DEJ/ WONDIRAD PREPARATORY SCHOOL

ETHIOPIAN UNIVERSITY ENTRANCE MODEL EXAMINATION (EUEME)

PHYSICS, SENE 2012/MAY 2020.

TIME ALLOWED: 2 HOURS

GENERAL DIRECTIONS

THIS BOOKLET CONTAINS **PHYSICS** EXAMINATION. IN THIS EXAMINATION, THERE ARE A TOTAL OF **50 MULTIPLE CHOICE EQUATIONS**. CAREFULLY SELECT THE BEST ANSWER AND **BLACKEN** ONLY THE LETTER OF YOUR CHOICE ON THE SEPARATE ANSWER SHEET PROVIDED. FOLLOW THE INSTRUCTION ON THE ANSWER SHEET AND THE EXAMINATION PAPER CAREFULLY. USE ONLY **PENCIL** TO MARK YOUR ANSWERS. YOUR ANSWER MARK SHOULD BE **HEAVY** AND **DARK**, COVERING THE ANSWER SPACE COMPLETELY. PLEASE ERASE ALL UNNECESSARY MARKS COMPLETELY FROM YOUR ANSWER SHEET.

YOU ARE ALLOWED TO WORK ON THE EXAM FOR **2 HOURS**. WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING, PUT YOUR PENCIL DOWN, AND WAIT FOR FURTHER INSTRUCTIONS.

ANY FORM OF CHEATING OR AN ATTEMPT TO CHEAT IN THE EXAMINATION WILL RESULT IN AN AUTOMATIC DISMISSAL FROM THE EXAMINATION HALL AND CANCELLATION OF YOUR SCORE(S).

PLEASE MAKE SURE THAT YOU HAVE WRITTEN ALL THE REQUIRED INFORMATION ON THE ANSWER SHEET BEFORE YOU START TO WORK ON THE EXAMINATION.

DO NOT TURN THIS PAGE OVER UNTIL YOU ARE TOLD TO DO SO.

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Physics

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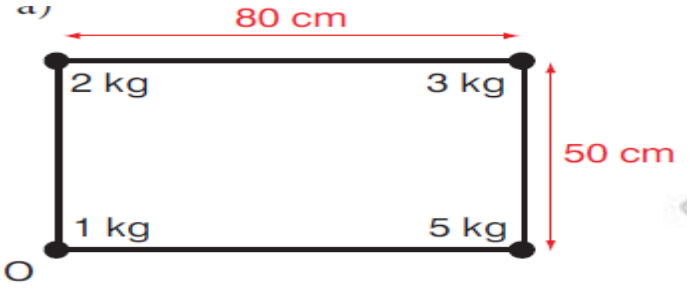
Number of Items: 50

DIRECTIONS: Each of the following questions is followed by **four** possible alternatives.Read each question and carefully **blacken** the letter of your best choice on the separate answer sheet provided.

You may refer to the information given below when you work on some of the questions.

Constant	**Symbol**	**Value**
Acceleration due to gravity	g	$10m/s^2$
Permittivity of vacuum	$\mathcal{E}_0$	$8.85 \times 10^{-12} C^2/N.m^2$
Charge of an electron	e	$1.6 \times 10^{-19}C$
Permittivity of free space	μ_0	$4\pi x10^{-7}Tm/A$
Universal gas constant	R	8.31 J/mol. k.
Planck's constant	h	$6.63 \times 10^{-34}J.s$
Electron mass	M_e	9.11×19^{-31} kg
Proton mass	M_p	1.67×10^{-27} kg
ln2 = 0.693, $\pi = 3.14$	p	$1.6 \times 10^{-19}C$
$Sin30^0 = cos60^0 = 0.5$,	$cos90^0 = sin0^0 = 0$	
$Sin37^0 = cos53^0 = 0.6$,	$sin90^0 = cos0^0 = 1$	
$Sin45^0 = cos45^0 = 0.707$	Speed of light in air, $c = 3 \times 10^8 m/s$	
$Sin53^0 = cos37^0 = 0.8$		
$Sin60^0 = cos30^0 = 0.866$		

