FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA. DEPARTMENT OF MATHEMATICS.
MTS 104(MECHANICS) CONTINUOUS ASEESSMENT TEST. 2017/2018 SESSION.
ANWER ALL QUESTIONS. TIME ALLOWED: 1 HOUR

QUESTION 1 (A)
A particle moves along a curve with parametric equations $x = 3t^2, y = t^2 - 6t, z = 4t - 7$. Find the components of the velocity and acceleration in the direction $P = (2i - 4j + k)$ at 10 seconds.

QUESTION 1 (B)
A male student of FUNAAB was running and had half the kinetic energy of a female student of FUNAAB whose mass is half that of her male counterpart. The male student speeds up $1m/s$ so as to have the same kinetic energy as that of the female student. What is the speed of the male student?

QUESTION 2(A)
A particle moves with velocity $V = (10i - 6j + 10k)m/s$ under the influence of a constant force $F = (20i + 20j + 20k)N$. Calculate the instantaneous power applied to the particle.

QUESTION 2 (B)
A position dependent force $F = (6 - 4x + 18x^2)N$ acts on a small object of mass $2Kg$ to displace it from $x = 0$ to $x = 3m$. Calculate the work done.

$y + 16 +$

$\int_0^3 (6 - 4x + 18x^2) = 21$

9

FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA
DEPARTMENT OF MATHEMATICS
2018/2019 SESSION MTS 104 CAT. Time Allowed : 50mins.
INSTRUCTION:Answer all Questions

$K = \frac{24}{9}$

1(a). Aparticle is projected with a speed u and at an angle of elevation α from a point O. Show that at time t after projection, the position vector of the particle relative to O is r, where

$$r = (ucos\alpha)ti + [(usin\alpha)t - \frac{1}{2}gt^2]j$$

and i and j are unit vector directed horizontal and vertically upwards respectively.

(b). Given that $u = 40ms^{-1}$ and that the particle strikes a target A on the same horizontal level as O, where $OA = 60m$. Find the least possible time, to the nearest tenth of a second that elapses before the particle hits the target. $(g = 10ms^{-2})$. -1.5

$K.E = \frac{1}{}$

2. Two bodies having masses of $6kg$ and $15kg$ and travelling along the same straight line level path, have respectively velocities of $12ms^{-1}$ right to left and $6ms^{-1}$ left to right, when they collide. The coefficient of restriction e is -0.85. Calculate the two final velocities and the energy loss due to the collision. -23.5 formula

20/10/2011

Mojuzgollah

DEPARTMENT OF AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

UNIVERSITY OF AGRICULTURE, ABEOKUTA: AEM 102: PRINCIPLES OF ECONOMICS

Name.....Department.....Mat No.....

Instruction: Answer ALL questions . Time Allowed: 20 Minutes Option B

1. Disposable income is (a). the same as real income (b). the same as money income (c)calculated by subtracting government purchases from NNP (d). none of the above

2 At prices above the equilibrium there will be (a) shortages (b) surplus (c)equilibrium (d) substitution

3 A price floor results in (a) shortages (b) excess supply (c)excess demand (d) black market

4. When income elasticity of demand of a commodity is less than zero, the commodity is

(a) normal good (b) inferior good (c) elastic (d) luxury good

5. If increase in the price of gari causes the quantity of yam demanded to fall, then yam and gari are said to be. (a) Complements (b) Substitutes (c) luxury (d) inferior

6. The slope of the PPF at any given point is called the (a) marginal rate of transformation (b) marginal rate of substitution (c) marginal rate of income (d) marginal rate of translation.

7. In the equation C =50 +0.9yd, the autonomous consumption (Intercept) is (a)0.9 (b) 50 (c) 45 (d) 59

8. The ability of labour to increase output without increasing the quantity of labour is called labour (a) Demand (b) Supply (c) scarcity (d) efficiency

9. Labour wages can be determined by (a) hours of work (b) cost of training (c) Job Demand (d) population

10. In the measurement of national income, only final goods and services are included to

(a) ensure that non market transactions are included (b) avoid double counting (c) devalue intermediate goods (d) appreciate intermediate goods

11. The total value of goods and services produced by all residents of a country in a year is referred to as (a) personal income (b) Gross Domestic Product (c) Gross National Product (d) National Income

12. The total value of goods and services produced by all nationals of a country in a year is referred to as (a) Gross National Product (b) Gross Domestic Product (c) National Income (d)Personal Income

13. GNP measures (a) the market value of all final output produced during a year (b) the amount of money received as wages and salaries (c) the total current annual expenditures for the nations output (d) all of the above

14. General demand deficiency causes (a) structural (b) mass (c) frictional (d) cyclical unemployment

15. Consequences of unemployment include (a) divestment (b) Instability (c) high dependency (d) migration

16. The standard of living of a country can be measured using per capita (a) income (b) tax (c) policy (d) index

17. All the following are markets except (a) labour market (b) capital market (c) retail market (d) Price market

18. When income elasticity of demand of a commodity is greater than one, the commodity is

(a) normal good (b) inferior good (c) giffen good (d) inelastic

19. Basic economic decisions as a result of Problem of scarcity does not include (a) what to produce (b)how to produce (c) for whom to produce (d) how to consume.

20. In the equation C =50 +0.9yd, consumption is 950 when Yd is (a)2000 (b)250 (c)1000 (d)1050

21. The demand curve is negative because as the price increases, the quantity demanded (a) decreases (b) Increases (c) all of the above (d) none of the above

22. In the equation Qd =f(p), the variable P is the (a) dependent (b) independent (c)economic (d)dummy

23. The income elasticity for a luxury good is..... while that of a necessity is.....

(a) > 1; > 0 (b) > 1; < zero (c) < 1; >0 (d) =1; >0

24. Frictional unemployment exists when (a) there is a fall in aggregate demand (b) workers are seasonally unemployed (c) workers lack the skills necessary to be employed (d) None of the above

25. Individuals, firms, governments and societies make choices due to (a) Scarcity (b)Supply (c) demand (d) none of the above

26. The total number of workers that are being engaged by employers at a particular time is referred to as labour (a) Demand (b)Supply (c) scarcity (d) equilibrium.

