AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

**CLASS XI EXAMINATION**

MAY 2012

Physics Paper I

Time allowed: 40 minutes   Marks 30

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 30 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.
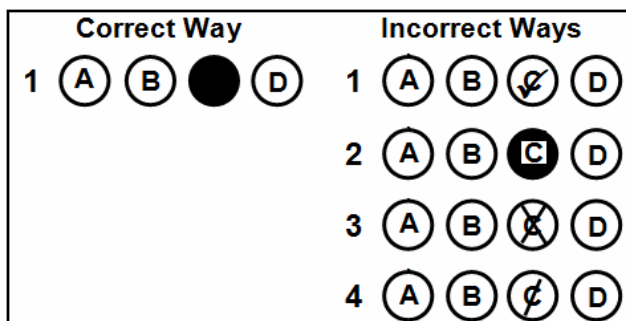
Candidate's Signature

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 scientific calculator if you wish.

1. The uncertainty in the time period of a simple pendulum reduces by increasing its

   A. mass.
   B. length.
   C. vibration.
   D. tension in the string.

2. The second equation of motion of a uniformly accelerated ball along a straight line is stated as

   $$s = v_i t + \frac{1}{2} a t^2 .$$

   Each term in the above equation has dimension(s) of

   A. $[L]$
   B. $[T]$
   C. $[LT^{-1}]$
   D. $[LT^{-2}]$

3. The rectangular components of a force of magnitude 10 N will be

   A. 4 N and 6 N.
   B. 6 N and 8 N.
   C. 8 N and 10 N.
   D. 10 N and 12 N.

4. If $\vec{A} + \vec{B} = 7\hat{i} + 7\hat{k}$ and $\vec{A} - \vec{B} = -\hat{i} + \hat{k}$, then the magnitude of $\vec{A}$ will be

   A. -1
   B. 3
   C. 5
   D. 7

5. When the line of action of force passes through the pivot then torque will be

   A. zero.
   B. negative.
   C. minimum.
   D. maximum.

6. The trajectory of a projectile is

   A. elliptic.
   B. circular.
   C. parabolic.
   D. hyperbolic.

7. Which of the following factors is NOT required to obtain the maximum height of a projectile?

    A. Mass
    B. Angle
    C. Velocity
    D. Gravitational acceleration

8. The minimum work will be done when the angle between force and displacement is

    A. 0°
    B. 90°
    C. 120°
    D. 360°

9. If a person of weight 500 N runs upstairs in 10 seconds and the vertical height of the stairs is 5 m, then the power developed by the person will be

    A. 50 W.
    B. 100 W.
    C. 250 W.
    D. 1000 W.

10. Which of the following options represents the correct sequence of energy conversion of a car when it is moving up a hill?

	Kinetic energy	Potential energy
A	Decreases	Increases
B	Increases	Decreases
C	Increases	Increases
D	Decreases	Decreases

11. Which of the following energy changes occur in the production of hydroelectricity?

    A. Potential $\rightarrow$ Electrical $\rightarrow$ Kinetic
    B. Potential $\rightarrow$ Kinetic $\rightarrow$ Electrical
    C. Potential $\rightarrow$ Chemical $\rightarrow$ Kinetic
    D. Kinetic $\rightarrow$ Electrical $\rightarrow$ Potential

12. Angular displacement is converted into linear displacement by

    A. $S = r\alpha$
    B. $S = r\theta$
    C. $v = r\omega$
    D. $\alpha = rs$

13. Which of the following is applicable in diving, gymnastics and ice-skating?

    A. Newton's law of gravitation
    B. Newton's third law of motion
    C. Law of conservation of energy
    D. Law of conservation of angular momentum

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14. Which of the following satellites revolves directly above the equator?