1. The closeness of a measured value to its true value is:
   A. Accuracy. C. Experimental error.
   B. Precision. D. Uncertainty
2. Which of the following is **NOT** a framework for writing up reports?
   A. Result. B. Aim C. Experiment. D. Diagrams.
3. Vectors that act on the same point are:
   A. Coplanar vectors. C. Null vectors.
   B. Equal vectors. D. Concurrent vectors.
4. Two vectors are $\vec{A} = \hat{\imath} + \hat{\jmath} + 2k$ and $\vec{B} = -3\hat{\imath}+4\hat{k}$. the scalar projection of $\vec{A}$ on to $\vec{B}$ is:
   A. 1 B.2 C. 4 D. 5.
5. For what value of a are the vectors $A = 2\hat{\imath} + 4\hat{\jmath} + 6\hat{k}$ and $B = 3\hat{\imath} + a\hat{\jmath} - 3\hat{k}$ perpendicular to each other?
   A. 2 B. 3 C. 4 D. 5.
6. A body moving with a finite acceleration of constant magnitude must experience a change in
   A. Velocity B. Speed. C. Acceleration. D. Weight.
7. A car travelling at a constant acceleration covers the distance between two points 180m a part in 6sec. If the car is starting from rest and its speed at the second point is 45m/s, what is the acceleration of the car?
   A. $5m/s^2$ B. $10m/s^2$ C. $15m/s^2$ D. $20m/s^2$
8. A ball is thrown vertically down ward with an initial speed of 20m/s from a height of 60m. What is the speed of the ball just before it strikes the ground?
   A. 20m/s B. 30m/s C. 40m/s D. 50m/s
9. In one dimensional motion where the velocity changes linearly with time, the slope of a velocity-time graph represents:
   A. Displacement B. Acceleration. C. Velocity D. Speed.
10. What is the center of mass of the following figure shown below with respect to corner O?
    A. 61cm. B. 71cm. C. 161cm. D. 171cm.



11. A body of mass 10km is moving with velocity of 2m/s. If a force of 20N is applied on the body. What will be its velocity after 5sec.?Θ

A. 2m/s. B. 10m/s. C.12m/s. D. 20m/s.

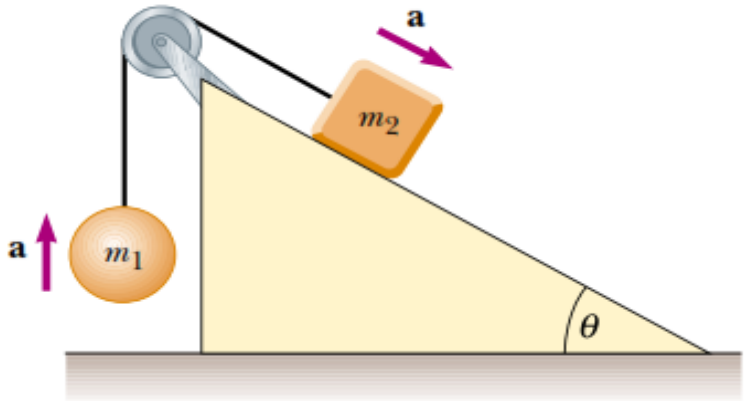
12. A 4gm bullet is shot at a speed of 2000m/s in to 2kg block initially at rest. If the bullet and the block slides together 3m before stop, what is the speed of the block just after impact?

A. 3.99m/s. B. 2.99m/s. C. 3.09m/s. D. 2.09m/s.

13. A block of mass m1 and m2 are attached by a lightweight cored that passes over a frictionless pulley of negligible mass as shown figure below. If the block lies on a frictionless incline of angle, what is the tension of the cored?

