FEDERAL UNIVERSITY OF AGRICULTURE ABEOKUTA
2017/18 MOCK CAT 16th June 2018

COURSE CODE: PHS 105

Answer All Questions **Time: 20mins**

1. A body which is uniformly retarded comes to rest in 10s after travelling a distance of 20m. Calculate its initial velocity. (a)0.5ms^{-1} (b) 2ms^{-1} (c) 4ms^{-1} (d) 20ms^{-1}

2. An object moving in a circle has an acceleration towards its Centre. This is provided by (a) a change of momentum (b) a centripetal force (c) a centrifugal force (d) newton's force of gravitational (e) an acceleration due to gravity

3. The friction which operates when one solid surface slides over another is called (a) solid friction (b) dynamic friction (c) static friction (d) limiting friction

4. A body accelerates uniformly from the rest at 2ms^{-2}.calculate its velocity after travelling 9m.(a) 36ms^{-1} (b) 18ms^{-1} (c) 6ms^{-1} (d) 4.50ms^{-1} (e) 4.24ms^{-1}

5. If the attract of the sun suddenly ceased the earth would continue to move in a straight line making a tangent with its original orbit . This statement is derived from newton's (a) first law of motion (b) second law of motion (c) third law of motion (d) law of universal gravitational

6. Given that the gravitational constant is 7× $\mathbf{10}^{-11}$Nm^{2}kg^{-2}.what is the force of attraction between 10^{6}kg mass of copper hanging one metre away from a 10^{3}kg mass of iron. (a) 7× $\mathbf{10}^{-20}$N (b) 7× $\mathbf{10}^{-8}$N (c) 7× $\mathbf{10}^{-2}$N (d) 7× $\mathbf{10}^{3}$N

7. A body falls from the rest to the ground in 0.5s. Calculate the height from which it falls. (a) 0.125m (b) 0.5m (c) 1.0m (d) 1.25m (e) 5.0m

8. A motor vehicle is brought to rest from a speed of 15m/s in 2s.calculate the retardation (a)0.75ms^{-2} (b) 1.33 ms^{-2} (c) 5 ms^{-2} (d) 7.50 ms^{-2}

9. The force responsible for holding the moon is orbit around the earth against the gravitational pull of the earth is (a) centrifugal (b) rotational (c) reaction (d) centripetal (e)transitional

10. A particle moves in a circular orbit of radius 0.02m, if the speed of the particles is 0.88 ms^{-2}. Calculate the frequency in cycles per seconds (a) 2.0 (b) 8.8 (c) 7.0 (d) 17.0 (e) 17.6

11. The point beyond which a stretched spring does not return to its original length is called the (a) breaking point (b) elastic limit (c) spring constant (d) elastic point (e) release point

12. A point at which the molecules of a loaded wire begin to slide across each other resulting in a rapid increase in extension is the (a) yield point (b) proportionality Point (c) deformation point (d) elastic point

13. The force required to make an object of mass M travelling with velocity V turn in a circle of radius R is (a) $\frac{mv^2}{r}$ (b) $\frac{mr^2}{v}$ (c) $\frac{mr}{v}$ (d) $\frac{mv}{r^2}$ (e) $\frac{mv}{r}$

14. a vibrating diving board has a frequency of 20Hz. What is the angular velocity of the board? (a) 2πrads^{-1} (b) 20πrads^{-1} (c) 30πrads^{-1} (d)40πrads^{-1}

15. A student found out from a simple pendulum experiment that 20oscillations were completed in 38secs. What is the period of oscillation of the pendulum? (a) 8.0secs (b)3.8secs (c)2.4secs (d) 1.9secs (e) 1.5secs

16. The force experienced by an object of mass 60kg in the earth's gravitational field is 1.002×10^2 N. what is the intensity of the gravitational field? (a) 0.60Nkg^{-1} (b) 1.67 Nkg^{-1} (c) 1.69 Nkg^{-1} (d) 9.81 ms^{-2}

17. Atoms of solid having crystalline structures are arranged in regular pattern called (a) energy level (b) atomic structure (c) lattice (d)orbit

18. The force that produces an angular deformation without a change in the volume of a material is referred to as (a) tensile stress (b)shear stress (c) compressive stress (d) bulk stress

19. Amorphous substance have the following properties I they are all hydrated II they do not have definite shape III they are all soluble (a) I only (b) I and II only (c) III only (d) II only (e) I,II and III

20. A spring with a force constant of 20 Nm^{-1} hanging vertically, has a equilibrium length of 0.25m. a 100g mass is attached to the spring and carefully allowed to drop so that it comes to rest. The new equilibrium length of the spring is (g=10ms^{-2}) (a) 30cm (b) 40cm (c)50cm (d) 75cm

