شركة تدريب هندسي

E.CAMP

الطريق الدائري بجوار المدرسة المعمارية

01064763583

PHYSICS 1

Mid-term - Revision

2021 - 2022 No.1 7

"Physics - Laws"

1 Fundamental Units:

- SI standard of Length (1M) → speed of light
- SI standard of mass (1kg) → alloy of iridium Platinum Kept in France
- SI standard of time (1S) → atmoic clock (Cesium atoms)

2 Unit Conversions:

- 1M = 100 CM
- 1 inch = 2.54 cm
- 1 Ft = 12 in = 30.48 cm
- 1 yard = 91.44 cm
- 1 Lb = 453.6 gram
- 1 mile = 1609 m
- 1 light year = $3 \times 10^8 \times 60 \times 60 \times 356 = 9.46 \times 10^{15}$ m

3

1 femto (f) → 10^{-15}	1 centi (c) → 10^{-2}
1 pico (p) → 10^{-12}	1 milli (m) → 10^{-3}
1 nano (n) → 10^{-9}	1 kilo (K) → 10^{3}
1 micro (μ) → 10^{-6}	1 Miga (M) → 10^{6}
	1 Giga (G) → 10^{9}

4

- sphere

$$V = \frac{4}{3}\pi r^3$$

$$S = 4\pi r^2$$

- cylinder

$$V = \pi r^2 h$$

$$S = 2\pi rh + 2\pi r^2$$

5 Significant figures

Quantity	Law	Unit	dimension	Quantity	Law	Unit	dimension
المساحة area	A	m^2	L^2	الشغل Work / الطاقة energy	$W=Fd$	جول J	ML^2T^{-2}
الحجم Volume	V	m^3	L^3	القدرة Power	$P_w=\frac{W}{t}$	Watt	ML^2T^{-3}
الكثافة density	$\rho=\frac{m}{V}$	kg/m^3	ML^{-3}	الضغط Pressure	$P=\frac{F}{A}$	بسكال Pa	$ML^{-1}T^{-2}$
السرعة velocity (speed)	$v=\frac{d}{t}$	m/s	LT^{-1}	التردد Frequency	$f=\frac{1}{T}$	هرتز Hz	T^{-1}
العجلة acceleration	$a=\frac{v}{t}$	m/s^2	LT^{-2}	الطول الموجي Wavelength	λ	m	L
القوة Force	$F=ma$	نيوتن N	MLT^{-2}	نصف القطر radius	r	m	L

μ ابتا $\quad Pa.s$

2 Elasticity: المرونة

(a) Tensile:

$$stress = \frac{F}{A} \quad , \quad strain = \frac{\Delta L}{L}$$

$$Young\text{-}Modulus\,(E) = Y = \frac{F/A}{\Delta L/L}$$

(b) Bulk:

$$stress = \Delta P \quad , \quad strain = \frac{-\Delta V}{V}$$

$$Bulk\ Modulus = \frac{\Delta P}{-\Delta V/V}$$

$$Compressability\,(K) = \frac{1}{B}$$

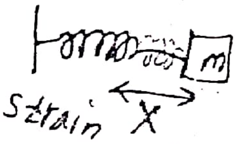
(c) Shear:

$$stress = \frac{F}{A} \quad , \quad strain = \phi = \frac{\Delta X}{h}$$

$$Modulus\ of\ rigidity\,(S) = \frac{F/A}{\phi}$$

Note: Hook's law $F = -KX$

stress ← F , strain → X , K ← ثابت الملف



F --- Force (N)

X --- extension

K --- spring constant (N/m)

3 Fluids الموائع

(1) $\rho_W = 1000\ kg/m^3$ & $\rho_{Hg} = 13600\ kg/m^3$

(2) $P_o = P_a = 1.013 \times 10^5\ Pa = 1.013\ Bar$

$= 0.76\ m\,Hg = 760\ torr$

(3) $\rho = \frac{m}{V}$ كثافة $\qquad P = \frac{F}{A}$ ضغط

(4) $P_{liquid} = P_{guage} = \rho g h$

(5) $P_{abs.} = P_a + \rho g h$ absolute pressure

(6) Archimedes: $F_B = \rho_F V g$ buoyant force

(7) Pascal: $\frac{F_1}{A_1} = \frac{F_2}{A_2}$

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PHYSICS DEPARTMENT

Program: Pre-engineering	Course: PHYSICS	2nd Term: 2018 / 2019
Level: 1ST	Course Code: PH1101	Date: 25/5/2019
Final Exam (Total Pages: 4)	Total Marks: 50	Time Allowed: 3 Hours