    A.   Killer satellite
    B.   Tether satellite
    C.   Geostationary satellite
    D.   Reconnaissance satellite

15. The given diagrams show the same scale vertical sections of a set of circular vessels, each containing the same depth of water. Which of the following statements is correct?
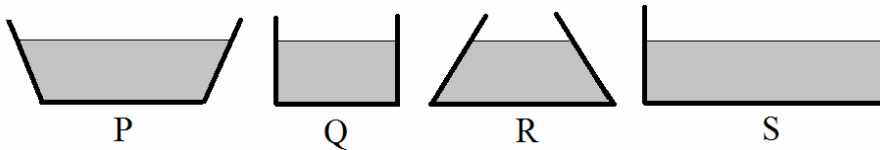

    A.   Water exerts the greatest pressure on the base of vessel P.
    B.   Water exerts the greatest pressure on the base of vessel S.
    C.   Water exerts the same pressure on the base of each vessel.
    D.   Water exerts different pressure on the base of each vessel.

16. All of the following are applications of Bernoulli's effect EXCEPT

    A.   atomizer.
    B.   filter pump.
    C.   Venturi meter.
    D.   vacuum cleaner.

17. In the given figure, the magnitude of an instantaneous velocity is the greatest at

    A.   Q only.
    B.   O only.
    C.   P only.
    D.   both P & Q.
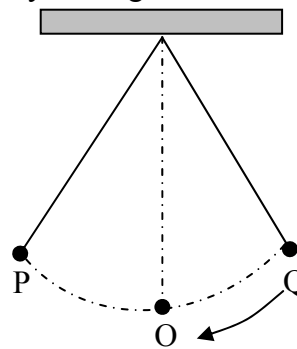
18. Which of the following equations shows maximum kinetic, maximum potential and total energies for a spring mass system?

    A. $E = mgh$

    B. $E = \dfrac{1}{2}k x_o^2$

    C. $E = \dfrac{1}{2}m v^2$

    D. $E = \dfrac{-GMm}{R}$

19.   All of the following are examples of forced oscillations EXCEPT

   A.   loud music.
   B.   running of heavy machinery.
   C.   marching of soldiers on a bridge.
   D.   mass of vibrating pendulum striking repeatedly with a wall.

20.   All of the following are examples of resonance EXCEPT

   A.   tuning a radio.
   B.   swinging a pendulum.
   C.   producing echo in a mountain region.
   D.   heating and cooking of food in a microwave oven.

21.   When two or more waves overlap at the same time the resultant wave will be the sum of individual waves. The principle is known as

   A.   reflection.
   B.   ultrasonic.
   C.   supersonic.
   D.   superposition.

22.   All of the following are uses of ultrasound EXCEPT

   A.   finding the depth of an ocean.
   B.   diagnosing medical problems.
   C.   finding the thickness of objects.
   D.   calculating the speed of vehicles.

23.   All of the following are conditions necessary for producing interference EXCEPT that

   A.   the source should be coherent.
   B.   the source should be monochromatic.
   C.   the two sources must be very close to each other.
   D.   the two sources must travel in opposite direction.

24.   In Young's double slit experiment the distance between two consecutive bright or dark fringes is

   A. $n\dfrac{\lambda}{d}$
   B. $\lambda\dfrac{L}{d}$
   C. $2\dfrac{L}{d}$
   D. $n\dfrac{L}{d}$

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25. Which of the following suggests that light waves are transverse?

    A.   Dispersion
    B.   Diffraction
    C.   Interference
    D.   Polarization

26. According to the kinetic molecular theory, the collision between gas molecules

    A.   is elastic.
    B.   is inelastic.
    C.   is negligible.
    D.   remains constant.

27. The volume of a fixed mass of a gas is inversely proportional to the pressure applied to it, keeping the temperature constant. This statement is

    A.   Boyle's law.
    B.   Charles law.
    C.   first law of thermodynamics.
    D.   second law of thermodynamics.

28. When a gas is compressed, its temperature

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

29. Which of following electrical devices functions as a reverse of a heat engine?

    A.   Radio
    B.   Motor
    C.   Generator
    D.   Refrigerator

30. An increase in the thermal pollution of the environment means an increase in

    A.   entropy.
    B.   temperature.
    C.   adiabatic expansion.
    D.   isothermal compression.

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