**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS IX**

**ANNUAL EXAMINATIONS 2021**

**Physics**

**Total Time: 1 hour 40 minutes**

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

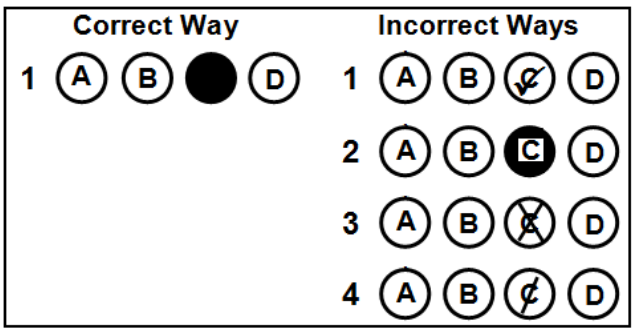


## INSTRUCTIONS

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.




**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. If 1.76 $cm^3$ is the volume of one cube, then the volume of twenty-one such cubes rounded off to three significant figures is

   A. 36.0 $cm^3$.
   B. 36.9 $cm^3$.
   C. 36.96 $cm^3$.
   D. 37.0 $cm^3$.

2. The number 123.4 can also be written in scientific notation as

   A. $0.1234 \times 10^3$
   B. $1.234 \times 10^{-2}$
   C. $1.234 \times 10^2$
   D. $12.34 \times 10^1$

3. The prefix used for the multiple value of $10^{-9}$ is

   A. atto.
   B. pico.
   C. nano.
   D. femto.

4. All of the following are the scalar quantities EXCEPT

   A. time.
   B. mass.
   C. distance.
   D. velocity.

5. A child drops a tennis ball from the height of 10 m. The velocity of the ball just before it strikes the ground will be

   (**Note**: The value of acceleration due to gravity is 9.8 $m/s^2$.)

   A. 14.0 m/s.
   B. 19.8 m/s.
   C. 21.8 m/s.
   D. 98.0 m/s.

6. If a stone placed at a certain height takes 5 seconds to reach the ground when it is dropped, then the distance covered by this stone will be

   (**Note**: The value of acceleration due to gravity is 9.8 $m/s^2$.)

   A. 24.5 m.
   B. 49.0 m.
   C. 122.5 m.
   D. 490.0 m.

7. The moving blades of an electric fan exemplifies

   A. circular motion.
   B. rotatory motion.
   C. vibratory motion.
   D. translatory motion.

8. The given table shows the distance covered by a car in four different segments.

| Segment | Distance Covered (m) |
|---|---|
| I | 0-10 |
| II | 11-22 |
| III | 23-35 |
| IV | 36-49 |

   If the car takes same interval of time to cover all four segments, then the car

   A. is accelerating.
   B. is decelerating.
   C. has uniform velocity.
   D. comes to rest after each segment.

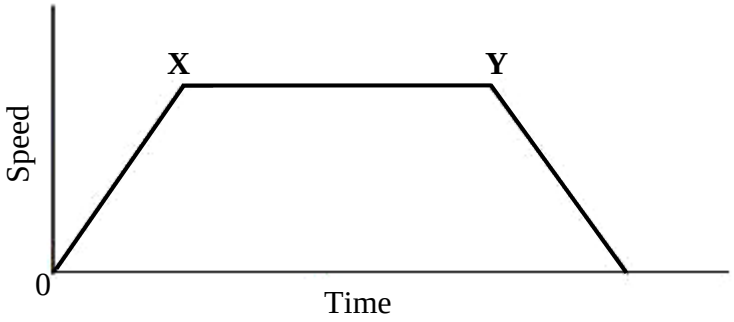
9. A force of 10 N is acting on a body along *x*-axis. The value of its *y*-component will be

   A. 0 N.
   B. 5 N.
   C. 10 N.
   D. 20 N.

10. If two forces of 3 N and 4 N are acting at a point, perpendicular to each other, then their resultant force will be

   A. 5 N.
   B. 7 N.
   C. 25 N.
   D. $\sqrt{7}$ N.

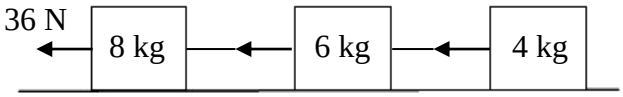
11. Consider the given speed-time graph.




