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Parent's Signature

Full Name _____ **Grade - 11** **Section** _____ **4th Quarter Final Exam**

Subject – Physics **Year: 2012 E.C** **Exam. Room:** _____ ***Time allowed 2:30 hr***

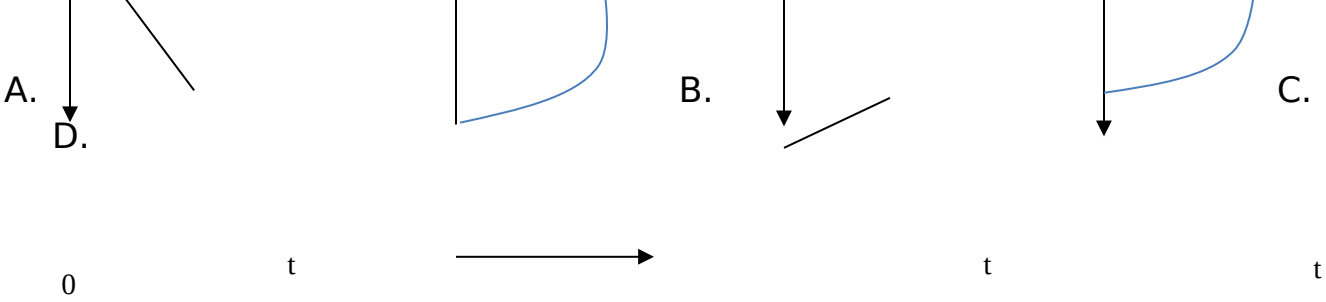
I. Write True, if the statement is correct and false otherwise on the separate answer sheet provided.

1. Work is the dot product of force and displacement.
2. Rotational kinetic energy is a measure of an object's resistance to change in its speed of rotation over a certain time.
3. Static equilibrium occurs when a body is at rest and there is no net force or net torque acting on it.
4. The critical point is where all the three states coexist together.
5. Turbulent flow occurs when there is no disruption between the layers.
6. Total pressure is constant along a stream line.
7. Deforming force is force acting on a body which produces change in its shape instead of its state of rest.

II. Choose the correct answer from the given four alternatives.

8. A force F at an angle θ above the horizontal is used to pull a heavy suitcase of weight mg a distance d along a level floor at constant velocity. The coefficient of friction between the floor and the suitcase is N. the work done by the frictional force is:
   A. $-Fd\cos\theta$ C. $-Nmgd$
   B. $-NFd\cos\theta$ D. $-Nmgd\cos\theta$
9. A football is kicked off the ground a distance of 10m downfield. Neglecting air resistance, which of the following statements would be INCORRECT when the football reaches the highest point?
   A. The ball's original kinetic energy has been changed into potential energy.
   B. The ball's horizontal velocity is the same as when it left the kicker's foot.
   C. The ball will have been in the air one half of its total flight time.
   D. The vertical component of the velocity is equal to zero.
10. From the top of a high cliff, a ball is thrown horizontally with initial speed V_o.
    Which of the following graphs best represents the ball's kinetic energy k as a function of time t?





11. What is the kinetic energy of a satellite of mass M that orbits the Earth, of mass M, in a circular orbit of radius R?

A. $\frac{1}{2}\frac{GMm}{R}$ C. $\frac{1}{2}\frac{GMm}{R^2}$

B. $\frac{1}{4}\frac{GMm}{R}$ D. $\frac{GMm}{R^2}$

12. Moment of inertia of a solid sphere about an axis through its center is $\frac{2}{5}$ MR², What is the moment of inertia of solid sphere about its tangential axis.

A. MR² B. $\frac{4}{3}$ MR² C. $\frac{7}{5}$ MR² D. $\frac{1}{2}$ MR²

13. The angular velocity of a body is $\vec{w} = \hat{i} + 10\hat{j} + 4\hat{k}$ rad/sec and a torque $\vec{J} = \hat{i}$ – 4j $+4\hat{k}$ NM acts on it. What is the rotational power delivered?

A. 55watt B. 123w C. 56watt D. 24watt

14. A door is free to rotate about its hinges. A force F applied normal to the door a distance x from the hinges produce an angular acceleration of x. What angular acceleration is produce if the same force is applied normal to the door at a distance of 2x from the hinges?

A. $\propto$ B. $2\propto$ C. $\frac{1}{2}\propto$ D. $\frac{1}{4}\propto$

15. An automobile moves in a circle of radius 110 meters with a constant speed of 33m/s. What is the angular velocity of the car about the center of the circle in radians per second?

A. 0.3 rad/sec C. 0.6πrad/sec

B. 0.3πrad/sec D. 3.3πrad/sec

16. In a uniform circular motion, the centripetal acceleration of a body moving of in a circular path results from

A. Change in magnitude of tangential velocity.
B. change in direction of angular velocity
C. change in direction of tangential velocity
D. change in magnitude of tangential acceleration

17. A bowling ball of mass M and radius R, whose moment of inertia about its center is $\frac{2}{5}$MR², rolls without slipping along a level surface at speed V. The maximum vertical height to which it can roll it ascends an incline is:

A. $\frac{7v^2}{10g}$ B. $\frac{v^2}{2g}$ C. $\frac{v^2}{5g}$ D. $\frac{5v^2}{7g}$

18. The point of intersection of the lines of action of the weight of all the points of body is called

A. center of the body C. center of mass of the body
B. center of gravity of the body D. none of the above

19. Two forces which are equal in magnitude but opposite in direction and not acting along the same line is a
A. couple B. Rotation C. Torque D. Motion

20. A body is said to be in dynamic equilibrium when it
A. possess instantaneous velocity
B. is moving with changing acceleration
C. is in uniform motion along a straight line
D. is in uniform motion along a circular path

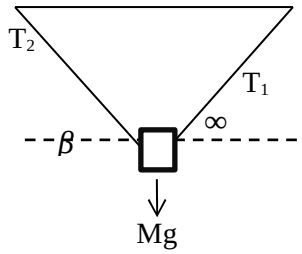
21. A body of mass M is suspended by two strings making angle x and B with the horizontal. What ate the tensions in the strings?