Please Answer The Following Questions:

1st Question:

Choose the Correct Answer: (15 Marks)

1) The current definition of the standard second of time is based on
A) the frequency of radiation emitted by cesium atoms. B) the earth's rotation rate
C) the duration of one year. D) the oscillation of a particular pendulum kept in France

2) If a woman weighs 125 lb, her mass expressed in kilograms is x kg, where x is
A) Less than 125. B) Greater than 125.

3) When a damping force is applied to a simple harmonic oscillator which has angular frequency ω_0 in the absence of damping, the new angular frequency ω is such that
A) $\omega < \omega_0$. B) $\omega = \omega_0$. C) $\omega > \omega_0$. D) $\omega T < \omega_0 T_0$. E) $\omega T > \omega_0 T_0$.

4) An ideal gas is at a pressure 1.00×10^5 N/m^2 and occupies a volume 2.00 m^3. If the gas is compressed to a volume 1.00 m^3 while the temperature remains constant, what will be the new pressure in the gas?
A) 0.500×10^5 N/m^2 B) 4.00×10^5 N/m^2 C) 1.00×10^5 N/m^2 D) 2.00×10^5 N/m^2
E) The answer depends on the mass of the gas particles.

5) In an adiabatic free expansion
A) No heat is transferred between a system and its surroundings. B) The pressure remains constant.
C) The temperature remains constant. D) The volume remains constant. E) The process is reversible.

6) The number of molecules in one mole of a substance
A) Depends on the molecular weight of the substance. B) Depends on the atomic weight of the substance.
C) Depends on the density of the substance. D) Depends on the temperature of the substance.
E) Is the same for all substances.

7) The amplitude of a system moving with simple harmonic motion is doubled. The total energy will then be:
A) 4 times as large B) 3 times as large C) 2 times as large D) the same as it was E) half as much

8) Tensile strain is
A) the ratio of the change in length to the original length. B) the stress per unit area.
C) the same as force. D) the applied force per cross-sectional area.
E) the ratio of stress to elastic modulus.

9) For an astronaut working outside a spaceship, the greatest loss of heat would occur by means of
A) Conduction. B) Convection. C) Radiation. D) Conduction and Convection. E) Conduction and Radiation.

10) A restoring force of magnitude F acts on a system with a displacement of magnitude x. In which of the following cases will the system undergo simple harmonic motion?
A) $F \propto \sqrt{x}$ B) $F \propto \sin x$ C) $F \propto x^2$ D) $F \propto x$ E) $F \propto 1/x$

11) In simple harmonic motion, the speed is greatest at that point in the cycle when
A) the magnitude of the acceleration is a maximum. B) the displacement is a maximum.
C) the magnitude of the acceleration is a minimum. D) the potential energy is a maximum.
E) the kinetic energy is a minimum.

12) Which one of the following is the longest length?
A) 10^9 meters B) 10^2 centimeters C) 10^5 millimeters D) 10^5 micrometers E) 10^7 nanometers

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1.13 0.0325×10^{-9} cm can also be expressed in mm as
A) 3.25×10^{-12} mm. B) 3.25×10^{-11} mm. (C) 3.25×10^{-10} mm. D) 3.25×10^{-7} mm.
E) 3.25×10^{-4} mm.

1.14 Convert 1.32×10^{-4} to decimal notation.
A) 1.320 B) 0.13200 C) 0.01320 D) 0.00132 (E) 0.000132

1.15 If a tree is 35 ft tall, its height expressed in meter is x m, where x is
(A) less than 35. B) greater than 35.

1.16 As the speed of a moving fluid increases, the pressure in the fluid
A) increases. B) remains constant. (C) decreases.
D) may increase or decrease, depending on the density of the fluid.