The speed of an object from point **X** to **Y** is

A. decreasing.
B. increasing.
C. uniform.
D. zero.

12. A 36 N force pulls a system of three masses on a horizontal frictionless surface as shown in the given figure. The acceleration of this system of masses is




A. 0.5 $m/s^2$.
B. 2 $m/s^2$.
C. 5 $m/s^2$.
D. 18 $m/s^2$.

13. A mass *m* with velocity *v* strikes a wall perpendicularly and returns with the same velocity.

What is the change in momentum of the body when it returns?

A. $-mv$
B. $2mv$
C. $-2mv$
D. zero

14. An astronaut is sitting in a rocket on the Earth which is ready to launch to the Moon.

When the astronaut will reach to the Moon, his weight and mass would

| | **Weight** | **Mass** |
|---|---|---|
| A | increase | remain the same |
| B | remain the same | increase |
| C | decrease | remain the same |
| D | remain the same | decrease |

15. If the two ends of a string are stretched by two opposite forces of 10 N each, then the tension in the string is

    A. 0 N.
    B. 5 N.
    C. 10 N.
    D. 20 N.

16. How much centripetal force is needed to move a body of mass 10 kg in a circle of radius 20 m with a speed 3 m/s?

    A. 1.5 N
    B. 4.5 N
    C. 13 N
    D. 33 N

17. The measure of inertia of a body is its

    A. mass.
    B. force.
    C. weight.
    D. velocity.

18. If a body of mass 10 kg is placed on the surface of the Earth, then the pull of the Earth on the body will be

    (**Note**: The value of acceleration due to gravity is 9.8 $m/s^2$.)

    A. 0.98 N.
    B. 19.8 N.
    C. 98 N.
    D. 100 N.

19. It is difficult to drive a car on an oily road because the frictional force

    A. increases.
    B. decreases.
    C. becomes zero.
    D. remains unchanged.

20. A sports racing car is made stable by

    A. raising its height.
    B. increasing its speed.
    C. decreasing its width.
    D. lowering its centre of gravity.

21. The perpendicular distance between axis of rotation and line of action of force is called

    A. momentum.
    B. acceleration.
    C. moment arm.
    D. displacement.

22. If, after disturbance, a body again comes to rest and its centre of gravity does not change, then this phenomenon is/ are called

    I. stable equilibrium
    II. unstable equilibrium
    III. neutral equilibrium

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

23. Compared to the sea level, the atmospheric pressure on mountains is

    A. equal.
    B. higher.
    C. lower.
    D. zero.

24. To push the liquid up in a straw, the air pressure inside the straw will

    A. increase.
    B. decrease.
    C. become zero.
    D. remain constant.

25. According to the kinetic molecular model of matter, the molecules of a substance

    A. are in the state of rest.
    B. are in the state of motion.
    C. have constant momentum.
    D. have same velocity during collision.

26. The property of solids that restore them to their original shapes when the external force acting on them stops is called

    A. buoyancy.
    B. elasticity.
    C. strain.
    D. stress.

27. A parcel box of weight 500 N is placed on a table. If the area of the bottom of the box is measured as 0.50 $m^2$, then the pressure exerted by the box on the table will be

    A. 250 Pa.
    B. 499.5 Pa.
    C. 500.5 Pa.
    D. 1000 Pa.

28. In a magic show, a performer lies down on a bed of nails without any injury. However, when the same performer steps on a single nail, it goes right through his foot.

    With reference to the given situation, which of the following statements is TRUE?

    A. Area is same in both cases, but more force is applied on the bed of nails.
    B. Force remains the same but more pressure on the bed of nails.
    C. Force increases but less pressure on the bed of nails.
    D. More force is exerted on a single nail than on the entire bed of nails.

29. In a clinical thermometer, mercury does not fall back to the bulb because

    A. it is less in quantity.
    B. it is in a capillary tube.
    C. of the shape of the thermometer's bulb.
    D. of the constriction in the capillary tube.

