Benha University
1st Term Exam (January 2017) Final Exam
Class: 1st Year Students
Subject: Physics (I)

Faculty of computer & informatics
Date: 12/01/2017
Time: ٣ Hs.
Examiner: Dr. Salah Hamza

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دور يناير ٢٠١٧
الإجابة باللون الأحمر

الفرقة: الأولي
تاريخ الامتحان: ٢٠١٧/٠١/١٢
نموذج إجابة مادة الفيزياء

Q1) Choose the correct answer and shaded its circle in the answer sheet: [90 marks]
Note: Select one answer only - don't use corrector - don't choose more than one answer.

1. The symbols that we use in dimensional analysis are
(a) M, L, T (b) Kg, m, Sec. (c) No answer

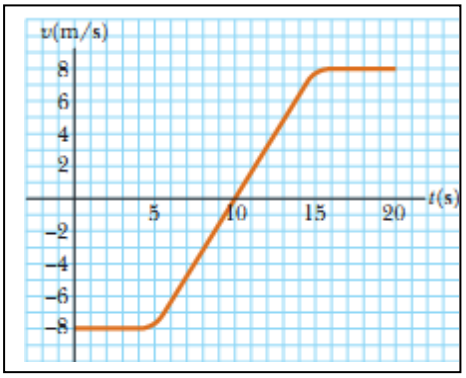
2. The equation $\eta = \pi PR^4/8A\upsilon\ell$ where (η) the coefficient of viscosity (P) pressure, (R) radius, (A) is the cross sectional area, (υ) velocity, and (ℓ) length, is dimensionally
(a) Correct (b) Incorrect (c) No answer

3. Chose the correct answer:
(a) $\Delta x = \frac{1}{2}(\upsilon_o + \upsilon)t^2$ (b) $\Delta x = \upsilon_o + at$ (c) $\upsilon = \upsilon_o \sin \omega t^2$

4. The dimensions of the centripetal acceleration, $a = \upsilon^2/r$, is given by:
(a) $ML^{-2}T^2$ (b) $ML^{-1}T^{-2}$ (c) ML^2T^{-2}

5. If the velocity of a moving car fits the relation $\upsilon^2 = 16 + 0.24\Delta x$, its acceleration is:
(a) $0.12\,m/s^2$ (b) $0.24\,m/s^2$ (c) $16\,m/s^2$

The velocity-time graph for an object moving along a straight path is shown in the figure.



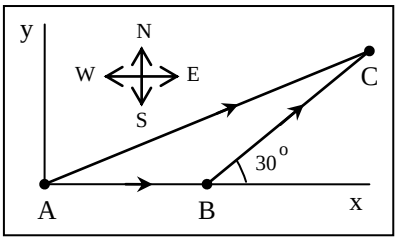
6. Its acceleration during the time interval 0 to 5 s is
(a) $-8/5\,m/s^2$ (b) zero m/s^2 (c) $8/5\,m/s^2$

7. Its acceleration during the time interval 15 to 20 s is
(a) $-8/5\,m/s^2$ (b) zero m/s^2 (c) $8/5\,m/s^2$

8. Its acceleration during the time interval 5 to 15 s is
(a) $-8/5\,m/s^2$ (b) zero m/s^2 (c) $8/5\,m/s^2$

9. A care of mass 1200 kg travels with constant speed of $20\,m/s$. The affected force on it is
(a) 24000 N (b) zero (c) 24000 dyne

10. An airplane, see the figure, flies $200\,\text{Km}$ due to east from city A to city B and then $300\,\text{km}$ in the direction of 30^{o} north of east from city B to city C. How far city C from City A?



(a) $609.88\,\text{km}$ (b) $435.89\,\text{km}$ (c) $483.72\,\text{km}$

11. which of the following relations is correct

(a) $\upsilon = \upsilon_o + x\,t$ (b) $x = x_o + \frac{1}{2}a\,t^2$ (c) $\upsilon^2 = \upsilon_o^2 + 2a\,t$

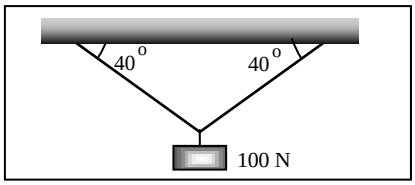
12. If the Cartesian coordinates of a point in the xy-plane are $(-3.5, -2.5)\,\text{m}$, then the polar coordinate of this point are:

(a) $r = 3.4\text{m}\,, \theta = 125.5^{o}$ (b) $r = 3.4\text{m}\,, \theta = 35.5^{o}$ (c) $r = 4.3\text{m}\,, \theta = 216^{o}$

13. Take three steps, turn 90^{o}, and then walk four steps. Now count the number of steps it takes to walks in a straight line back to your starting point.