27. A change in supply denotes (a) change in the quantity (b) a shift in the demand curve (c) change in the price (d) a shift in the supply curve

28. Profit is a major feature of (a) a market economy (b) a socialist economy (c) a traditional economy (d) an authoritarian economy.

29 The consumer must possess a coupon in addition to having the willingness and financial capacity to purchase a good or service under (a) government regulation (b) capitalism (c) rationing (d) socialism.

30. When the quantity demanded equals quantity supplied there is (a) substitution (b) equilibrium (c) transformation (d) marginalization.

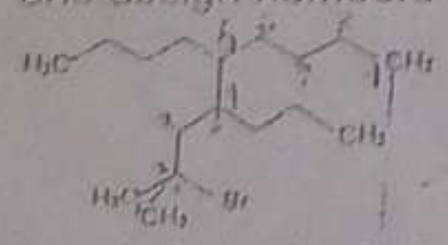
C = 50 + 0.9yd

950 = 50 + 0.9yd

UNIVERSITY OF AGRICULTURE, ABEOKUTA
COLLEGE OF NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY
2009/2010 SECOND SEMESTER COUNTINOUS ASSESSMENT TEST
CHM 102: INTRODUCTORY ORGANIC CHEMISTRY — TIME ALLOWED 30 MIN

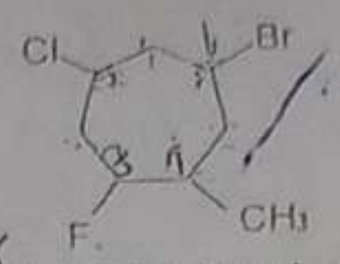
NAME..... MATNO..... DEPT.....

1. Alkanes form a homologous series of ---------- corresponding to general molecular formular ---------- (a) saturated hydrocarbon / C_nH_{2n+2} (b) unsaturated hydrocarbon / C_nH_{2n} (c) unsaturated hydrocarbon / C_nH_{2n+2} (d)unsaturated hydrocarbon / C_nH_{2n}
2. Which of the following does not represent an alkane? (a) C_6H_{14} (b) $C_{13}H_{28}$ (c) $C_{10}H_{36}$ (d) $C_{19}H_{40}$
3. How many straight-chain dichloroalkanes correspond to the formular $C_4H_8Cl_2$? (a) 3 (b) 6 (c) 4 (d) 8
4. Which one of the following groups of products is formed when methane and chlorine are mixed in the dark? (a) Carbon powder + HCl (b) $CHCl_3$, CH_2Cl_2, CCl_4 (c) CH_3 + HCl (d) no products are formed
5. Which one of the following alkanes $C_5H_2CH(CH_3)_2$ (d) $(CH_3)_3CCH(CH_3)_2$
6. Ethane can take in two hydrogen atoms or their equivalent to give a single addition product. This is because ethane is (a) unsaturated as it possesses a double bond in the molecule (b) unsaturated as it possesses a triple bond in the molecule (c) an extremely reactive gas (d) an hydrocarbon
7. How many isomers does C_4H_{10} have? (a) 1 (b) 2 (c) 3 (d) 4
8. Blood sugar is another name for what? (a) lactose (b) fructose (c) glucose (d) sucrose
9. Carbobydrate have general formular of $C_n(H_2O)_m$. Which of the following compounds have its n = m? (a) glycogen (b) fructose (c) glucose (d) sucrose
10. A chiral carbon is a carbon having how many groups attached to it? (a) 1 (b) 2 (c) 3 (d) 4
11. D- Glucose, D- Galactose and D- Fructose are the 3 main ---------- in biological world? (a) heptoses (b) hexoses (c) pentoses (d) tetroses
12. In heterocylic manosaccharides, a 5 ring compound is called (a) pentanal (b) pentanone (c) furanose (d) pyranose
13. A disaccharide having D- Galactopyranose and D- Glucopyranose joined together by β- 1, 4 glycosidic bond is called what? (a) lactose (b) maltose (c) glucose (d) sucrose
14. Among the most common amino acids, how many have non polar side chains? (a) 3 (b) 4 (c) 9 (d) 6
15. GABA is found in brain and is another name for what? (a) 4- Amino butanoic acid (b) 2- Amino pentanoic acid (c) 4- gluco butanoic acid (d) 2- Amino butanoic acid
16. Consider the parent chain in the structure given below and assign numbers to the substituents



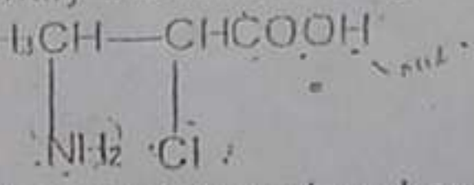
a. 1, 1, 1, 3, 4 b. 5, 6, 8, 8, 8 c. 5, 6, 8, 8 (d) 2, 2, 4, 5

17. What is the name of the cycloalkane drawn below?



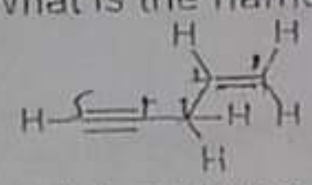
(a) 1-bromo-6-chloro-4-fluoro-3-methylcycloheptane b. bromo-6-chloro-1-fluoro-2-methylcycloheptane c. chloro-3-bromo 5-methyl- 6-fluorocycloheptane d. bromo-1-chloro-6-fluoro-5-methylcycloheptane

