

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

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 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D	1 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
2 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D	2 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
3 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D	3 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
4 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D	4 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D

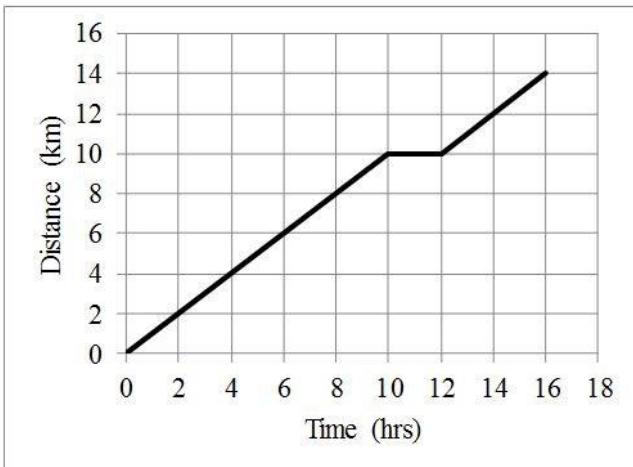
Candidate's Signature

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. The scientific notation of 0.00002019 is
  - A.  $2.019 \times 10^{-5}$
  - B.  $2.019 \times 10^{-4}$
  - C.  $2.019 \times 10^4$
  - D.  $2.019 \times 10^5$
2. The total number of significant figures in 2030 is
  - A. 2
  - B. 3
  - C. 4
  - D. 6
3. The instrument used to measure the length of a solid cylinder is called a
  - A. screw gauge.
  - B. physical balance.
  - C. Vernier callipers.
  - D. measuring cylinder.
4. Which of the following physical quantities is obtained by the formula  $\frac{\text{change in velocity}}{\text{time interval}}$ ?
  - A. Speed
  - B. Distance
  - C. Acceleration
  - D. Displacement
5. If a tractor starts from rest in a field, reaching its maximum velocity of 5 m/s in 10 s, then the acceleration of the tractor will be
  - A.  $0.5 \text{ m/s}^2$ .
  - B.  $2 \text{ m/s}^2$ .
  - C.  $5 \text{ m/s}^2$ .
  - D.  $15 \text{ m/s}^2$ .

6. A distance-time graph of a moving object is given below.



With reference to the given graph, the distance covered during 10 to 12 hrs is

- A. 0 km.
  - B. 4 km.
  - C. 5 km.
  - D. 10 km.
7. A school bus starts moving from rest with an acceleration of  $2 \text{ m/s}^2$ . If it covers a distance of 25 m, then the final velocity of the bus will be
- A. 0 m/s.
  - B. 10 m/s.
  - C. 50 m/s.
  - D. 100 m/s.
8. In a cricket match, a batsman hits a ball vertically upward with a velocity of 10 m/s. The maximum height attained by the ball will be  
*(Note: The acceleration due to gravity is  $9.8 \text{ m/s}^2$ .)*
- A. 0.51 m.
  - B. 1.96 m.
  - C. 5.10 m.
  - D. 10.20 m.
9. The value of acceleration due to gravity ‘g’ is considered to be constant ( $9.8 \text{ m/s}^2$ ) for
- A. the Mars orbiting the Sun.
  - B. a rocket launched in the air.
  - C. an object in free fall motion.
  - D. a car moving on a straight road.

10. A brick falls from the top of a building of 100 m high. The final velocity of the brick, when it hits the ground will be

(Note: The acceleration due to gravity is  $9.8 \text{ m/s}^2$ .)

- A. 19.6 m/s.
- B. 20.4 m/s.
- C. 44.2 m/s.
- D. 200.0 m/s.

11. An asteroid hit vertically on the surface of the Earth with a certain velocity.

The velocity and acceleration due to gravity of the asteroid just before hitting the ground will be

	Velocity	Acceleration due to Gravity
A	maximum	positive
B	minimum	positive
C	zero	negative
D	zero	positive

12. Which of the following physical quantities is due to the pull of the gravity?

- A. Mass
- B. Inertia
- C. Weight
- D. Tension

13. Two different metallic plates slid over each other in a machine.

The material that will reduce the MOST of the friction between them is

- A. oil.
- B. wax.
- C. soap.
- D. water.