30. All of the following are factors on which the rate of evaporation depends EXCEPT for the

    A. surface area.
    B. surface temperature.
    C. colour of the surface.
    D. pressure at the surface.

31. The escape of high kinetic energy molecules in the form of vapours from the surface of a liquid without heating is known as

    A. fusion.
    B. boiling.
    C. evaporation.
    D. condensation.

32. If an inflated tyre of a car bursts, then the temperature of air that will escape from the tyre

    A. increases.
    B. decreases.
    C. becomes 100°C.
    D. remains constant.

33. If the temperature of a substance is 20°C, then its temperature in Kelvin scale will be

A. – 253 K.
B. – 6.66 K.
C. 68 K.
D. 293 K.

34. When a glass test tube which is heated at a high temperature is immediately immersed in a beaker of cold water, it cracks because as compared to the cold water, the glass has

A. low thermal conductivity.
B. low specific heat capacity.
C. high thermal conductivity.
D. high specific heat capacity.

35. An example of a good conductor of heat is a

A. glass door.
B. frying pan.
C. wooden door.
D. leather jacket.

36. Radiations incident on a surface increases its temperature.

Which of the following characteristics should be present in a surface that can protect itself MOST effectively against radiation?

A. Poor absorber and poor emitter
B. Poor absorber and good emitter
C. Good absorber and poor emitter
D. Good absorber and good emitter

37. Which of the following statements is FALSE about heat transfer?

A. Conduction is poor in gases.
B. The hotter the substance, the less will be the radiation.
C. A cold substance attains the temperature of its surroundings.
D. As a substance absorbs heat, its temperature always increases.

38. All of the following are the methods to prevent heat loss from houses in winter EXCEPT

A. tiled floor.
B. carpeted floor.
C. double ceiling.
D. double glazed windows.

39. The process of transfer of heat in liquids and gases is/ are

I. conduction
II. convection
III. radiation

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

40. When a wooden spoon is dipped in a bowl of soup, it does not become hot.

In the given situation, the wooden spoon acts as a/ an

A. electrical conductor.
B. electrical insulator.
C. heat conductor.
D. heat insulator.

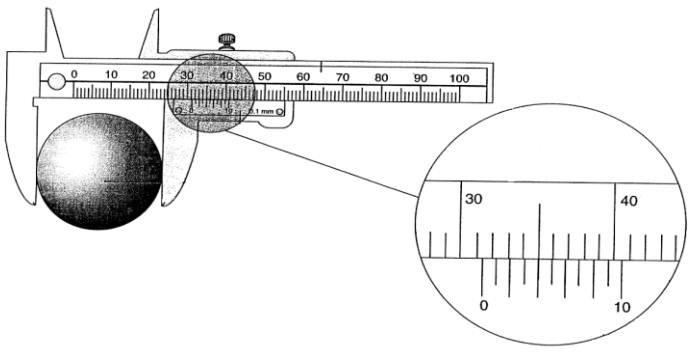
## ALTERNATE TO PRACTICAL (ATP: Questions 41-50)

41. You are given a glass test tube to determine its volume.

The instrument that will be the BEST choice to determine the volume is

A. meter rule.
B. screw gauge.
C. measuring tape.
D. Vernier callipers.

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



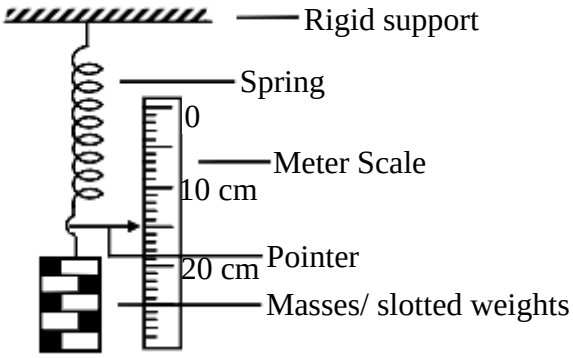

The main scale reading on the Vernier callipers is

A. 30.1 mm.
B. 31.0 mm.
C. 35.0 mm.
D. 40.1 mm.

43. In an amusement park, a child takes a slide. He starts from rest and his velocity becomes 5 m/s in 5 s just before his feet touch the ground. The acceleration of the child is