18. The hybridized state of carbon in octene is? a. sp (b) sp^2 c. sp^3 d. d^2sp^2
19. Identify the functional groups in the compound below



a. chloro, amide and carboxylic acid groups (b) chloro, amine and carboxylic acid groups c. chloro, amine, carbonyl and hydroxyl groups d. chloro, amide, carbonyl and hydroxyl groups

20. What is the name of the compound drawn below?

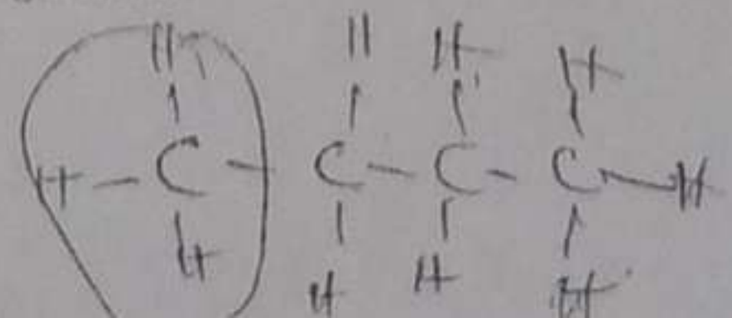


(a) pent-1-en-4-yne b. pent-4-en-1-yne c. pentene-yne d. penyine-1-ene

21. What is the approximate H-C-H bond angle methane? (a) 109° b. 120° c. 180° d. 170°
22. What is the IUPAC name for isobutane? a. isopropylmethane b 3-methylbutane c. methylpropane d. 3-methylpentane
23. Alcohol molecules are stabilized by---------- bond Covalent (b) ionic (c) chemical (d) H
24. In cabonyl compounds the bond between C and O made up of------ bond (a) α and β (b) σ and π (c) π and ψ (d) θ and β
25. The structure RCHOH indicates ------- alcohol, Primary (b) secondary (c) Tertiary (b) simple

When vapour X is passed over Cu catalysts liquid produced either in the presence or absence of air

26. Liquid Y is (a) aldehyde (b) alcohol (c) ketone methanol
27. Vapour Y is (a) methanol (b) alcohol (c) ketone aldehyde
28. Dehydration of alcohol at a temperature betw <150°C yields (a) olefin (b) alkanes (c) ether hydrogen
29. The stability of the phenoxide ions is an indicatio phenol being (a) acidic (b) basic (c) monoproti electrophilic
30. The process of producing ethanol from sugar or si is (a) Oxidation (b) evaporation (c) Fermentatio hydrogenation



DEPARTMENT OF CHEMISTRY,
UNIVERSITY OF AGRIC., ABEOKUTA, NIGERIA.
SECOND SEMESTER G.A.T. 2009/2010 SESSION

CHM 102: INTRD. TO ORGANIC CHEMISTRY *INSTRUCTION: Attempt all questions* *Duration: 30 min.*

<1> Another name for glucose is ----------?
(a) Maltose (b) Pentose (c) Aldose (d) Dextrose.

<2> The name given to a disaccharide having 2 units of D – glucopyranose joined by a glycosidic bond is ----------?
(a) sucrose (b) glucose (c) maltose (d) lactose

<3> Glycogen is a reserved carbohydrate for animals and can be mostly found in where?
(a) liver and muscle (b) Stomach and bladder
(c) liver and stomach (d) bladder and muscle

<4> Why is cellulose insoluble in water? Because:
a) there are not enough 'OH' group on the surface
b) there are excess 'OH' group on the surface
c) there are not enough 'H' group on the surface
d) there are excess 'H' group on the surface

<5> The most common three amino acids are?
) D- glucosamine, D- monosamine and D- galactosamine
) L- glucosamine, L- monosamine and D- galactosamine
) L- monosamine, D- monosamine and β- galactosamine
) L- galactosamine, D- galactosamine and β- galactosamine

<6> Which of the following is mostly found in skin, bones, hair and nails?
(a) keratin (b) aminobasic (c) glycogen (d) glucose

<7> 2-methyl propan-2-ol is an example of ---------- alcohol
primary (b) secondary (c) tertiary (d) quaternary

<8> An opened bottle of wine tastes sour when left in the air a few days because the wine has,
turns to alkali (b) oxidized to carboxylic acid
turns to vinegar (d) fermented

<9> Ethanol can be made from carbohydrates in a process vn as
(a) fermentation (b) decomposition (c) distillation
lehydration

<10> Methanol can be produced from
catalytic hydration of alkene (b) distillation
ydroxylation of alkane
atalytic hydrogenation of carbon monoxide

<11> The most common valency of an atom is determined by
ectron (b) number of unpaired electrons
ound state (d) excited state.

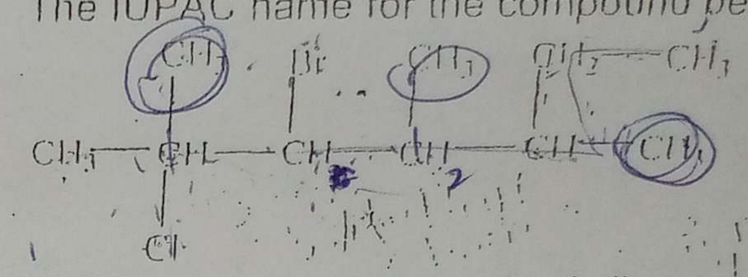
<12> ----------is achieved by blending 2s electron with the 3 2p ons
) (b) sp^2 (c) sp^3 (d) none.