1.17 The number of significant figures in 0.00109 is:
A) 2 (B) 3 C) 4 D) 5 E) 6

1.18 A right circular cylinder with a radius of 2.3 cm and a height of 1.4 m has a volume of:
A) 0.20 m^3 B) 0.14 m^3 C) 9.3×10^{-2} m^3 (D) 2.3×10^{-3} m^3 E) 7.4×10^{-4} m^3 $V = \pi r^2 h$

1.19 The quantity with the same units as force times time, Ft, with dimensions MLT^{-1} is
(A) mv B) mvr C) mv^2r D) ma E) mv^2/r

1.20 Write out the number 7.35×10^{-5} in full with a decimal point and correct number of zeros.
A) 0.00000735 (B) 0.0000735 C) 0.000735 D) 0.00735 E) 0.0735

1.21 A thermometer registers a change in temperature of 100°F. What change in temperature does this correspond to on the Kelvin Scale? A)453 B)328 C)180 D)55.6 E)2...

1.22 The density of an object is defined as:
A) the volume occupied by each unit of mass. (B) the amount of mass for each unit of volume.
C) the weight of each unit of volume. D) the amount of the substance that has unit volume and unit mass.
E) the amount of the substance that contains as many particles as 12 grams of the carbon-12 isotope.

1.23 A child has a temperature of 104°F. What is the temperature in degrees Kelvin?
A) 40 K B) 406 K C) 401 K D) 313 K E) 349K

1.24 Salt water is more dense than fresh water. A ship floats in both fresh water and salt water. Compared to the fresh water, the volume of salt water displaced by the ship is
A) greater than the volume of fresh water. (B) less than the volume of fresh water.
C) the same as the volume of fresh water.

1.25 Which of the following quantities has the same dimensions as kinetic energy, $1/2\ mv^2$?
A) ma B) mvx C) mvt (D) mgh E) mgt

1.26 The standard exam page is 8.5 inches by 11.0 inches. Its area in cm^2 is
A) 15 B) 37 C)94 D)237 (E)603

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1/27 The work done in the expansion from an initial to a final state

A) is the area under the curve of a PV diagram. B) depends only on the end point.

C) is independent of the path. D) is the slope of a PV curve. E) equals $P(V_f - V_i)$.

1/28 In an isothermal process

A) the volume remains constant. B) the temperature remains constant. C) no heat is transferred between a system and its surroundings. D) the pressure remains constant.

E) the internal energy is not constant.

1/29 During the time that latent heat is involved in a change of state:

A) the temperature does not change B) the substance always expands C) a chemical reaction takes place D) molecular activity remains constant E) kinetic energy changes into potential energy

1/30 The change in frequency heard by an observer whenever there is relative motion between a source of sound waves and the observer is called the Doppler effect, this statement is:

A) True B) False

2nd Question (12 Marks)

2/1 Define the simple harmonic oscillation and Find the periodic time of a Physical Pendulum. *(4 marks)*

2/2 Calculate the absolute pressure at the bottom of a freshwater lake at a point whose depth is 27.5 m. Assume the density of the water is 1000 kg/m^3 and that the air above is at a pressure of 101.3 kPa. (b) What force is exerted by the water on the window of an underwater vehicle at this depth if the window is circular and has a diameter of 35.0 cm? ($g = 9.8$ m/sec^2) *(4 marks)*

2/3 A segment of steel railroad track has a length 40 m when the temperature is 0 °C. What is its length when the temperature is 50 °C? Suppose the ends of the rail are rigidly clamped at 0 °C so that the expansion is prevented. What is the thermal stress set up in the rail if its temperature is raised to 50 °C? (assume that the Young's modulus for steel 2×10^{11} N/m^2, the Linear expansion coefficient is 1.1×10^{-5} °C^{-1}). *(4 marks)*

(a) $P = P_a + \rho g h = (101.3\times10^3) + (1000\times9.8\times27.5) = 370.8\times10^3$ Pa

(b) $F = PA = (370.8\times10^3)\times\pi(35\times10^{-2})^2 = 35.675\times10^3$ N

3rd Question (11 Marks)