(a) 5 steps (b) 7 steps (c) 3.5 steps

14. The tension in the two wires that support the $100\,\text{N}$ object as in the figure is



(a) $50\,\text{N}$ (b) $77.79\,\text{N}$ (c) $100\,\text{N}$

15. A $2000\,\text{kg}$ is slowed down from $20\,\text{m/s}$ to $5\,\text{m/s}$ in $4\,\text{s}$. The force affected on the car is

(a) $5700\,\text{N}$ (b) $7500\,\text{N}$ (c) $-7500\,\text{N}$

16. which of the following relations is incorrect

(a) $\upsilon_y = \upsilon_{oy} + a_y\,t$ (b) $y = y_o + \frac{1}{2}a_y\,t^2$ (c) $\upsilon_o^2 = \upsilon_{oy}^2 + 2a_y\,t$

17. In U.S. system of units, the Pascal is equivalent to

(a) $\text{kg}\cdot\text{m}^{-1}\cdot\text{s}^{-2}$ (b) $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ (c) $\text{kg}\cdot\text{m}^{2}\cdot\text{s}^{-2}$

18. In general, the work-energy theorem states that

(a) $\Delta\text{K.E} + \Delta\text{P.E} = 0$ (b) $W = \Delta\text{K.E} - \Delta\text{P.E}$ (c) $W = \Delta\text{K.E} + \Delta\text{P.E}$

19. Which of the following particles do not have an acceleration

(a) a particle moving in a straight line with constant speed
(b) a particle moving around a curve with constant speed
(c) a and b

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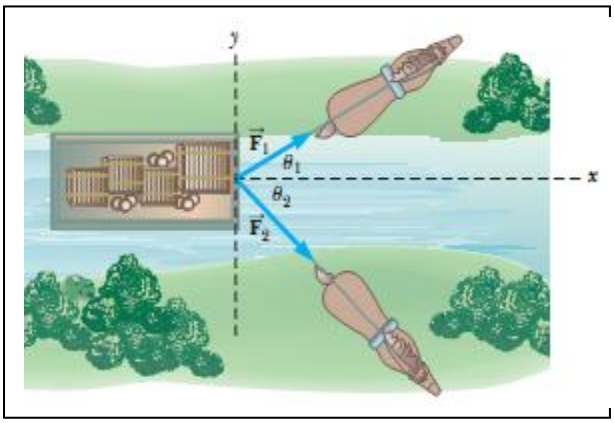
20. Two horses are pulling a barge with mass $2\times10^{3}\,\text{kg}$ along a canal. If each horse exerts a force of magnitude $6\times10^{2}\,\text{N}$ on the barge, $\theta_1 = 30^{o}$ and $\theta_2 = 45^{o}$ then the x-components of the force exerted by the first horse (F_{1x}) is



(a) $6\times10^{2}\,\text{N}$ (b) $5.2\times10^{2}\,\text{N}$ (c) $4.24\times10^{2}\,\text{N}$

21. The x-components of the force exerted by the second horse (F_{2x}) is

(a) $6\times10^{2}\,\text{N}$ (b) $5.2\times10^{2}\,\text{N}$ (c) $4.24\times10^{2}\,\text{N}$

22. The total force in x-direction (F_x) is

(a) $9.44\times10^2\,N$ (b) $F_x\ 12\times10^2\,N$ (c) $8.48\times10^2\,N$

23. The acceleration in x-direction is (a_x) is

(a) $0.424\ m/s^2$ (b) $0.6\ m/s^2$ (c) $0.472\ m/s^2$

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24. If the mass of Earth is M_E and its radius is r, then the weight of an object of mass m is

(a) $w = GM_E m r^{-2}$ (b) $w = mG$ (c) $w = M_E G$

25. Newton's second law states that

(a) The acceleration of an object is directly proportional to the net force acting on it

(b) The acceleration of an object is inversely proportional to its mass

(c) a and b

26. The sentence states that " **an isolated force can never occur in nature**" represents

(a) Newton's first law (b) Newton's second law (c) Newton's third law

27. The sentence states that "**an object moves at constant velocity unless acted on by a force**" represents

(a) Newton's first law (b) Newton's second law (c) Newton's third law

28. The sentence states that " **the net force acting on an object equals the product of its mass and acceleration**" represents

(a) Newton's first law (b) Newton's second law (c) Newton's third law

29. The work done on an object by a constant force is given by:

(a) $F/\Delta x$ (b) $\Delta x/F$ (c) $F\Delta x$

30. SI unit of work is

(a) Newton × meter (b) $Kg\,m^2s^{-2}$ (c) a and b

31. The kinetic energy KE of an object of mass m moving with a speed υ is $KE = \frac{1}{2}m\upsilon^2$, so its SI unit is joule (J) or