14. A light inextensible rope is pulled by two boys in opposite directions with a force of 5 N each.

The total tension in the rope will be

- A. 0 N.
- B. 5 N.
- C. 10 N.
- D. 25 N.

15. A boy attached a stone of mass 0.1 kg at the end of a 1 m long rope. If the boy rotates the stone in a circle with a velocity of 2 m/s, then the tension in the rope will be
- A. 0.025 N.
  - B. 0.4 N.
  - C. 2 N.
  - D. 4 N.
16. A student pedals a bicycle for 15 s. After some time, he/ she finishes cycling due to which the bicycle stops after 30 s.
- Which of the following physical quantities is responsible for bringing the bicycle at rest?
- A. Mass
  - B. Inertia
  - C. Weight
  - D. Friction
17. If a school van takes a sharp turn, then the students sitting in the van would feel a push in outward direction due to
- A. inertia.
  - B. torque.
  - C. equilibrium.
  - D. frictional force.
18. If 1 N force moves a 2 kg object in a circle of radius 8 m, then the velocity of the object will be
- A. 2 m/s.
  - B. 4 m/s.
  - C. 10 m/s.
  - D. 16 m/s.
19. A teacher places a coin on a piece of card board that is placed on the open end of a glass. He/ she pulls the card board with a jerk. If the coin falls in the glass, then which of the following is demonstrated in the given experiment?
- A. Inertia
  - B. Friction
  - C. Balanced forces
  - D. Law of momentum
20. A plumber is trying to open a screw with a spanner by applying a perpendicular force of 50 N at a distance of 0.1 m. The torque produced by the force will be
- A. 5 units.
  - B. 49.9 units.
  - C. 50.1 units.
  - D. 500 units.

21. If the two opposite parallel forces of the same magnitude are applied on an object along different lines of action, then the object will experience
- torque.
  - couple.
  - equilibrium.
  - frictional force.
22. In a children park, two children are sitting on a sea saw. If the sea saw is not moving, then the net torque will be
- $\tau = 0$
  - $0 < \tau < 1$
  - $\tau = 1$
  - $1 < \tau < 2$
23. It is said that a cup of frozen ice cream has less volume as compared to the same amount of melted ice cream.

At room temperature, the mass and density of the melted ice cream will

	Mass of Ice Cream	Density of Ice Cream
A	change	be high
B	remain the same	be low
C	change	be low
D	remain the same	be high

24. As compared to the sea level, atmospheric pressure on mountains
- is lower.
  - is higher.
  - is the same.
  - varies unpredictably.
25. The state of matter in which molecules are closely packed together and have vibratory motion is
- gas.
  - solid.
  - liquid.
  - plasma.

26. A student is given a task to find the density of an irregular object.

The appropriate set of apparatus required will be

A	Vernier Callipers	Water	Measuring Cylinder
B	Screw Gauge	Physical Balance	Water
C	Physical Balance	Water	Measuring Cylinder
D	Spring Balance	Measuring Cylinder	Metre Rule

27. A change caused by stress in original shape, volume or length is called as

- A. strain.
- B. density.
- C. pressure.
- D. elasticity.

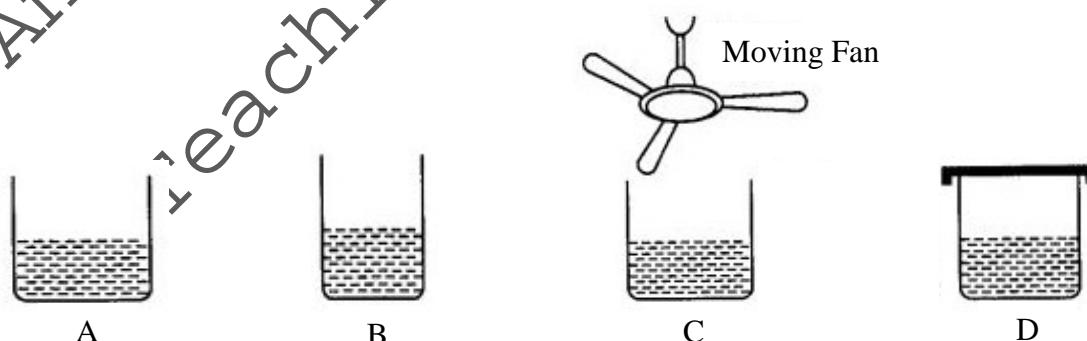
28. The example of Archimedes' principle is a

- A. moving car.
- B. floating ship.
- C. moving rocket.
- D. flying aeroplane.