3/1 Prove that the relation between the linear expansion coefficient α, surface expansion coefficient β and volume expansion coefficient γ is given by

$$\alpha : \beta : \gamma = 1 : 2 : 3$$ *(4 marks)*

3/2 For sound wave, prove that the maximum pressure variations are given by

$$\Delta p_m = \rho v \omega S_m$$

(Where ρ is the density, v speed, ω angular frequency and S_m is the maximum displacement from the equilibrium position) *(4 marks)*

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PHYSICS DEPARTMENT

Please answer the following Questions:

1st Question MCQ Answer in a separate sheet (20 marks)

1.1 Which one of the following is the longest length?
A. 10^7 nanometers B. 10^0 meters C. 10^2 centimeters D. 10^4 millimeters E. 10^5 micrometers

1.2 An iron block of density ρ_{Fe} and of volume l^3 is immersed in a fluid of density ρ_{fluid}. The block hangs from a scale which reads W as the weight. The top of the block is a height h below the surface of the fluid. The correct equation for the reading of the scale is
A. $W = (\rho_{Fe} + \rho_{fluid})ghl^2$. B. $W = (\rho_{Fe} + \rho_{fluid})gl^3$. C. $W = (\rho_{Fe} - \rho_{fluid})ghl^2$
D. $W = (\rho_{fluid} - \rho_{Fe})gl^3$. E. $W = (\rho_{Fe} - \rho_{fluid})gl^3$.

1.3 When a damping force is applied to a simple harmonic oscillator which has angular frequency ω_0 in the absence of damping, the new angular frequency ω is such that
A. $\omega T < \omega_0 T_0$ B. $\omega T > \omega_0 T_0$. C. $\omega < \omega_0$. D. $\omega = \omega_0$. E. $\omega > \omega_0$.

1.4 Two moles of an ideal gas are placed in a container of adjustable volume. When measurements are made
A. all the statements above are found to be correct.
B. only statements (A) and (B) are found to be correct.
C. the pressure is inversely proportional to the volume at constant temperature.
D. the temperature is directly proportional to the volume at constant pressure.
E. the temperature is directly proportional to the pressure at constant volume.

1.5 In an adiabatic free expansion
A. the volume remains constant. B. the process is reversible.
C. no heat is transferred between a system and its surroundings. D. the pressure remains constant.
E. the temperature remains constant.

1.6 A sinusoidal force with a given amplitude is applied to an oscillator. At resonance the amplitude of the oscillation is limited by:
A. none of the above B. the damping force C. the initial amplitude D. the initial velocity
E. the force of gravity

1.7 The amplitude of a system moving with simple harmonic motion is doubled. The total energy will then be
A. the same as it was B. half as much C. 4 times as large D. 3 times as large E. 2 times as large

1.8 The quantity with the same units as force times time, Ft, with dimensions MLT^{-1} is
A. ma B. mv^2/r C. mv D. mvr E. mv^2r

1.9 For an astronaut working outside a spaceship, the greatest loss of heat would occur by means of
A. conduction and convection. B. conduction and radiation. C. conduction.
D. convection. E. radiation.

1.10 Two bodies can be in thermal equilibrium with one another when they are at the same temperature even if they
A. have any of the properties listed above.
B. have any of the properties listed above and one of them is contact with a third body at a different temperature.
C. absorb different quantities of thermal energy from their surroundings in equal time intervals.
D. have different masses.
E. have different volumes.

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PHYSICS DEPARTMENT

6/1/2018

Please Answer The Following Questions:

1st Question:

Choose the Correct Answer: (30 Marks)

1.1 Scientists use the metric system chiefly because it is more accurate than the English system.
(A) True (B) False

1.2 The current definition of the standard second of time is based on
(A) the frequency of radiation emitted by cesium atoms. (B) the earth's rotation rate.
(C) the duration of one year. (D) the oscillation of a particular pendulum kept in France.