<13> How many p-orbitals unaffected during sp^3 hybridization
(a) 0 (b) 4 (c) 2 (d) 6

<14> In an sp^2 hybridization, geometry and angle of inclination are ---------- and ---------- respectively
(a) planar/ 120° (b) planar/109° (c) tetrahedral/120°
(d) tetrahedral/109°

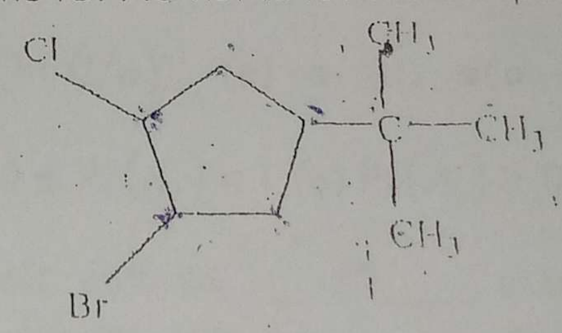
<15> The sp orbitals are ---------- opposed, so that the ---- between the electrons are minimized
(a) highly/attractive (b) angularly/repulsive
(c) non-linearly/repulsive (d) linearly/repulsive

<16> The IUPAC name for the compound below is



(a) 2-Chloro-3-bromo-2,4-dimethyl-5-ethylhexane
(b) 3-Bromo-2-chloro-5-ethyl-2,4-dimethylhexane
(c) 3-Bromo-2-chloro-2,4,5-trimethylheptane
(d) 3-Bromo-2-chloro-2,4-dimethylheptane

<17> The IUPAC name for the compound below is



(a) 1-Chloro-2-bromo-4-isobutylpentane
(b) 1-Bromo-2-chloro-4-neobutylpentane
(c) 1-Chloro-2-bromo-4-neobutylpentane
(d) 1-Bromo-2-chloro-4-isobutylpentane

<18> Arrange the following compounds in order decreasing boiling point
(a) $CH_2CH_2CH_2CH_3$ (b) $CH_3CH_2CH_2CH_2CH_2CH_3$
(c) $CH_3(CH_2)_8CH_3$
(a) a,b,c (b) a,c,b (c) b,a,c (d) c,b,a

<19> The technique used to separate crude oil into differe components is called:
(a) Extraction (b) Refinery (c) Cracking (d) Fraction distillation

<20> In the reaction:
$CH_3CH(CH_3)_2 + Br_2 \longrightarrow$ monobromoalk
Which of the following are the possible monobromoalkan products formed?
(a) 2-bromo-2-methylpropane and 2-bromobutane
(b) 1-bromo-2-methylpropane and 2-bromopropane
(c) 1-bromo-2-methylbutane and 1-bromo-2-methylpropane
(d) 1-bromo-2-methylpropane and 2-bromo-2-methylpropane

FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA, COLLEGE OF PHYSICAL SCIENCES, DEPARTMENT OF STATISTICS, 2017/2018 2ND SEMESTER TEST STS 112

1.) The procedure of putting a measure on uncertainty is called (a) Odds (b) Likelihood (c) Probability (d) a and b (e) b and c

2.) A collection of well defined objects is (a) Subset (b) Proper set (c) Set (d) Sample space (e) c & d

3.) If $\Omega = \{a, b, c, d, e\}$ and $A = \{b, c\}$, then A is (a) Sample point (b) Event (c) $\subseteq \Omega$ (d) b & c (e) a,b,c

4.) Evaluate ${}^{6}C_{2}$ (a) 12 (b) 15 (c) 9 (d) 20 (e) 10

5.) The total collection of all subset of a set is called (a) Subset (b) Proper set (c) Set (d) Power set (e) c & d

6.) A procedure whose outcome cannot be predicted is said to be (a) a characteristics (b) a random variable (c) random (d) a variable (e) an attributes

7.) If a set has three sample points, the total points in its power set is (a) 9 (b) 8 (c) 27 (d) 10 (e) 12

8.) If a coin is tossed four times, how many ways can we have two heads (a) 4 (b) 5 (c) 6 (d) 7 (e) 8

(9) Power set and ____ are synonymous (a) finite set (b) countable set (c) sigma algebra (d) ring (e) a & b

(10) All the following are correct except (a) $N \subseteq Z^{+}$ (b) $\infty \notin Q$ (c) $\sqrt{2} \in I$ (d) $\Re \subseteq I$ (e) $\infty \in \Re$

(11) If $A = \{6,7,8\}$ and $B = \{3,4,7\}$, find $A \Delta B$ (a) $\{3,6\}$ (b) $\{6\}$ (c) $\{3,4\}$ (d) $\{3,4,6\}$ (e) $\{3\}$ $\{3,$

(12) For the product space of set A and B to be distinct then A and B must be (a) Random (b) Attributes (c) vectors (d) variable (e) Random variable

(13) In addition to satisfying closure, Association, Identity, Inverse rule; a set G and an operation $\otimes$ is said to be a group if G is (a) Power set (b) Sigma set (c) non-empty set (d) Proper set (e) singleton

(14) If $a \in G$ then the multiplicative inverse of a is (a) $1/a$ (b) $(1/a)^{-1}$ (c) $-a$ (d) $a(a-1)+a$ (e) 1

(15) Which of the following are the same (a) $\Pr(\{\ \}) = 0$ (b) $0 \le \Pr(A_i) < 1$ (c) $\Pr(A_i) \ge 0$ (d) a&c (e) b& c

A sample space is a list of ___16___ elements from a well defined ___17___ that is obtained from ___18___ (16) (a) most (b) some (c) few (d) all (e) many

(17) (a) power set (b) set (c) non empty set (d) subset (e) proper set

(18) (a) a random outcome (b) a trial (c) an experiment (d) Procedure (e) Event

(19) If $A = \{1,2,3,4\}$ and $B = \{2,4,6,8\}$, provided $A \cup B \in \Omega$ find $\Pr(A \cap B)$? (a) $1/2$ (b) $3/4$ (c) $1/3$ (d) $2/3$ (e) $3/8$

(20) If $A = \{1,2,3,4\}$ and $B = \{2,4,6,8\}$, provided $A \cup B \in \Omega$ find $\Pr(A \cap B^{c})$? (a) $1/2$ (b) $3/4$ (c) $1/3$ (d) $2/3$ (e) $3/8$

