^2$ .)
- A. 0.451 s.  
B. 0.903 s.  
C. 1.282 s.  
D. 2.838 s.
5. Which of the following characteristics of sound differentiates a noise from a musical sound?
- A. Pitch  
B. Velocity  
C. Amplitude  
D. Frequency

6. If the frequency of sound waves becomes higher than 20,000 Hz, then it will be inaudible to the human ear. This type of waves is called
- A. radiowaves.
  - B. microwaves.
  - C. ultrasonic waves.
  - D. infrasonic waves.
7. The method that is used to absorb undesirable sounds by soft and porous surfaces is called
- A. noise protection.
  - B. audible protection.
  - C. acoustic protection.
  - D. frequency protection.
8. The propagation of sound waves in air shows that they are
- A. electromagnetic waves.
  - B. longitudinal waves.
  - C. transverse waves.
  - D. matter waves.
9. Consider the given conditions.
- I. Angle of incidence is less than the critical angle.
  - II. Angle of incidence is greater than the critical angle.
  - III. Light enters from a denser medium to a rarer medium.
- Which of these conditions would cause the occurrence of total internal reflection?
- A. I only
  - B. II only
  - C. I and III
  - D. II and III
10. In long-sightedness, rays reflecting from nearby objects are focused
- A. in front of retina.
  - B. on the blind spot.
  - C. behind the retina.
  - D. at the centre of retina.
11. When an object is placed between the principal focus (F) and the centre of curvature (2F) of a convex lens, then the image formed will be
- A. virtual and erect.
  - B. real and inverted.
  - C. real and small in size.
  - D. virtual and large in size.

PLEASE TURN OVER THE PAGE

12. The focal length of a concave mirror is 10 cm. An object of height 5 cm is lying at the focus of concave mirror. The image distance of this object is
- A. 0 cm.
  - B. 5 cm.
  - C. 10 cm.
  - D. undetermined.
13. A fish is swimming in the water. Its position is vertically below a bird that is flying towards it. How will the speed and distance of the bird appear to the fish as compared to the real speed and real distance?

|   | Real Speed                        | Real Distance                 |
|---|-----------------------------------|-------------------------------|
| A | Moving faster than its real speed | Nearer than its real distance |
| B | Moving slower than its real speed | Away than its real distance   |
| C | Moving faster than its real speed | Away than its real distance   |
| D | Moving slower than its real speed | Nearer than its real distance |

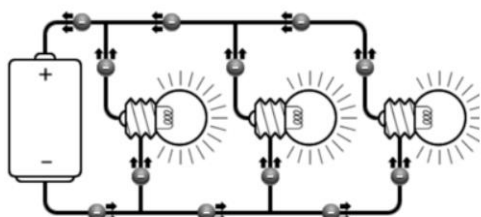
14. When two capacitors of a capacitances  $2 \mu\text{F}$  and  $3 \mu\text{F}$  are connected in series, then the equivalent capacitance will be
- A.  $0.8 \mu\text{F}$ .
  - B.  $1.0 \mu\text{F}$ .
  - C.  $1.2 \mu\text{F}$ .
  - D.  $5.0 \mu\text{F}$ .
15. When a hair comb is used, the comb becomes positively charged because
- A. hair has extra positive charges.
  - B. neutrons are created in the comb.
  - C. the comb loses electrons to the hair.
  - D. hair gain extra protons from the comb.
16. Two small spheres have equal charges ( $q$ ) and are separated by a distance ( $d$ ). The force exerted on each sphere by the other has magnitude ( $F$ ).
- If the charge on each sphere is doubled and distance ( $d$ ) becomes halved, then the force on each sphere will become
- A.  $2 F$ .
  - B.  $4 F$ .
  - C.  $8 F$ .
  - D.  $16 F$ .

17. If a charged body is moved against an electric field, then it will have
- thermal energy.
  - elastic potential energy.
  - electrical kinetic energy.
  - electrical potential energy.
18. Different resistors are connected in parallel arrangement in a circuit.

Which of the following options is TRUE for the given statement?

|   | Electric Current  | Electric Voltage  |
|---|-------------------|-------------------|
| A | Remains the same  | Remains the same  |
| B | Remains the same  | Becomes different |
| C | Becomes different | Becomes different |
| D | Becomes different | Remains the same  |

19. In a series circuit, if the number of bulbs are increased, then it will
- decrease resistance in the circuit.
  - increase the voltage in the circuit.
  - increase the flow of electric current.
  - decrease the brightness of the bulbs.
20. Consider the given diagram of a circuit.



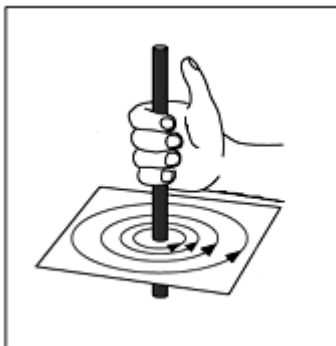
As compared to the source voltage, the voltage on each of the light bulb will

- increase.
- decrease.
- remain the same.
- vary unpredictably.

21. Erum is performing an experiment in her school's science lab. For this, she needs to have a galvanometre, but it is not available in the lab.