(a) $Kg\,m^{-2}s^2$ (b) $Kg\,m^2s^{-2}$ (c) $Kg\,m^2s^2$

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32. The energy stored in the spring is known as

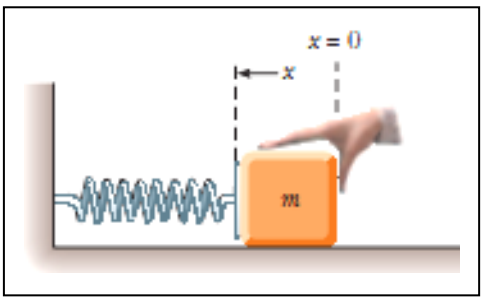
(a) Elastic (b) Kinetic (c) potential

33. A block on the end of a spring is pulled to position $x = A$ and released. In one full cycle of its motion, the total distance does it travel is

(a) A (b) $2A$ (c) $4A$

34. The average power delivered to an object during time interval Δt is

(a) $P = F\upsilon$ (b) $P = W/\Delta t$ (c) a and b



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35. dimensions of Young's modulus is given by:

(a) $ML^{-2}T^2$ (b) $ML^{-1}T^{-2}$ (c) ML^2T^{-2}

36. A vertical steel wire ($Y = 2\times10^{11}\,Pa$) of length $4\,m$ is under vertical pressure $0.75\times10^{7}\,Pa$. The distance the wire is compressed is

(a) $1.5\times10^{4}\,m$ (b) $1.5\times10^{-4}\,m$ (c) $15\times10^{-4}\,m$

37. The conservation of energy law in fluids is given by

(a) $P+\frac{1}{2}\rho\upsilon^{2}+\rho gh=\text{const.}$ (b) $A/\upsilon=\text{const.}$ (c) $A\upsilon=\text{const.}$

38. If the velocity of simple pendulum fits the relation $\upsilon=-0.25\cos\left(\frac{\pi}{8}t\right)$, its angular frequency is:

(a) $0.393\ rad/s$ (b) 0.25 (c) $0.25\pi/8$

39. Pendulum of length $0.171m$ gives period $0.833s$. What is the value of g in this location?

(a) $7.93\,m/s^{2}$ (b) $9.73\,m/s^{2}$ (c) $9.37\,m/s^{2}$

40. The ratio between $\beta:\alpha:\gamma$ in thermal expansion is

(a) 3 : 1 : 2 (b) 1 : 2 : 3 (c) 2 : 1 : 3

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41. Hooke's law states that

(a) $F=-k\,x$ (b) $F=k\,x$ (c) $F=k/x$

42. Point P is known as

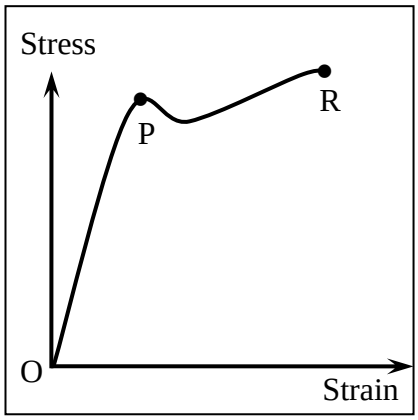
(a) Breaking point (b) Elastic limit (c) Plastic limit

43. Point R is known as

(a) Breaking point (b) Elastic limit (c) Plastic limit

44. The behaviour in the range OP represent

(a) Plastic behavior (b) Elastic behavior (c) no answer



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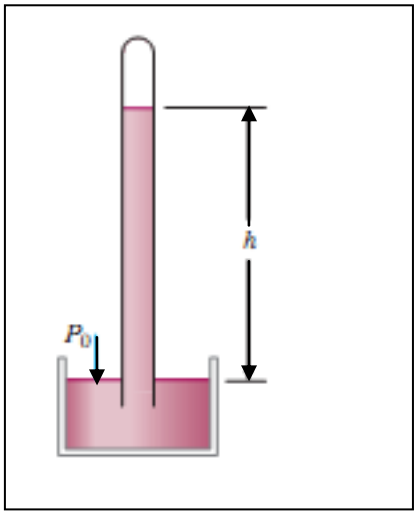
45. Pascal duplicated Torricelli's barometer using a red liquid of density 984 kg/m^3 as the working liquid. The height h of the liquid column for normal atmospheric pressure is

(a) 67 Cm (b) 0.76 m (c) 10.29 m



With my best wishes
Dr. Salah Hamza