A. $T_1 = \frac{mgcosB}{\sin ¿¿}$, $T_2 = \frac{mgcos\infty}{\sin ¿¿}$

B. $T_1 = \frac{mgcos\infty}{\sin ¿¿}$, $T_2 = \frac{mgcos\beta}{\sin ¿¿}$

C. $T_1 = \frac{mgcos\infty}{\sin ¿¿}$, $T_2 = \frac{mgcos\beta}{\cos ¿¿}$

D. $T_1 = \frac{mgcos\beta}{\sin ¿¿}$, $T_2 = \frac{mgsin\infty}{\sin ¿¿}$



22. In a hydraulic press a force of 24N is applied to a smaller piston of area $0.4m^2$. What load will be supported by the larger piston whose area is $0.7m^2$?
A. 42N B. 24N C. 48N D. 84N

23. Aluminum, of value 10-^3M^3 is completely submerged in water and displaces some amount of water. What is the magnitude of the buoyant force acting on the aluminum?
($\rho_{Al}=2.7\,x\,10^3 kg/m^3$ ¿
A. 10N B. $2\sqrt{5}$ N C. $2\sqrt{3}$ N D. 265N

24. "The speed of water spraying from the end of a garden hose increases as the size of the opening is decreased with the thumb". This statement best describes:
A. Archimedes' principle C. Pascal's principle
B. equation of continuity D. Bernoulli's equation

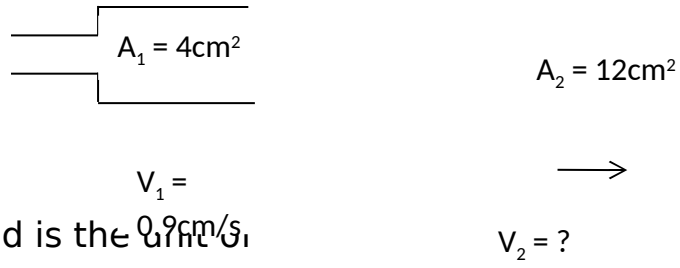
25. What does the value of Reynolds number in fluid dynamics describe?
A. It describes the strength of surface tension of liquids
B. It describes the viscosity of liquids.
C. It describes whether the fluid flow is horizontal or vertical
D. It describes whether the fluid flow is stream lined or turbulent.

26. What is the rate of energy radiation per unit area of a black body (e=1) at a temperature of 2000k? (take ρ= $5.67x10^{-8}W/m^2\ k^{-4)}$

A. 90.72W.M^{-2} B. 907200J.M^{-2} C. 90.72kW.M^{-2} D. 907W.M^{-2}

27. In the figure below, what is the speed of water as it leaves A_2?

A. 0.3m/s
B. 0.9m/s
C. 3.3m/s
D. 3.6m/s



28. Pascal second is the unit of

A. Pressure C. Dynamic viscosity
B. kinematic viscosity D. Surface tension

29. An electric immersion water heater is rated at 400watt. How long will it take to heat one kilogram of water from 10^0c to 30^0c?

(take $\rho H_2O = \frac{4.2J}{kg}.k$¿

A. 3.5min B. 1min C. 15min D. 45min

30. equation of continuity is based on the principle of conservation of

A. Energy B. Mass C. Momentum D. None

III. Answer the following questions.

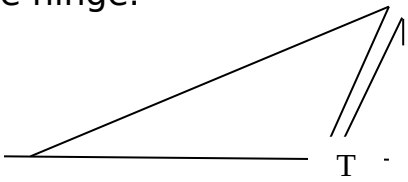
31. Explain briefly the difference between stable and unstable equilibrium.
32. State briefly the law of conservation angular momentum.
33. Mention at least two application of Pascal's law
34. Mention at least four application of Bernoulli's principle

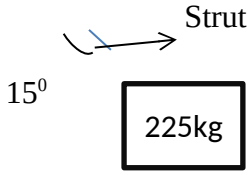
IV. Fill in the blank space with appropriate words or phrase.

35. _____ Is a body that can rotate with all the parts locked together and without any change in its shape?
36. A type of equilibrium that occurs when a body is moving at a steady velocity and there is no net force or net torque acting on it is _____ _____.
37. _____ is a theoretical object that absorbs all electromagnetic radiation that hits it.

V. Workout, show the steps clearly.

38. An automobile engine develops 200Kw when rotating at a speed of 3,600 rev/min. What torque does it deliver?
39. The system in figure below is in equilibrium, A mass of 225kg hangs from the end of the uniform strut whose mass is 45kg. Calculate
    a) the tension T in the cable
    b) the horizontal and vertical force components exerted on the strut by the hinge.







40. Calculate the percentage increase in the length of a wire of diameter 2mm stretched by a force of 1kgF. Young's modulus of the material of wire is $(\gamma) = 1.5 \times 10^{11} N/m^2$.

Set by:- Habtimer Ayele