A. 1 m/s$^2$.
B. 5 m/s$^2$.
C. 10 m/s$^2$.
D. 25 m/s$^2$.

44. In the given mass-spring system, five slotted weights each of 50 g are hanged on the helical spring.

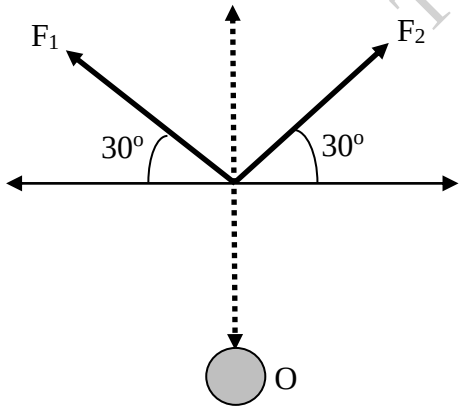



If one slotted weight is removed from the spring, then the reading on the metre scale will be

(**Note**: There is no systematic error in the instrument.)

A. 3 cm.
B. 6 cm.
C. 12 cm.
D. 15 cm.

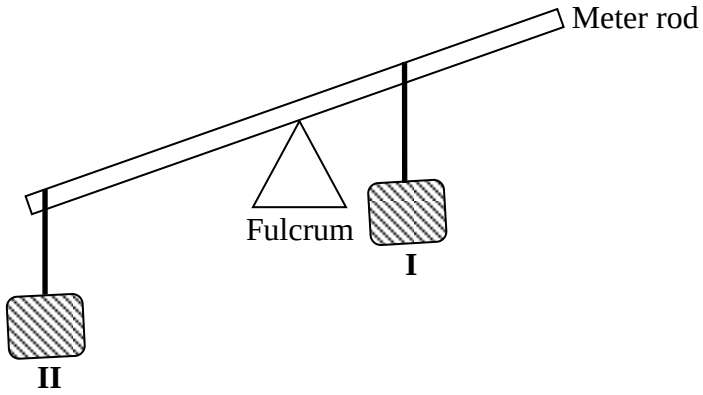
45. The given figure shows the vector addition of forces.




If $F_1 = F_2 = 50$ N are acting on an unknown object 'O', then the weight of the object will be

A. 0 N.
B. 50 N.
C. 100 N.
D. 150 N.

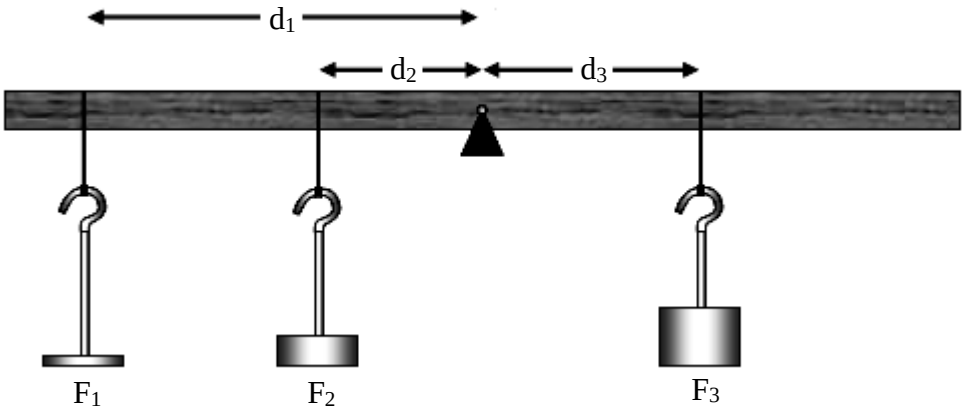
46. The given figure shows two equal boxes, **I** and **II**, hanged on a meter rod fixed at the fulcrum.




A student has been given the task by his/ her teacher to balance the meter rod. He/ she should

A. place box I in the centre.
B. place boxes I and II over each other.
C. move box I towards the fulcrum.
D. move box I away from the fulcrum.