29. Doctors use clinical thermometer to measure the temperature of a person. If a person has high fever, then the mercury in the bulb will

- A. expand.
- B. contract.
- C. remain unchanged.
- D. vary unpredictably.

30. In which of the following options the rate of evaporation will be the greatest?



31. Which of the following statements is CORRECT, in order to increase the temperature of a substance?

- A. It depends on the density of the object.
- B. It depends on the internal energy of the object.
- C. It is directly proportional to the amount of heat absorbed.
- D. It is inversely proportional to the amount of heat evolved.

PLEASE TURN OVER THE PAGE

32. Considerable gaps are left in the construction of a railway track because of
- linear thermal expansion.
  - linear thermal contraction.
  - volumetric thermal expansion.
  - volumetric thermal contraction.
33. It is commonly observed that the temperature of the land rises more quickly as compared to the temperature of the sea.

The option that describes the reason of the given phenomena is

	Specific Heat of Water	Specific Heat of Land
A	less	more
B	more	less
C	higher in summer	lower in winter
D	lower in winter	higher in summer

34. A 0.3 kg copper pipe needs to be heated from  $50^{\circ}\text{C}$  to  $60^{\circ}\text{C}$ . The energy required to heat the pipe will be

(Note: Take the specific heat capacity of copper as  $444 \text{ J/kg}^{\circ}\text{C}$ )

- 1332 J.
  - 6660 J.
  - 7992 J.
  - 14652 J.
35. If the temperature of an object is higher as compared to its surroundings, then it will
- radiate less heat.
  - conduct less heat.
  - absorb more heat.
  - radiate more heat.
36. In large working organisations, central heating systems are installed to save energy in the winter season.

In a closed room, the heating system MAINLY works on the phenomenon of

- radiation.
- convection.
- evaporation.
- condensation.

37. In a household kitchen, handles of spoons and utensils are made up of wood or rubber.

This is because wood and rubber are

- A. bad conductors.
- B. semiconductors.
- C. good conductors.
- D. super conductors.

38. Which of the following surfaces is the BEST radiator of heat energy?

- A. A dull black surface
- B. A shiny silver surface
- C. A dark coloured surface
- D. A light coloured surface

39. Heat reaches the surface of the Earth from the Sun MAINLY because of

- I. radiation
- II. convection
- III. conduction

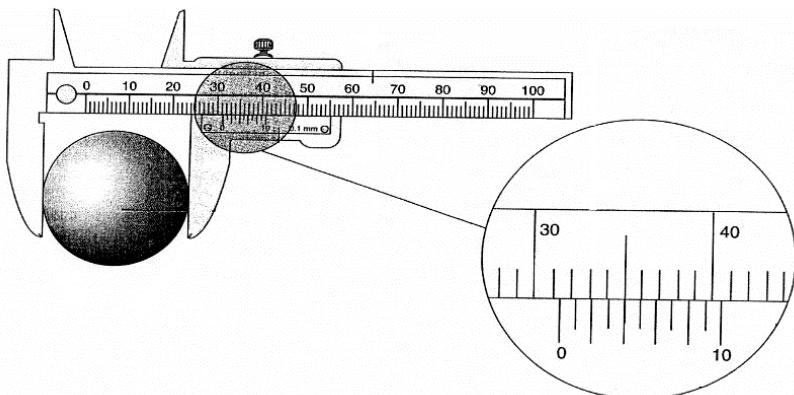
- A. I only.
- B. III only.
- C. I and II.
- D. II and III.

40. In the greenhouse effect, the greenhouse gases in the lower atmosphere

- A. disintegrate into other gases.
- B. help radiations to escape to space
- C. ionise other gases in the surrounding.
- D. prevent radiations from escaping in the space.