1.3 What is $0.205^{2/3}$, expressed to the proper number of significant figures.
(A) 0.348 (B) 0.35 (C) 0.3 (D) 0.3477

1.4 On a day when the temperature reaches 50°F, the temperature in kelvins is
(A) 283K (B)301K (C)382K (D) 215K

1.5 A segment of steel railroad track has a length of 30 m when the temperature is 0 °C (if $\alpha=11\times10^{-6}$ °C^{-1} $Y=2\times10^{11}$ N/m^2). The thermal stress set up in the rail if its temperature is raised to 40 °C equals:
(A)7.8×10^{7} N/m^2 (B) 8.7×10^{7} N/m^2 (C)8.7×10^{-7} N/m^2 (D)8.7×10^{8} N/m^2

1.6 The quantity with the same units as force times time, Ft, with dimensions MLT^{-1} is
(A) mv (B) mvr (C) mv^2r (D) ma (E) mv^2/r

1.7 Some species of whales can dive to depths of 1 kilometer. What is the total pressure they experience at this depth? (ρ_{sea} = 1020 kg/m^3 and 10^5 N/m^2 = 1 ATM.) $P = P_a + \rho g h = 10^5 + 1020\times9.8\times10^3$
$= 100.99\times10^5 \simeq 101$ ATM
(A) 9 ATM (B) 90 ATM (C)101 ATM (D) 111 ATM (E)130 ATM

1.8 Two moles of an ideal gas are placed in a container of adjustable volume. When measurements are made
(A) the pressure is inversely proportional to the volume at constant temperature. (B) the temperature is directly proportional to the volume at constant pressure. (C) the temperature is directly proportional to the pressure at constant volume. (D) all the statements above are found to be correct.
(E) only statements (A) and (B) are found to be correct.

1.9 When a damping force is applied to a simple harmonic oscillator which has period T_0 in the absence of damping, the new period T is such that
(A) $T < T_0$. (B) $T = T_0$. (C) $T > T_0$. (D) $\omega T < \omega_0 T_0$. (E) $\omega T > \omega_0 T_0$.

1.10 If you double the pressure on the surface of a can of water, the buoyant force on a stone placed in the water will
(A) increase, but not double. (B) double. (C) decrease, but not by one-half. (D) not change.

1.11 Which of the following does not have a precise definition in terms of the physical properties of sound waves?
(A)frequency (B)intensity (C)loudness (D)sound level (E) wavelength

1.12 A source of sound waves is placed at the center of a very large sound-reflecting wall. The source emits 0.5 W of power. Two meters from the source the intensity in W/m^2 is
(A)9.95×10^{-3}. (B) 1.99×10^{-2}. (C)0.313. (D)0.399. (E)0.625.

1.13 Tensile stress is
(A) The strain per unit length. (B) The same as force. (C) The ratio of the change in length to the original length. (D) The applied force per cross-sectional area. (E) The ratio of elastic modulus to strain

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1.4 A point source emits sound waves with a power output of 100 watts. What is the sound level (in dB) at a distance of 10 m?

(A) 139 (B) 119 (C) 129 (D) 109 (E) 10

1.5 Two bodies can be in thermal equilibrium with one an her when they are at the same temperature even if they

(A) absorb different quantities of thermal energy from their surroundings in equal time intervals.
(B) have different masses. (C) have different volumes. (D) have any of the properties listed above.
(E) have any of the properties listed above and one of them is contact with a third body at a different temperature.

2nd Question (25 Marks)

2.1 Define the simple harmonic oscillation and Find the periodic time of a Physical Pendulum. *(10 marks)*

2.2 Prove that the ratio between the average coefficient of linear, surfaces and volume expansion is: 1:2:3 *(10 marks)*

2.3 In a car lift used in a service station, compressed air exerts a force on a small piston that has a circular cross section of radius 5 cm. This pressure is transmitted by a liquid to a piston that has radius of 15cm. What force must the compressed air exert to lift a car weight 13300N. What air pressure produces this force?