A. $\frac{M_1M_2g(\cos\theta+1)}{M_1+M_2}$. C. $\frac{M_1M_2g(\sin\theta-1)}{M_1+M_2}$.

B. $\frac{M_1M_2g(\sin\theta+1)}{M_1+M_2}$ D. $\frac{M_1M_2g(\cos\theta-1)}{M_1+M_2}$.



14. Which of the following is **CORRECT** about work done?

A. The work is done by conservative force over a closed loop.

B. The work done by a conservative force over a closed loop is different from zero.

C. The work done by a conservative force over a closed loop is always zero.

D. None of the above.

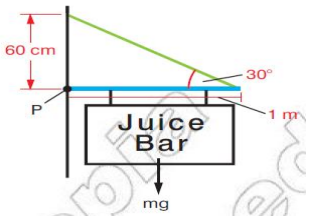
15. If a force of 40N is used to stretch a spring which has a spring constant of 350N/m, then how much energy is stored in the spring?

A. 2.12J. B. 21.2J. C. 5.12J. D. 15.2.J

16. A flywheel is rotating with an angular velocity of 1.4 rad/s and is acted on by an acceleration of 0.6 rad/s^2. What angular velocity will it have attained after three complete turns?

A. 24.6rad/s. B. 34.6 rad/s. C. 4.96 rad/s. D. 5.96 rad/s.

17. Which of the following is correct about the total kinetic energy of the whole fly wheel?
    A. The total kinetic energy of the whole fly wheel is the sum of that every particles in it and those particles have the same speed.
    B. The total kinetic energy of the whole fly wheel is the sum of that every particles in it and those particles have different angular speed.
    C. The total kinetic energy of the whole fly wheel is the sum of that every particles in it and those particles have the same angular speed.
    D. The total kinetic energy of the whole fly wheel is the sum of that every particles in it and those particles have the same speed and angular speed.
18. Which of the following statement is correct about the first condition of equilibrium?
    A. The net force on an object must be zero.
    B. The sum of all torques must be zero.
    C. Anticlockwise moments should balance counter clockwise moments.
    D. All of the above.
19. The figure shown below shows a sign that is hanging from the horizontal bar. The bar is fixed the wall at P. The sign and the bar have a mass of 2kg. If the system is in equilibrium and the wire is massless. What is the size of the force in the wire?
    A. 10N B. 20N. C. 15N. D. 25N.



20. A set of force with a resultant moment but no net force is:-
    A. Torque. C. couple
    B. Moment of inertia. D. rotational equilibrium.
21. The definition of Young's Modulus is given by:-
    A. Force per unit area. C. ratio of stress to strain.
    B. Ratio of strain to stress. D. force per unit elongation.
22. Which element is correct about pressure under a fluid in container?
    A. It depends on the volume of the fluid. C. It depends on the shape of the container.
    B. It depends on the density of the fluid. D. It is independent of the depth of the fluid.

23. Streamline flow is a type of fluid flow where the fluid travels smoothly in regular layers. What is the reason for this happen?
    A. Velocity and pressure is constant.
    B. Velocity increase but pressure is constant.
    C. Velocity and pressure is increase.
    D. Velocity and pressure is decrease.
24. Temperature of a body is a measure of the
    A. Heat content of a body
    B. Average pressure in a gas
    C. Average molecular kinetic energy.
    D. Heat of vaporization of a liquid.
25. Which one of the relation is **WRONG** when an ideal gas is subject to an adiabatic process? Where, p = pressure T = temperature, V = volume and γ = specific heat ratio.
    A. $P^{\gamma}V$ = constant
    B. $TV^{\gamma-1}$ = constant
    C. PV^{γ} = constant.
    D. None
26. Which of the following statements is **NOT** correct?
    A. Reversible process is a process that can be reversed through finite change in the system.
    B. Complete conversion of energy from a hot source in to work is impossible.
    C. There are processes in which there is an overall decrease in entropy.
    D. Entropy is a measure of the amount of disorder.
27. An ideal gas undergoes an isothermal process starting with a pressure of $2x10^5$Pa and a volume of $6cm^3$. Which one of the following might be the pressure and volume of the final state?
    A. 4×10^5Pa and $4cm^3$**.**
    B. 5×10^5Pa and $3cm^3$**.**
    C. 4×10^5Pa and $3cm^3$**.**
    D**.** 1×10^5Pa and $10cm^3$**.**
28. The intensity of the sound is $2x10^{-6}$ W/m^2 at a distance of 12m from the explosion of the rocket. Find the distance from the source at which the intensity is $8x10^{-6}$ W/m^2?