(21) Find y' if $y = \sin^{-1}(m \sin x)$ (a) 2 (b) 1 (c) $1/2$ (d) m (e) $m/2$

(22) $\int 2(x - \sin 2x)dx$ (a) $2(x^2 - \cos 2x)$ (b) $2(x^2 + \cos 2x)$ (c) $(x^2 + \cos 2x)$ (d) $(x^2 - \cos 2x)$ (e) $(x - \cos 2x)$

(23) Discrete random variables assigns___ to outcomes of an experiment (a) Z^- (b) Z^+ (c) Z (d) Q (e) I

(24) Supposing the decision to switch between drug A and B at follow up can only be allowed twice, how many sample points do we have for patients that do not switch at all (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

(25) The following notation are required to explain variables that are nominal or ordinal except

(a) - (b) + (c) < (d) ≤ (e) ⊗

(26) The series $p\sum_{x=0}^{n}\left[1 + qe^{it} + qe^{2it} + \ldots\ldots + \right]$ defines (a) sum of negative binomial characteristics function (b) expectation of binomial characteristics function (c) sum of geometric characteristics function (d) expectation of geometric progression (e) None of the above

(27) What is the common ratio of the series $\sum_{x=0}^{n}\left[1 + qe^{it} + qe^{2it} + \ldots\ldots + \right]$ (a) 1 (b) qe^{it} (c) qe^{2it} (d) qe^{3it} (e) q

(28) What is the sum to infinity of $p\sum_{x=0}^{n}\left[1 + qe^{it} + qe^{2it} + \ldots\ldots + \right]$?

(a) pq^x (b) pq^{it} (c) $p(1 - qe^{it})^{-1}$ (d) $p(1 - qe^{it})$ (e) $pe^{it}(1 - q)$

(29) What is the mean and variance of the series $p\sum_{x=0}^{n}\left[1 + qe^{it} + qe^{2it} + \ldots\ldots + \right]$?

(a) q/p; q/p^2 (b) q/p^2; q/p^3 (c) q/p^2; pq (d) q/p^2; q/p (e) q/p^2; p/q

(30) The mean and variance of a binomial distribution is (a) np, np^2 (b) npq, np (c) $np, np(1-p)$ (d) np^2, npq (e) np, nq

(31) The characteristics function of a negative binomial is

(a) $(pe^{it} + q)^r$ (b) $p(1 - qe^{it})^r$ (c) $[p(1 - qe^{it})]^r$ (d) $[p(1 - qe^{it})^{-1}]^r$ (e) $[p(1 - qe^{it})^{-1}]^{-r}$

(32) The sum to ∞ of $\left[1 + \lambda + \lambda^2/2! + \lambda^3/3! + \ldots\ldots + \right]$ (a) $\exp(-\lambda)$ (b) $\exp(\lambda)$ (c) $e^{-\lambda}$ (d) $e^{2\lambda}$ (e) $\exp(\lambda^n/n!)$

(33) The mean and variance of poisson (λ) distribution is (a) λ, λ^2 (b) λ^n, λ^{2n} (c) λ^2, λ^2 (d) λ, λ (e) $\lambda, 2\lambda$

(45) The function $\phi(t) = e^{4(e^t - 1)}$ has mean and variance of (a) 4,2 (b) 2,4 (c) 4,4 (d) 2,2 (e) $\frac{1}{2}, \frac{1}{4}$.

(46) If $\chi^2(10)$; find the confidence interval c_1 and c_2 such that $\Pr(c_1 < \chi^2 < c_2) = 0.95$; (a) 2.7, 19 (b) 3.82, 21.9 (c) 3.25, 20.5 (d) 3.25, 18.3 (e) 3.94, 18.3.

(50) Let X has the pdf $f(x) = \frac{1}{\beta^2} x e^{-x/\beta}$; $\beta > 0$; find β if the mode=2 (a) 5 (b) 4 (c) 3 (d) 2 (e) 1

(51) If $X \sim N(75,100)$; find Pr(70 < X < 100); (a) 0.309 (b) 0.691 (c) 0.685 (d) 0.994 (e) 0.315.

(52) If $X \sim N(0,1)$; find b if Pr(-b < X < b)=0.853 (a) -1,1.05 (b) -1.05, 1.05 (c) -1.1, 1.1 (d) -2,2 (e) -1, 1

(53) If e^{3t+8t^2} is the MGF of the RV X find Pr(-1 < X < 9) (a) 0.977 (b) 0.777 (c) 0.023 (d) 0.999 (e) 0.976

(54) Let X and Y be RV with $\mu_X = 1$ and $\mu_Y = 4$ find the mean of 3X-4Y (a) 3 (b) 5 (c) -5 (d) -3 (e) -2.

(55) If $\chi^2(5)$; find the confidence interval c_1 and c_2 such that $\Pr(c_1 < \chi^2 < c_2) = 0.95$; (a) 0.484, 11.1 (b) 1.24, 14.4 (c) 0.831, 12.8 (d) 1.15, 11.1 (e) 0.831, 11.1

(56) Let X has the pdf $f(x) = 1$; 0<X<1; find the pdf of y. If $Y = -2 \ln X$ (a) gamma(1,2) (b) gamma(2,2) (c) gamma(2,1) (d) $\chi^2(1)$ (e) $\chi^2(0.5)$

(57) Given a pivotal quantity $T = \frac{\bar{x} - \mu}{s/\sqrt{n-1}}$; find the margin of error for μ within the confidence interval $[a;b]$; if $a = -b$ (a) $\pm \frac{as}{\sqrt{n-1}}$ (b) $\frac{1}{2}\left|\frac{bs}{\sqrt{n-1}}\right|$ (c) $2\left|\frac{bs}{\sqrt{n-1}}\right|$ (d) $\left|\frac{bs}{\sqrt{n-1}}\right|$ (e) 2b

(58) Given a population size 5, from N(3,3), what is the standard error from a sample of size 2