(a) $\frac{F_1}{A_1} = \frac{F_2}{A_2}$ $F_1 = 14.48 \times 10^2$ N $P = \frac{F_1}{A_1} = 1.28 \times 10^5$ Pa

3rd Question (15 Marks)

3.1 Define ALL the Following Scientific Terms:

Pascal's law- Thermal conductivity- Elastic modulus- Boyle's law- Adiabatic process-Torricelli's Law Latent heat of fusion- Internal energy- The pressure amplitude Restoring force. *(10 marks)*

stress / strain

3.2 Prove that Bernoulli's equation as applied to an ideal fluid is given by the following equation *(5 marks)*

$P + \frac{1}{2}\rho v^2 + \rho g y = \text{constant}$

4th Question (20 Marks)

4.1 Prove that the ideal gas pressure of N molecules and average velocity v is $P = 1/3\rho v^2$. *(8 marks)*

4.2 A submarine (sub A) travels through water at a speed of 8 m/s, emitting a sonar wave at a frequency of 1400 Hz. The speed of sound in the water is 1533 m/s. A second submarine (sub B) is located such that both submarines are traveling directly toward each other. The second submarine is moving at 9 m/s. (A) What frequency is detected by an observer riding on sub B as the subs approach each other? (B) The subs barely miss each other and pass. What frequency is detected by an observer riding on sub B as the subs recede from each other? *(7 marks)*

4.3 A 0.5 mol sample of hydrogen gas is at 300 K. (A) Find the average speed, the rms speed, and the most probable speed of the hydrogen molecules. (k=1.38x10^{-23}J/K, m_p=1.67x10^{-27}Kg) *(5 marks)*

f engineering | Course: PHYSICS | Final Term: 2018/20
vel: 0N1 | Course Code: PH1101 | Date:
d Term Exam (Total pages: 2) | Total marks: 20 | Time Allowed: 45min
udent name: | Group: | Section:

ase Answer the Following Questions:

Question

ase The Correct Answer:

1- Which one of the following is the longest length?
A) 10^0 meters B) 10^2 centimeters C) 10^4 millimeters D) 10^5 micrometers E) 10^7 nano

2- 0.0325×10^{-8} cm can also be expressed in mm as
A) 3.25×10^{12} mm. B) 3.25×10^{-11} mm. C) 3.25×10^{-10} mm D) 3.25×10^{-9} mm
E) 3.25×10^{4} mm.

3 Convert 1.2×10^{-3} to decimal notation.
A) 1200 B) 0.1200 C) 0.0120 D) 0.0012 E) 0

4 If a tree is 20 m tall, its height expressed in feet is x ft, where x is
A) less than 20. B) greater than 20.

5 As the speed of a moving fluid increases, the pressure in the fluid
A) increases. B) remains constant. C) decreases
D) may increase or decrease, depending on the density of the fluid

6 The force exerted on your eardrum due to the water when you are swimming at the bottom o
at is 5.0 m deep is: (assume the surface area of the eardrum to be approximately 1 cm^2).
A) 5N B) 50N C) 0.5N D)
$F = PA = \rho g h A = 10^3 \times 9.81 \times 5 \times 1 \times 10^{-4} \simeq 5N$ P. 0

7 The mattress of a water bed is 2m long by 2m wide and 30cm deep. The pressure exerted by
a) on the floor when the bed rests in its normal position is. (Assume the entire lower surface of
A) contacts the floor. (ρ_{water}=1000Kg/m^3, g=980cm/sec^2)). $P = \rho g h = 1000 \times 9.81 \times (30 \times 10^{-2}) = 2.94 \times 10^3$
A) 2.95×10^3 Pa B) 2.95×10^5 Pa C) 1.59×10^5 Pa D)

8 The current definition of the standard meter of length is based on
A) the distance between the earth's equator and north pole. B) the distance between the earth and
C) the distance traveled by light in a vacuum. D) the length of a particular object kept in

9 Tensile stress is
A) the strain per unit length. B) the same as force. C) the ratio of the change in length to th
ength. D) the applied force per cross-sectional area. E) the ratio of elastic modulus to strain.

10 At a certain depth in the ocean, the absolute pressure is p. If you go to twice that depth (treatir
ater as incompressible)
A) the absolute pressure will be $2p$. B) the absolute pressure will be less than $2p$
C) the absolute pressure will be greater than $2p$. D) the gauge pressure will not change
E) the gauge pressure will increase but will not double

11 The number of significant figures in 0.00180 is:
A) 2 B) 3 C) 4 D) 5 E) 6

12 A right circular cylinder with a radius of 2.3 cm and a height of 1.4 m has a volume of:
A) 0.20 m^3 B) 0.14 m^3 C) 9.3×10^{-3} m^3 D) 2.3×10^{-3} m^3 E)
$V = \pi r^2$

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PHYSICS DEPARTMENT

Faculty of Nursing	Course: BIOPHYSICS	First Term: 2018 /2019
Level: 1	Course Code: Bio 5/9	Date: 10/1/2019
Final Exam		Time Allowed: 120min

Please Answer the Following Questions:

1st Question (20 marks)

Choose the Correct Answer:

1.1 The current definition of the standard kilogram of mass is based on
A) the mass of the earth. B) the mass of the sun.
C) the mass a particular object kept in France. D) the mass of a cesium133 atom.