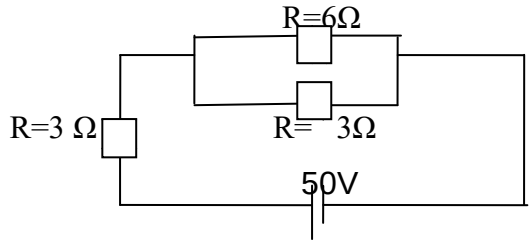
    A. 6m. B. 3m. C.4m. D.9m.

29. Which of the following statement is **FALSE** about wave?
    A. Sound wave is an example of longitudinal wave.
    B. In transvers wave, the vibration of the particles of the medium is parallel to the motion of the wave.
    C. Radio wave is an example of electromagnetic wave.
    D. In longitudinal wave, the vibration of the particles of the medium is parallel to the motion of the wave.

30. The mechanical wave travelling along a string the speed of the wave depends on:
    A. The tension on the string. C. A & B.
    B. The mass per unit length. D. None of the above.
31. An object moves with SHM of amplitude 10cm and time period of 2sec.The maximum velocity of the object is:
    A. 3.14m/s. B. 0.314m/s. C. 31.4m/s. D. 314m/s.
32. Monochromatic light of wavelength $4x10^{-6}$ m illustrated a pair of narrow slits 2mm apart. What is the bright fringe width in the interference pattern formed on a screen 2m away?

    A. 4.5mm. B.4mm. C.3.5mm. D.3mm.
33. Which one of the following is **WRONG** statement?
    A. In a single slit experiment, the width of central maxima is twice as wide as the ferst order maxima.
    B. In a single slit experiment, the width of first order maxima is twice as wide as the central maxima.
    C. Every point on a wave front acts as a source of spherical secondary wavelets.
    D. Frequency remains constant when a light travels from one medium to another.

34. If two charges each of magnitude 4µc exerts a force of 360N on each other, the separation between charges is, A.$2x10^{2}$m. B. $2x10^{-2}$m. C.$3x10^{2}$m. D.$3x10^{-2}$m
35. In order to make a capacitor as large as possible we could do,
    A. Decrease the area of the plates.
    B. Increase the distance between the plates.
    C. Use a dielectric with a large a dielectric constant.
    D. Use a dielectric with a small a dielectric constant
36. A parallel plate capacitor has a capacitance C_1. If a second parallel plate capacitor has a plate with twice the area and half the separation, then what is the capacitance of the second capacitor? A. $2C_1$. B.1/2 C_1. C. C_1. D. $4C_1$.
37. In the fig , What is the total Resistance and the total current respectively



A. 5Ω &10A. C. 5Ω & 5A.
B. 2Ω & 2A. D. 2Ω & 10A.

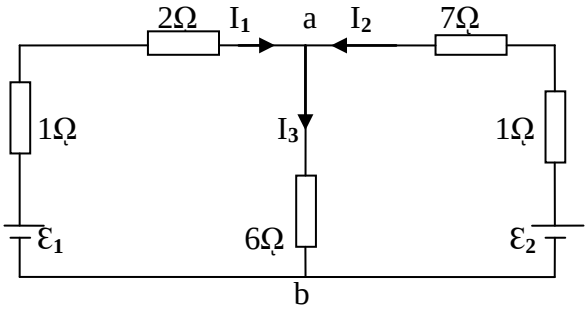
38. A particle of mass $2x10^{-4}$kg and $8x10^{-6}$C is released in a region where there is a constant electric field of 250N/C. What is the acceleration of the electric filed?