(a) $\sqrt{6}$ (b) $\frac{\sqrt{6}}{2}$ (c) $\frac{\sqrt{6}}{3}$ (d) $\frac{\sqrt{6}}{4}$ (e) $\frac{\sqrt{6}}{5}$

MTS 101

FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA

DEPARTMENT OF MATHEMATICS MTS101 – ALGEBRA (2012/2013) CAT

1. List the members of the set $\{x \in \Re : x^2 + 1 = 0\}$

   A. $\emptyset$ B. $\{1\}$ C $\{-1, 1\}$ D. $\{i, -i\}$.

2. List the members of $\{x : x^2 = 16 \text{ and } 3x = 9\}$

   A. $\{3,4,-4\}$ B. $\emptyset$ C. $\{-4,4\}$ D. $\{3\}$

3. Of a group of 200 persons, 100 are interested in Music, 70 are interested in Photography and 40 like skiing. Also, 40 are interested in both Music and photography, 30 in both Music and skiing, 20 in both photography and skiing, while 20 are interested in photography but not in Music or skiing. How many persons are interested in all the three?

   A. 9 B. 10 C. 11 D. 12

4. $2(3\sqrt{5}-4)^{-2}$ equals

   A. $\frac{122}{841} - \frac{48}{841}\sqrt{5}$ B. $\frac{1}{841}(122+48\sqrt{5})$ C. $\frac{48}{841} - \frac{122}{841}\sqrt{5}$ D. $\frac{81}{841}(48+122\sqrt{5})$

5. Solve the equation $\sqrt{3x+1} - 1 = \sqrt{x+4}$

   A. 0 B. 2 C. 3 D. 5

6. Find x, if $2^{3x+1} - 5^{x+1} = 0$

   A. 1.92 B. 1.93 C. 1.94 D. 1.95

7. Simplify $\frac{4^{-x}.16^{2x-2}}{4^{2x-3}.128}$

   A. 2^{2x+9} B. 2^{2x-9} C. 2^{3x+9} D. 2^{3x-9}

8. Solve the simultaneous equations for $x + y$

$$2^x.4^{-y} = 2$$
$$3^{-x}.9^{2y} = 3$$

   A. 1 B. 2 C. 3 D. 4

9. Solve completely for a, $9\log_a 5 = \log_5 a$

   A. 5^3 or 5^{-3} B. 3^5 or 3^{-5} C. 3^5 or 5^3 D. 3^5 or 5^{-3}

10. Simplify $\log_a b + \log_a bx + \log_a bx^2$

    A. $\log_a b - \log_a x$ B. $\log_a b + \log_a x$ C. $3(\log_a b - \log_a x)$ D. $3(\log_a b + \log_a x)$

11. Find the remainder when $4x^3 - 7x^2 + 2x + 5$ is divided by x-3

    A. 56 B. -56 C. -160 D. 20

12. Find the factors of $x^3 + 3x^2 - 4x - 12$

    A. (x-2)(x+2)(x-3) B. (x+2)(x-2)(x+3) C. $(x-2)^2(x-3)$ D. $(x^2+4)(x-3)$

13. Given that (x+3y) is a factor of $+6x^2y + 11xy^2 + 6y^3$, factorise the expression completely.

    A. (x+3y)(x-y)(x+2y) B. (x-3y)(x+y)(x-2y) C. (x+3y)(x+y)(x+2y) D. (x+3y)(x+y)(x-y)

14. Find the value of k if (x+1) is a factor of $x^3 + 5x^2 + kx + 3$, then find the other factors of the expression

    A. k=7, (x+1)(x+3) B. k=0, (x+1)(x+3) C. k= -7, (x+1)(x+3) D. k=1, (x-1)(x-3)

15. Find the values of a and b if (x+1) and (x+2) are both factors of $x^3 + ax^2 + bx + 8$

    A. $(-7,-14)$ B. $(7,-14)$ C. $(-7,14)$ D. $(7,14)$

16. Find the value of λ for which the equation $x^2 - x + 1 = \lambda(x^2 + x + 1)$, where $\lambda \neq 1$, has equal roots.

A. $(\frac{1}{3}, -3)$ B. $(\frac{1}{3}, 3)$ C. $(-\frac{1}{3}, 3)$ D $(-\frac{1}{3}, -3)$

17. The roots of (x-1)(x-2) = p are equal. Find the value of p.

A. $1/4$ B. $1/2$ C. $-1/2$ D. $-1/4$

18. Find the range of values of λ for which the equation $x^2 - x + 1 = \lambda(x^2 + x + 1)$, where $\lambda \neq 1$, has real and unequal roots.

$3 < \lambda < -\frac{1}{3}$ B. $-\frac{1}{3} < \lambda < -3$ C. $\frac{1}{3} < \lambda < 3$ D. $3 < \lambda < 1/3$

19. If α and β are the roots of the equation $px^2 + qx + r$, find in terms of p, q and r, the values of $\alpha^2 + \beta^2$.

A. $\frac{q^2+2pr}{p^2}$ B. $\frac{q^2-2pr}{p^2}$ C. $\frac{-q^2+2pr}{p^2}$ D. $\frac{-q^2-2pr}{p^2}$

20. The roots of $3x^2 + 8x + 5 = 0$ are α and β. Find the quadratic equations with α^2 and β^2.

A. $x^2 - 34x + 25 = 0$ B. $9x^2 + 34x + 25 = 0$ C. $9x^2 + 34x + 25 = 0$ D. $x^2 - 34x - 25 = 0$

	A	B	C	D
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	A	B	C	D
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University of Agriculture, Abeokuta,
Department of Mathematics^a, 2011/2012 MTS 101 CAT
INSTRUCTION: Answer ALL Time:40 minutes

1. Which of the following is not true for sets A, B and C.
(a) $A \cap (B \cap C) = (A \cap B) \cap C$ (b) $A \cup (B \cup C) = (A \cup B) \cup C$
(c) $A \triangle (B \triangle C) = (A \triangle B) \triangle C$ (d) none of the above.