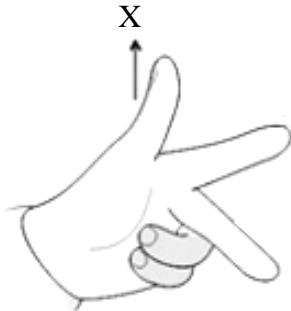
For completing the task, the measuring device which Erum may use as an alternate to the galvanometre will be a/ an

- A. ammetre.
  - B. voltmetre.
  - C. ohmmetre.
  - D. potentiometre.
22. If the speed of a conductor through a magnetic field increases, then the induced electromotive force (e.m.f.) in the conductor
- A. increases.
  - B. decreases.
  - C. becomes zero.
  - D. remains constant.
23. The device(s) used to change the value of alternating voltage is/ are
- I. transformer
  - II. direct current (DC) motor
  - III. alternating current (AC) generator
- A. I only.
  - B. II only.
  - C. I and III.
  - D. II and III.
24. As shown in the given figure, when a steady current is passed through a conductor, then the direction of the electric current will be

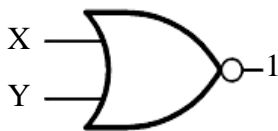


- A. upwards.
- B. clockwise.
- C. downwards.
- D. anti-clockwise.

25. If a coil of wire is placed in a changing magnetic field and the number of turns in the coil is decreased, then the voltage induced across the coil will
- A. be zero.
  - B. increase.
  - C. decrease.
  - D. remain constant.
26. According to Fleming's left hand rule, the direction of thumb (X) shows

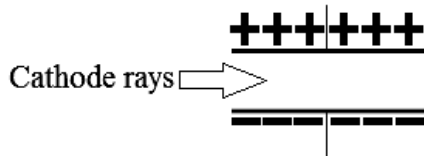


- A. force.
  - B. torque.
  - C. magnetic field.
  - D. electric current.
27. For the given diagram of logic gate, the CORRECT option will be



|   | Input X | Input Y |
|---|---------|---------|
| A | 0       | 1       |
| B | 1       | 0       |
| C | 1       | 1       |
| D | 0       | 0       |

28. A beam of cathode rays passes through an electric field between two parallel plates as shown in the given diagram.



Which of the following changes will take place after the beam has passed through the plates?

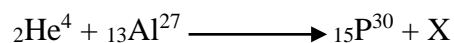
- A. It will bounce back.  
B. It will pass un-deflected.  
C. It will bend towards the positive plate.  
D. It will bend towards the negative plate.
29. The name of the logic gate shown in the given diagram is
- 
- The diagram shows a NAND logic gate symbol. It has two input lines on the left labeled 'X' and 'Y', and one output line on the right labeled 'Z'. The symbol is a D-shaped gate with a small circle at the output.
- A. OR.  
B. NOT.  
C. NOR.  
D. NAND.
30. Cathode Rays Oscilloscope (CRO) is NOT used to
- A. measure potential difference.  
B. measure alternating and direct current.  
C. study the effect of background radiation.  
D. study the effect of electric field on moving charges.
31. In electronics, the characteristics of an analogue quantity is that it
- A. randomly selects sets of quantities.  
B. can be represented by discrete levels.  
C. has a continuous set of values over a given range.  
D. can be described with a finite number of mathematical steps.
32. Which of the following shows the CORRECT sequence of storage media as per their storage capacity ranging from maximum to minimum?
- A. Hard disc → compact disc → floppy disc  
B. Compact disc → hard disc → floppy disc  
C. Floppy disc → compact disc → hard disc  
D. Floppy disc → hard disc → compact disc



33. Asad wants to send a signed document urgently from a remote area where the only mode of communication available is telephone.

In the given situation, which of the following is the MOST efficient way of sending the document?

- A. Fax
  - B. Email
  - C. Post mail
  - D. Photo phone
34. Which of the following hardware is NOT commonly visible on a running desktop system?
- A. Printer
  - B. Monitor
  - C. Keyboard
  - D. Central processing unit (CPU)
35. In radio and television, transmissions are sent into the air with the help of
- A. light signals.
  - B. electric signals.
  - C. mechanical waves.
  - D. electromagnetic waves.
36. The half-life of a radioactive element is 3.0 days. How long does it take for a sample of 56 gm of this radioactive substance to decay into 7 gm?
- A. 2 days
  - B. 3 days
  - C. 8 days
  - D. 9 days
37. All of the following are affected by electric and magnetic fields EXCEPT
- A. alpha particles.
  - B. beta particles.
  - C. cathode rays.
  - D. gamma rays.
38. In the given equation of nuclear reaction, (X) represents



- A. proton.
- B. neutron.
- C. beta particle.
- D. alpha particle.

39. One of the peaceful practical applications of nuclear fission is to

- I. produce electricity
- II. make atomic bomb
- III. increase agricultural yield

- A. II only.
- B. III only.
- C. I and II.
- D. I and III.

40. Which of the following nuclear radiations cause(s) redness and sores on the human skin?

- I. Alpha particles
- II. Beta particles
- III. Gamma rays

- A. I only
- B. II only
- C. I and III
- D. II and III

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