1.2 Write out the number 7.35×10^{-5} in full with a decimal point and correct number of zeros.
A) 0.00000735 B) 0.0000735 C) 0.000735 D) 0.00735 E) 0.0735

1.3 Systolic pressure is the maximum blood pressure, while Diastolic Pressure is the minimum blood pressu
A) True B) false

1.4 If a woman weighs 140.lb, her mass expressed in kilograms is x kg, where x is
A) less than 140. B) greater than 140.

1.5 A thermometer registers a change in temperature of 100°F. What change in temperature does this correspond to on the Kelvin Scale? A)453 B)328 C)180 D)55.6 E)24

1.6 The number 0.00132 has
A) 6 significant figures. B) 5 significant figures. C) 4 significant figures.
D) 3 significant figures.

1.7 The basic unit of radiation dose absorbed in tissue is the *gray (Gy)*
A) True B) False

1.8 A heart defibrillator delivers 4.00×10^{2} J of energy by discharging a capacitor initially at 1.00×10^{4} What is its capacitance?
A) 8μF B) 80μF C) 8F D) 0.8μF

1.9 Tensile strain is
A) the ratio of the change in length to the original length. B) the stress per unit area. C) the same as force. D) the applied force per cross-sectional area. E) the ratio of stress to elastic modulus.

1.10 Kinetic friction is a force that opposes the motion of two systems that are in contact and moving relative to one another
A) True B) False

1.11 X-rays are classified as:
A) Ionized radiation B) non-ionized radiation C) visible beam

1.12 Heat generated in the body is mainly lost to the environment through
A) Conduction B) Evaporation C) convection D) Radiation

1.13 Two nuclei which share the same atomic number Z always are
A) stable B) unstable C) isotopes D) isobars E) radioactive

Suez Canal University
Faculty of sciences
Department of Physics

Final 1st term exam
1st year Petroleum and w
Date: -2013

Subject: Physics I
Code: PH101
Time: 2 h

Write the LETTER labelling correct answer in your answer notebook — 16 mark

1- The number of significant figures in 15.00 is:
A. 1 B. 2 C. 3 (D) 4 E. 5

2- $(6.3 \times 10^6)/(2.0 \times 10^{-6}) =$
A. 3.2×10^{-6} B. 3.15×10^{12} C. 3.1×10^6 D. 3.5 (E) 3.2×10^{12}

3- A satellite of mass m has an orbital period T when it is in a circular orbit of radius R around the earth. If the satellite instead had mass 4m, its orbital period would be
A) 4T. B) 2T. C) T. D) T/2 E) T/4.

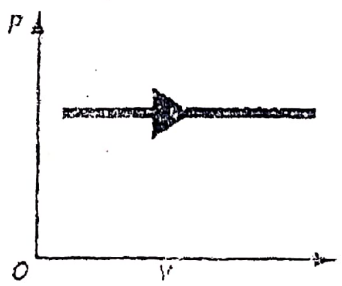
4- Tensile trains
(A) the ratio of the change in length to the original length.
B) the stress per unit area. C) the same as force
D) the applied force per cross-sectional area
E) the ratio of stress to elastic modulus

5- As the speed of a moving fluid increases, the pressure in the fluid
A) increases. B) remains constant. (C) decreases.
D) may increase or decrease, depending on the density of the fluid.

6- For a fixed amount of gas, if the absolute temperature of the gas is doubled what happens to the pressure of the gas?
A) The answer cannot be determined without volume information.
B) The pressure of the gas becomes double the original pressure.
C) The pressure of the gas becomes eight times the original pressure.
D) The pressure of the gas becomes one half the original pressure.
E) The pressure of the gas becomes four times the original pressure

7- When a gas undergoes an isothermal process, there is
A) no change in the pressure of the gas. B) no change in the temperature of the gas
C) no change in the volume of the gas. D) no work done by (or on) the gas
E) no heat added to the gas.