2. Solve $\frac{1}{2-x} < 3$ and give the solution set as an interval or union of intervals. (a) $(2, \infty)$ (b) $(-\infty, \frac{5}{3})$ (c) $(\frac{5}{3}, 2)$ (d) $(-\infty, \frac{5}{3}) \cup (2, \infty)$

3. Evaluate $log_y 3^y$. (a) y^3 (b) $\frac{1}{3}$ (c) y (d) 3.

4. Solve the equation $3^x = 7.83$ (a) $x = 0.8938$ (b) $x = 0.4771$
(c) $x = 3$ (d) $x = 1.87$

5. Let $A = \{1, 2, 3, 6, 8\}, B = \{2, 5, 6, 7, 9\}$ and $C = \{4, 5, 6, 8\}$ be sets, then find $B \triangle (A \cap C)$. (a) $\{2, 5, 7, 9\}$ (b) $\{6, 8\}$ (c) ϕ
(d) $\{2, 5, 7, 8, 9\}$.

6. The element(s) of the set $Y = \{x | x^2 + 5x - 14 = 0\}$ is/are (a) -2
(b) -7 (c) $-2, -7$ (d) $-7, 2$

7. Evaluate $81^{\frac{1}{2}} \times 9^{\frac{-1}{2}}$. (a) $\frac{1}{3}$ (b) 3 (c) 1 (d) 9.

8. Simplify $\frac{8.2^{n+1} - 2^{n+2}}{2^{n+3} - 2^n}$. (a) $\frac{12}{17}$ (b) $\frac{4}{3}$ (c) $\frac{6}{7}$ (d) $\frac{3}{4}$.

9. The power set of the set $B = \{1, 2, 3\}$ is (a) $\{\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}\}$
(b) $\{\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$
(c) $\{\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \phi, \{1, 2, 3\}\}$ (d) None of the above

10. Simplify $(x^4 y^2 z^{-3})^{\frac{1}{2}} (x^5 y^2 z)^{\frac{1}{2}} \div x z^{\frac{7}{2}}$. (a) $x^9 y^4 z^7$ (b) $x^{\frac{-7}{2}} y^2 z^{\frac{9}{2}}$
(c) $x^{\frac{7}{2}} y z^{\frac{9}{2}}$ (d) $x^{\frac{7}{2}} y^2 z^{-\frac{9}{2}}$.

11. *Express $\frac{2}{9}$ as a repeating decimal and use bar to indicate the repeating digit.* (a) $0.\overline{32}$ (b) $0.\overline{13}$ (c) $0.\overline{22}$ (d) $0.\overline{2}$

12. *Express $0.\overline{12}$ as a quotient of integers in lowest terms.* (a) $\frac{4}{33}$ (b) $\frac{2}{13}$
(c) $\frac{3}{14}$ (d) $\frac{1}{11}$

13. *Obtain the rational number represented by 0.14285.* (a) $\frac{7}{11}$ (b) $\frac{1}{7}$
(c) $\frac{5}{7}$ (d) $\frac{6}{7}$

14. *Solve for x in the equation $\sqrt{x+5} = 5 - \sqrt{x}$.* (a) 5 (b) 3 (c) 4
(d) 2.

15. Which of the following is not a subset of $A = \{a, e, i, o, u\}$. (a) $\{a, i, o\}$ (b) $\{e, u\}$ (c) $\{a, e, o\}$ (d) $\{a, e, i, o, u\}$.

16. The set $(A \cup B) \cap (A' \cup C') \cap (A \cup B') \cap (A' \cup C')$ is (a) undefined (b) empty (c) Universal set (d) none of the above.

17. The simplification of set $(A \cup B)' \cup (A' \cap B')'$ gives (a) $A \cup B$ (b) $A \cap B$ (c) Universal set (d) ϕ

18. In a certain gathering of 200 students, 60 percent of them like Economics while 77 percent of them like History. How many of them like both History and Economics. (a) 58 (b) 37 (c) 5 (d) 74.

19. Let $A = \{1, 2, 3, 6, 8\}$, $B = \{2, 5, 6, 7, 9\}$ be sets, then find $A \triangle B$. (a) $\{1, 3, 5\}$ (b) $\{1, 3, 5, 7\}$ (c) $\{1, 3, 5, 7, 8\}$ (d) $\{1, 3, 5, 7, 8, 9\}$

20. Solve the system of inequalities $3 \leq 2x + 1 \leq 5$. (a) $[1, \infty)$ (b) $(-\infty, 2]$ (c) $[1, 2]$ (d) $(1, 2)$

S/N	A	B	C	D
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S/N	A	B	C	D
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NATIONAL ASSOCIATION OF PHYSICS STUDENTS

1ST SEMESTER PREPARATORY EXAMINATION(MTS 101)

JUNE 2010 TIME ALLOWED(HR):v=2t + 8 where v=10

1. Find x if $a^{2x} = T$

   A. $\log_a T^4$ B. $\log_a (a^2/T)$ C. $\log_a (a/T)$ D. $\log_a (a^2/T)$ E. None

2. If $2\log_y x + 2\log_x y = 5$. Find $\log_y x$

   A. ½,2 B. 1,4 C ½,-2 D. 1,-4

3. Find the ranges of values of p for which the roots of the equation $Px^2 + 4(p-1)x + 9=0$ are real roots:

   A. -¼,4 B. ¼,-4 C. ¼,4 D. -¼,-4 E.None

4. Let R and S be two sets such that n(RUS)=60,n(RnS)=8 and n(S)=30. Find n(R):

   A. 36 B. 37 C 38 D. 22

Given that A=(5,10,15,20,25) B=(5,25,125,625) and μ=AuB .Use this data to answer the questions below:

5. Find $A' \cap B'$

   A. {5,25} B. {5,10} C. {10,25} D. {10,15}

6. Find $A' \cap B$

   A. {20,25,125} B. {10,15,25} C. {5,10,15} D. (ϕ)

7. Find $A \cap B'$

   A. {20,25,125} B. {10,15,25} C. {5,10,15,20,125} D. (ϕ)

If α and β are the roots of the equation $x^2 - 2x + 3=0$. Find the equation whose roots are

8. α+2,β+2

   A. $x^2 - 6x+11=0$ B. $2x^2 - 6x+11=0$ C. $x^2+6x-11=0$ D. $x^2-6x-11=0$

9. α-2,β-2

   A. $2x^2+8=0$ B. $x^2+8=0$ C. $x^2+4=0$ D. $x^2-4=0$

10. Expand $(1+2x)^5$ and determine the co-efficient of x^4:

    A. 32 B. 160 C. 80 D. 40

11. If the first three terms of the expansion of $(1+ax)^n$ in ascending powers of x are $1+12x+64x^2$, Find n and a respectively:

    A. 4/3,9 B. 9,4/3 C. -4/3,9 D. -9,4/3

12. Find the positive square root of 49-12√5

    A. 3√5 – 2 B. 2 - 3√5 C. -3√2 – 2 D. 3√5 +2 E. None

13. In an examination, every student offer History or Geography or both. Out of 500 candidates, 60% took History while 72% took Geography. How many candidates took both courses?

    A. 32 B. 160 C. 132 D. 232 E. None

14. If (3+4√3)(2-a√3)= -18 + 2√3,find the value of a:

    A. 2 B. -2 C. 3 D. -3

15. Solve √(3x+4) - √(x-3) = 3

    A. 4 or 7 B. -4 or 7 C. 4 or -7 D. -4 or -7

FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA

DEPARTMENT OF MATHEMATICS MTS101 – ALGEBRA (2012/2013) CAT

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5. Solve the equation $\sqrt{3x+1} - 1 = \sqrt{x+4}$

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6. Find x, if $2^{3x+1} - 5^{x+1} = 0$

   A. 1.92 B. 1.93 C. 1.94 D. 1.95

7. Simplify $\frac{4^{-x}.16^{2x-2}}{4^{2x-3}.128}$

   A. 2^{2x+9} B. 2^{2x-9} C. 2^{3x+9} D. 2^{3x-9}

8. Solve the simultaneous equations for $x + y$

$$2^x.4^{-y} = 2$$
$$3^{-x}.9^{2y} = 3$$

   A. 1 B. 2 C. 3 D. 4

9. Solve completely for a, $9\log_a 5 = \log_5 a$

   A. 5^3 or 5^{-3} B. 3^5 or 3^{-5} C. 3^5 or 5^3 D. 3^5 or 5^{-3}

10. Simplify $\log_a b + \log_a bx + \log_a bx^2$

    A. $\log_a b - \log_a x$ B. $\log_a b + \log_a x$ C. $3(\log_a b - \log_a x)$ D. $3(\log_a b + \log_a x)$

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    A. 56 B. -56 C. -160 D. 20

12. Find the factors of $x^3 + 3x^2 - 4x - 12$

    A. (x-2)(x+2)(x-3) B. (x+2)(x-2)(x+3) C. $(x-2)^2(x-3)$ D. $(x^2+4)(x-3)$

13. Given that (x+3y) is a factor of $x^3 + 6x^2y + 11xy^2 + 6y^3$, factorise the expression completely.

    A. (x+3y)(x-y)(x+2y) B. (x-3y)(x+y)(x-2y) C. (x+3y)(x+y)(x+2y) D. (x+3y)(x+y)(x-y)

14. Find the value of k if (x+1) is a factor of $x^3 + 5x^2 + kx + 3$, then find the other factors of the expression

    A. k=7, (x+1)(x+3) B. k=0, (x+1)(x+3) C. k= -7, (x+1)(x+3) D. k=1, (x-1)(x-3)

15. Find the values of a and b if (x+1) and (x+2) are both factors of $x^3 + ax^2 + bx + 8$

    A. $(-7, -14)$ B. $(7, -14)$ C. $(-7, 14)$ D. $(7, 14)$

16. Find the value of λ for which the equation $x^2 - x + 1 = \lambda(x^2 + x + 1)$, where $\lambda \neq 1$, has equal roots.

A. $(\frac{1}{3}, -3)$ B. $(\frac{1}{3}, 3)$ C. $(-\frac{1}{3}, 3)$ D. $(-\frac{1}{3}, -3)$

17. The roots of $(x-1)(x-2) = p$ are equal. Find the value of p.

A. $1/4$ B. $1/2$ C. $-1/2$ D. $-1/4$

18. Find the range of values of λ for which the equation $x^2 - x + 1 = \lambda(x^2 + x +$

1), where $\lambda \neq 1$, has real and unequal roots.

A. $3 < \lambda < -\frac{1}{3}$ B. $-\frac{1}{3} < \lambda < -3$ C. $\frac{1}{3} < \lambda < 3$ D. $3 < \lambda < 1/3$

19. If α and β are the roots of the equation $px^2 + qx + r$, find in terms of p, q and r, the values of $\alpha^2 + \beta^2$.

A. $\frac{q^2+2pr}{p^2}$ B. $\frac{q^2-2pr}{p^2}$ C. $\frac{-q^2+2pr}{p^2}$ D. $\frac{-q^2-2pr}{p^2}$

20. The roots of $3x^2 + 8x + 5 = 0$ are α and β. Find the quadratic equations with α^2 and β^2.

A. $x^2 - 34x + 25 = 0$ B. $9x^2 + 34x + 25 = 0$ C. $9x^2 + 34x + 25 = 0$ D. $x^2 - 34x - 25 = 0$

	A	B	C	D
1				
2				
3				
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	A	B	C	D
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