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CHM 101

Name these following compounds: Time: 20mins

1. Chlorine has two neutral isotopes; chlorine 35: 35 amu 75% abundance, chlorine 37; 37 amu 25% abundance. Calculate the mass i.e. R.A.M of chlorine. (a) 31.5 (b) 33.5 (c) 35.5 (d) 40.0
2. The mass of an electron is _____(a) 0.0054amu (b) 0.006amu (c) 0.00054amu (d) 0.001amu.
3. Who first described an atom? _____ (a)Democritus (b) Vorticella (c) Stanley (d)Mardsen.
4. Who discovered the neutron? _____ (a) John Dalton (b) James Chadwick (c) Rutherford (d) Ravenhill.
5. When green light is emitted from an oxygen atom, it has a wavelength of 558nm, what is the frequency? Take c=3.0 x 10^8m/s (a) 5.38 x 10^{14}Hz (b)2.14 x 10^{13}Hz (c) 5.32 x 10^{23}Hz (d) 6.67 x 10^{-34}Hz.
6. Atomic spectrum can be of two types. (a) Parallel and scattered (b) smooth and dispersed (c) continuous and discrete (d) Long and short.
7. What is the relationship between the three characteristics of wave? (a) V=2x/t (b) v=c/v (c) e=hv (d) w=hf.
8. What is the total number of electron that can be occupied on an energy level according to principal quantum number? (a) $n^2/2$ (b)$2/n^2$ (c) $2n^2$ (d)$3/2n^2$.
9. The distribution of electrons are dependent on the _____ (a) standard numbers (b) Compton numbers (c) quantum numbers (d) quantum numbers.
10. If 454g of NH_4NO_3 decomposes, how much of N_2O and H_2O are found what is the theoretical yield? (a) 250g H_2O & 204g N_2O (b) 210g H_2O & 244g N_2O (c) 114g H_2O & 340g N_2O (d) 204g H_2O & 250g N_2O.
11. Calculate the percentage yield, if you isolated only 131g of N_2O. (a) 42.5g (b) 25.3% (c) 43.2% (d) 52.4%.
12. Using 5.00g of H_2O_2, what mass of O_2 and H_2O can be obtained? Reaction is catalyzed by MnO_2 (a)2.646g H_2O & 2.352g O_2 (b) 2.35g of $O_2$and 2.45g H_2O (c) 2.23g H_2O & 3.10g O_2 (d) 0.49g O_2 & 4.51g H_2O.
13. If in a given reaction there is not enough of one reagent to use up the other reagent completely, this reagent is called (a) Additive reagent (b) Limiting reagent (c) Standing reagent (d) Building reagent.
14. There are three types of bonds that can occur between atoms. (a) Chemical bonds, mechanical and physical bonds (b) Top bond, super and facial bond (c) Covalent, ionic and metallic bond (d) None of the above.
15. _____ is the device used to measure the atmospheric pressure of a place. (a) Voltameter (b) Photometer (c) Sphygmomanometer (d) Barometer.
16. 1 atm = _____ bar (a) 100235 (b) 1.01325 (c) 760 (d) 101.325 x 10^5
17. 760mmHg = _____ torr (a) 1 (b) 720 (c) 1.01325 x 10^5 (d) 760.
18. Convert 75 lb/m2 to mmHg, atm and Pa (a) 2512mmHg, 1.5atm and 4.44 x 10^6 Pa (b) 1915.2mmHg, 2.52 atm and 25.53 x10^2 Pa (c) 52119mmHg, 3.10atm and 2.16 x 10^5 Pa (d) None of the above.
19. Given that the pressure of an unknown gas is 225.4mmHg, convert the pressure to atm, bar and psi (a) 0.297atm, 0.301bar and 4.366psi (b) 0.301atm, 0.297bar and 92.65psi (c) 2.907atm, 3.01bar and 4.366psi (d) none of the above.
20. Bola finds that the air trapped in a tube occupies 24.8cm3 at 1.14atm, by adding mercury to the tube, she increases the pressure of the trapped air to 2.68atm. Assuming that it happened at constant temperature. What is the new volume of air (in L)? (a)0.92L (b)5.172dm3 (c) 0.0105dm3 (d) 24.1L.
21. Calculate the amount of oxygen gas in a cylinder of 30L, if the pressure is 20atm at 30°C. (a) 2.41g (b) 24.1g (c) 71.5g (d) 24.1mol.
22. A gas exerts a pressure of 2.0atm at 30.0°C; in a 10L container in what size container would the same amount of gas exert a pressure of 4.0atm at 20 °C.
23. A 0.10mol sample of oxygen occupies 2.0L, what volume would be occupied by 0.25mole of oxygen? Bothe sample are at the same temperature and pressure. (a) 2.5L (b) 5.2L (c) 5.0L (d) 7.5L.
24. If 4.58g of a gas occupies 3.33L at 27oc and 808torr, what is the molar mass? (a) 23.54g (b) 32.7g (c) 58.5g (d) 43.8g.
25. What is the density of methane at 20oc and 2.0atm? (a) 13.3g/L (b) 21.5g/L (c) 1.33G/L (d) 133g/L.
26. What is the enthalpy change when 100g of copper is heated from 10 °C to 100 °C? (a) 90J (b) 3501J (c) 2521J (d) 122J.
27. Balance the following equation in acidic medium. Fe^{2+} + MnO_4^- ------- Fe^{3+} + Mn^{2+}
    (a) 2 MnO_4^- + 5Fe^{3+} + 8H^+ -------- 2 Mn^{2+} + 4OH^- + 5Fe^{2+}
    (b) 5 Fe^{2+} + MnO4- + 8H+ -------- 5 Fe^{3+} + MnO_4^- + 4H_2 (c) MnO_4^- + 5 Fe^{2+} + 8H^+ -------- Mn^{2+} + 4H_2O + 5 Fe^{3+} (d) none of the above.
28. Given from the table that: Anode (ox) reaction: $Zn_{(s)}$ ---------- $Zn^{2+}_{(aq)}$ + 2e- E = +0.70v
    Cathode (red) reaction: $Cu^{2+}_{(aq)}$ + 2e- ---------- Cu(s) E = +0.34v
    Equation: $Zn_{(s)}$/ $Zn^{2+}_{(aq)}$// $Cu^{2+}_{(aq)}$/$Cu_{(s)}$.