A. $10m/s^2$. B. $5m/s^2$. C. $15m/s^2$. D. $20m/s^2$.

39. Calculate the resistance of an aluminum cylinder thathas a length of 10cm and a cross-sectional area of 2×10^{-4} m^2 with resistivity $3x\ 10^{-8}\Omega m$.

A. $2.73 \times 10^{-4}\Omega$. B.$1.5 \times 10^{-5}\ \Omega$. C.$1.92 \times 10^{-4}\ \Omega$. D.$3.22 \times 10^{-5}\ \Omega$.

40. For the circuit shown below, what is the value of $\mathcal{E}_1$and$\mathcal{E}_2$respectively if I_1=1/3A and I_2=½ A?



A. 6v, 9v. C. 6v, 8v.

B. 9v, 5v. D. 3v, 6v.

41. Which one of the following affects the resistance of resistor?

A. The length of the conductor. C. The nature of the conductor.

B. The cross-sectional area of conductor. D. All of the above

42. Which of the following is **TRUE** about charged particle?

A. Any charged particle in the motion produces a magnetic field as well as an electric field.

B. Any charged particle in the motion only produces a magnetic field.

C. Any charged particle in the motion only produces an electric field.

D. Any charged particle which is at rest produces a magnetic field.

43. Which of the following is **NOT** true?

A. The magnetic field inside a long solenoid is strong, uniform and parallel to its axis.

B. The magnetic field outside a long solenoid is almost zero.

C. The magnetic field of toroid is totally confined to the space enclosed by the winding.

D. None of the above.

44. Two long wires of 10 m in length carries a current of 2 A and 0.5A in the same direction. The wires are separated by 4 cm. What is the magnetic force that the wires exerted on each other?

A. 5×10^{-5} N. C. 5×10^{-7} N.

B. 5×10^{-6} N. D. 4×10^{-6} N.

45. Which of the following statement is correct about the size of the inductance?
    A. When increasing the current through the coil, increasing the inductance.
    B. When increasing the number of turning on the coil, decreasing the inductance.
    C. When increasing the magnetic flux through the coil, increasing the inductance.
    D. All of the above.

46. Aniron core solenoid of 250 turns per unit meter and area $2.5cm^2$.What are the inductance and the energy stored in the inductor if a current of 2.5A flows through it?
    A. 2×10^{-5}H and 6×10^{-5}J.
    B. 6×10^{-5}H and 2×10^{-5}J.
    C. 2×10^{-5}H and 5×10^{-5}J.
    D. 3×10^{-5}H and 2×10^{-5}J.

47. Which of the following statement is correct about a series RLC circuit, if R=0?
    A. The angle between the current and voltage is zero.
    B. The average power of the circuit is different from zero.
    C. The angle between the current and voltage is less than 90^0.
    D. The average power of the circuit is zero.

48. An inductor has a self-inductance of 12 *mH*. The current in the circuit decreases at a rate of 2 A/s. What is the magnitude of the induced electromotive force?
    A. 2.4π V. B. 1.2π V. C. 2.4×10^{-2} V. D. 1.2×10^{-2} V.

49. Which of the following statement is **NOT TRUE** about radiation?
    A. Gamma radiation has high energy and frequency.
    B. Beta particles are emitted from the nucleus when neutron decays in to proton.
    C. Beta particle is much greater than an Alpha particle.
    D. Gamma radiation has no charge and mass.

50. The process by which two or more nuclides are fused together to form a new nuclide is:
    A. Nuclear fission.
    B. Nuclear fussion.
    C. Alpha radiation.
    D. Gamma radiation

Stay Home.

THE END