8- The process shown in the pV diagram in the figure is an
A) adiabatic expansion.
B) isothermal expansion.
C) isochoric expansion
D) isobaric expansion.
E) isochoric compression.



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Proof ONLY 3 Draw a graph showing the used parameters 15 marks

1- State and proof the Kipler's third law

2- Proof Bernoulli's equation

3-a Suppose $A = B^n C^m$, where A has dimensions LT, B has dimensions L^2T^{-1}, and C has dimensions LT^{-2}. P that n= 1/5 and m= 3/5

3-b Proof that the following equation is dimensionally correct?

$$Y(m) = (2m)\cos(kx), \text{ where } k=2m^{-1}$$

4- For an isotropic material, proof that the volume bulk modulus $\beta = 3\alpha$, where α is the linear expansion coefficient

Answer ONLY 3 problems 45 marks

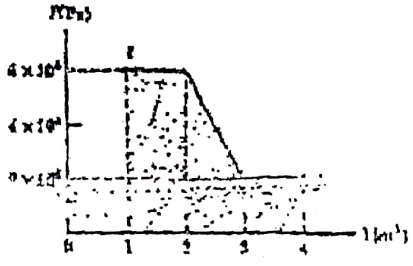
1- Consider a satellite of mass m moving in a circular orbit around the Earth at a constant speed v and at an altitude h above the Earth's surface.
(A) Determine the speed of the satellite in terms of G, h, R (the radius of the Earth), and M (the mass of the Earth).
(B) If the satellite is to be geosynchronous (that is, appearing to remain over a fixed position on the Earth), how fast is it moving through space?

2- A small cube of iron is observed under a microscope. The edge of the cube is 5.00×10^{-6} cm long. Find (a) the mass of the cube and (b) the number of iron atoms in the cube. The atomic mass of iron is 55.9 g/mol, and its density is7 860 kg/ m^3, Avogadro's number=6.02×10^{23} mol^{-1}.

3- A block of unknown mass is attached to a spring with a spring constant of 6.50 N/m and undergoes simple harmonic motion with amplitude of 10.0 cm. When the block is halfway between its equilibrium position and the end point, its speed is measured to be 30.0 cm/s.
Calculate (a) the mass of the block, (b) the period of the motion, and (c) the maximum acceleration of the block.

4- The average coefficient of volume expansion for carbon tetrachloride is 5.81×10^{-4} $(°C)^{-1}$. If a 50.0-gal steel container is filled completely with carbon tetrachloride when the temperature is 10.0°C, how much will spill over when the temperature rises to 30.0°C?

5- (a) Determine the work done on a fluid that expands from i to f as indicated in Figure. (b) How much work is performed on the fluid if it is compressed from f to i along the same Path ?



Please, note that there are 3 pages as examination paper

3 $A = B^n C^m$, $A = LT$, $B = L^2 T^{-1}$

$C = LT^2$ Prove that: $n = \frac{1}{5}$, $m = \frac{3}{5}$

"answer"

$$LT = (L^2 T^{-1})^n (LT^2)^m$$

$$\therefore LT = L^{2n} T^{-n} L^m T^{2m}$$

$$\therefore L^1 T^1 = L^{2n+m} T^{-n+2m}$$

$$\therefore 2n + m = 1 \rightarrow (1)$$

$$-n + 2m = 1 \quad *2$$

$$-2n + 4m = 2 \rightarrow (2)$$

add (1) & (2) $\therefore 5m = 3 \Rightarrow \boxed{m = \frac{3}{5}}$ & $\boxed{n = \frac{1}{5}}$

(3-b) $Y(m) = 2m \cos(kx)$, $k = 2m^{-1}$

"answer"

L.H.S $= [Y] = L \rightarrow (1)$ $m \rightarrow$ meter

R.H.S $= L \cos(L^{-1} * L)$

$= L \rightarrow (2)$

From (1) & (2) $\therefore$ L.H.S = R.H.S