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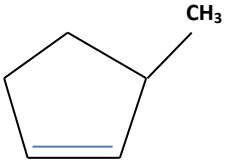
CHM 103

Name these following compounds: **Time: 15mins**

1. CH_3-CH_2-$CH(CH_3)$-CH=CH-CH_3

2.



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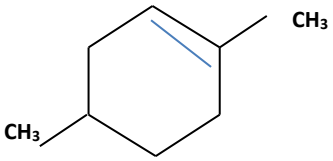
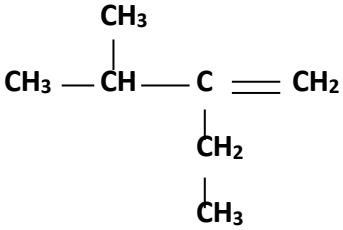


4.



5. The general formular for Alkene is
6. State Markonikof's rule
7. In the fractional distillation of crude oil, central heating fuel i.e diesel oil the range (a) C40-C50 (b) C20-C30 (c) C18-C20 (d) C5-C12
8. Which of the reactions is not a preparation of an alkane (a) Wartz reaction (b) Grignard reaction (c) Halogenation (d) Combustion
9. The technique that is used to refine the oil is called (a) Crystalization (B)Refination (c) Fractional distillation (D) Pyrolysis
10. The hydrocarbon of C20 is called (a) Leucosane (b) Eicosane (c) Bucosane (d) Glucosane
11. Alkyne has the general molecular formular (a) CnHn-2 (b) CnHn+2 (c) CnH2n+2 (d) CnH2n-2
12. The IUPAC name for the copound

CH_3-CH_2-$C(CH_2)$=CH_2

CH_3 (a)He-1-ene(b) 1,1-diethylethene (c) 3-ethylbut-3-ene (d) None

13. The IUPAC names for the compounds CH3CH=CH2 and HOCH2CH2OH are respectively (a) Propylene and ethylene glycol (b) Propene and ethyl alcohol (c) Propene and ethane -1,2-iol (d) Propylene and ethane -1,2-diol
14. HOOL-(CH2)2-COOH, What is the functional group in this compound? (a) Carboxylic group (b) Methyl group (c) Alkanoic group (d) All of the above
15. (a) 1-bromo-1-chloro-2,2,2-trifloroethane (b) 2-bromo-2-chloro-1,1,1-trifloroethane (c) 2-chloro-2-bromo-1,1,1-trifloroethane (d) None of the above
16. (CH3)3N is N,N-dimethylaminoethane. True/False
17. C(CH3)4 is tetramethylmethane True/False
18. Name for the Structure is O-xylene True/False
19. Name is Methoxybenzene True/False
20. Name is 1,5-dihydroxylbutanoic acid True/False