47. In the given figure, a uniform meter rod is balanced at its centre by a fulcrum.



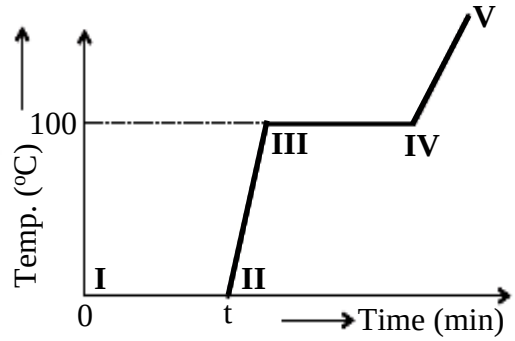

The distances $d_1$, $d_2$ and $d_3$ are equal to 40 cm, 10 cm and 15 cm respectively. If $F_1$ and $F_2$ are equal to 5 N and 10 N respectively, then the magnitude of $F_3$ will be

A. 5 N.
B. 20 N.
C. 50 N.
D. 80 N.

48. In a science lab, a student heats up a chemical substance from 10°C to 20°C which requires thermal energy of 1000 J. If mass of the substance is 10 kg, then the specific heat capacity of the substance will be

A. 3 J/kg°C.
B. 5 J/kg°C.
C. 10 J/kg°C.
D. 15 J/kg°C.

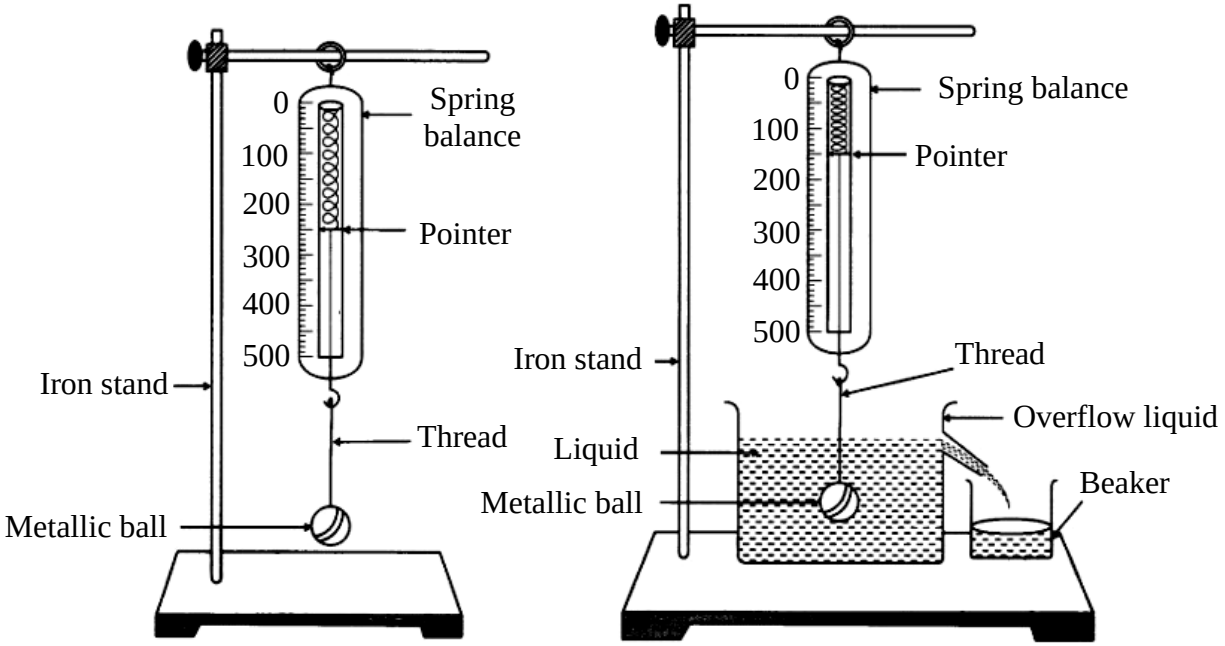
49. The given graph shows the changes of ice into water on heating.




Which of the following statements is TRUE about the given graph?

A. At point II, water starts boiling.
B. The region II to III represents condensation.
C. At point III, all the water gets converted into steam.
D. The region I to II represents ice and water in thermal equilibrium.

50. The pointer of a spring balance in **figure II** moves up, when a metallic ball, suspended from it, is immersed into a liquid that is denser as compared to air. Refer **figure I** for comparison.




This difference in reading is observed because

A. density of the liquid changes.
B. upthrust on the ball becomes less.
C. of apparent loss in the weight of the ball.
D. weight of the ball acts vertically downwards.

END OF PAPER

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