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

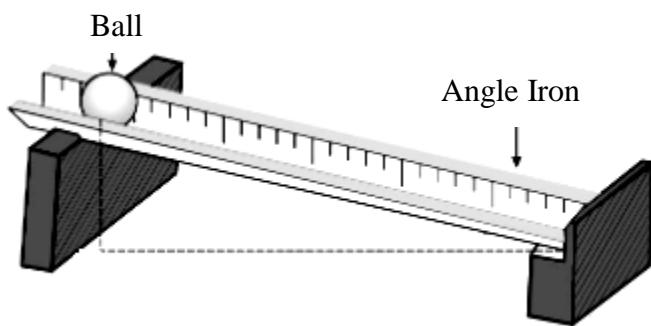
41. The given figure focuses on the magnified part of a Vernier callipers.



The name of the scale(s) shown in the magnified part is/are

- I. main scale
  - II. Vernier scale
  - III. circular scale
- A. I only.
  - B. II only.
  - C. I and II.
  - D. II and III.
42. The instrument used to measure the diameter of a metallic wire is
- A. metre scale.
  - B. spherometre.
  - C. screw gauge.
  - D. physical balance.
43. If a ball is moving vertically upward, then the magnitude of acceleration due to gravity for the ball will be
- A.  $-980 \text{ m/s}^2$ .
  - B.  $-9.8 \text{ m/s}^2$ .
  - C.  $9.8 \text{ m/s}^2$ .
  - D.  $980 \text{ m/s}^2$ .

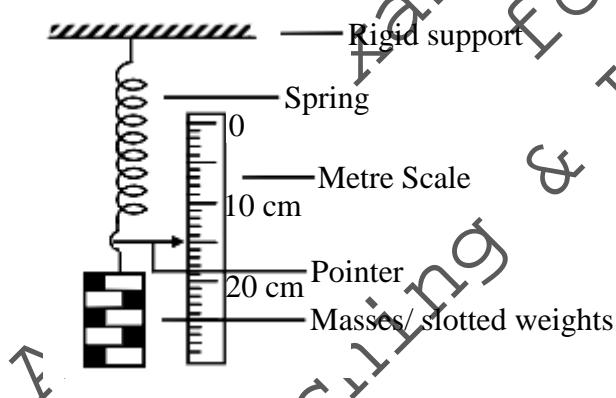
44. The following apparatus is used in a physics lab to find acceleration of a rolling ball with a help of a graph.



While drawing the graph  $2S$  and  $t^2$  are taken on y-axis and x-axis respectively.

Which of the following mathematical equations takes  $2S$  and  $t^2$  as a dependent and an independent variables to find the acceleration?

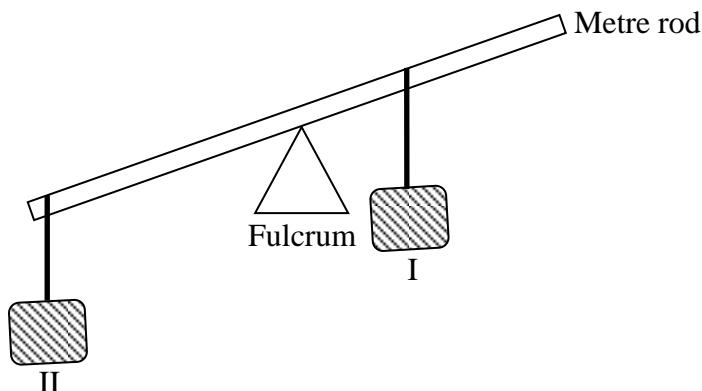
- A.  $S = vt$
  - B.  $v_f = v_i + at$
  - C.  $S = v_i t + \frac{1}{2} at^2$
  - D.  $2aS = v_f^2 - v_i^2$
45. In the given mass-spring system, five slotted weights each of 50 g are hanged to a helical spring.



The reading on the metre scale is

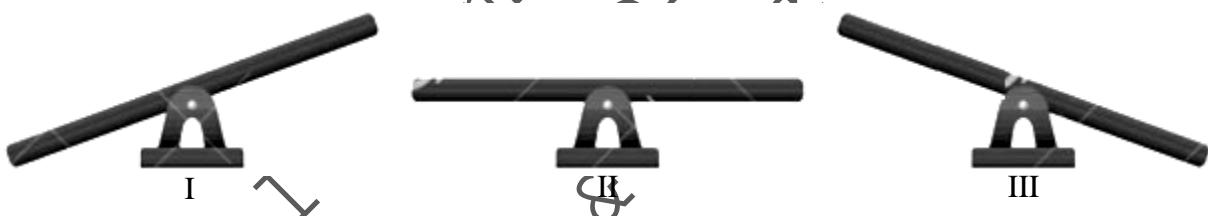
- A. 0 cm.
- B. 10 cm.
- C. 15 cm.
- D. 20 cm.

46. The given figure shows two boxes, I and II, hanged on a metre rod that is fixed at a fulcrum.



A student has been given the task by his/ her teacher to balance the metre rod by keeping the position of the boxes unchanged on the rod. He/ she should

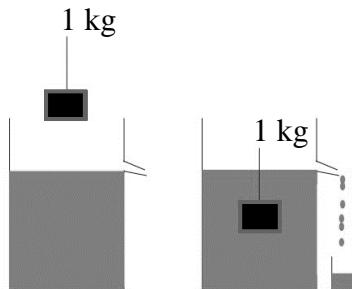
- A. increase the weight of box I.
  - B. increase the weight of box II.
  - C. move the fulcrum towards box I.
  - D. equally increase the weight of both the boxes.
47. The following figures show uniform metre rod placed on a fulcrum in three different positions I, II and III.



Forces of equal magnitudes are acting on each ends of the rod in the case of

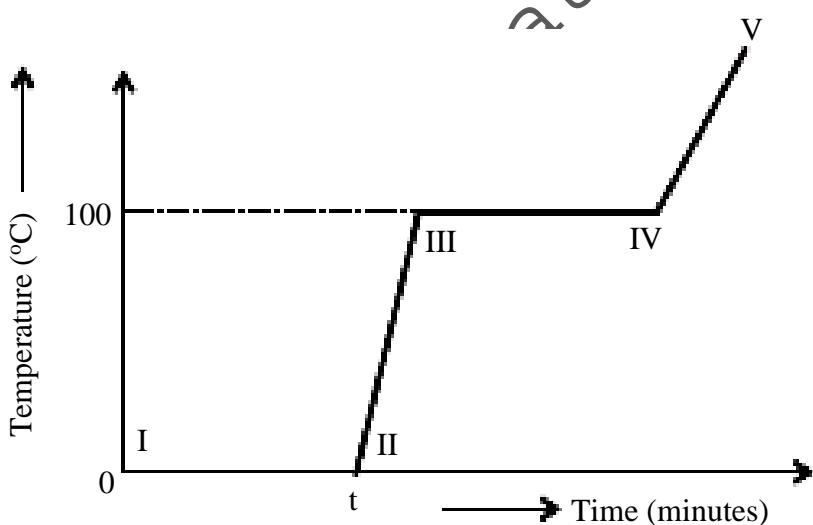
- A. II only.
  - B. III only.
  - C. I and II.
  - D. I and III.
48. In a science lab, a student heats up a metallic piece from  $30^{\circ}\text{C}$  to  $80^{\circ}\text{C}$  which requires thermal energy of 500 J. If mass of the piece is 1 kg, then the specific heat capacity of the metal will be
- A. 4.5  $\text{J/kg}^{\circ}\text{C}$ .
  - B. 6.2  $\text{J/kg}^{\circ}\text{C}$ .
  - C. 10.0  $\text{J/kg}^{\circ}\text{C}$ .
  - D. 16.6  $\text{J/kg}^{\circ}\text{C}$ .

49. In a science lab, a student put a block in a beaker completely filled with water. He observed that some amount of water spills out from the beaker.



Which of the following principles/ laws depicts the given situation?

- A. Pascal's law
  - B. Principle of moments
  - C. Archimedes' principle
  - D. Law of conservation of momentum
50. The given graph shows change in the states of ice on heating.



Which of the following statements is TRUE about the point V?

- A. Water starts boiling
- B. Ice converts into water
- C. Water starts vaporising
- D. Entire water converts into steam

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