# ENTRANCE TESTFOR ADMISSION INTO UNDER G RADUATE PROFESSIONAL COURSES 2010 

## BIOTECHNOLOGY

DATE:
TME:
DURATION:

THURSDAY, $6^{\text {TH }}$ MAY, 2010
9:30 AM - 11:00 AM
1 HOUR 30 MINUTES

## INSTRUCTIONS

- This test has two parts. Part A and Part B.
- Part A has a total of 70 multiple choice questions. Question 1-70 of Part A is to be answered on the Answer Sheet provided to you and must be returned back at the conclusion of this test.
- Part B has a total of $\mathbf{2 0}$ questions. These questions are to be answered on the question paper itself, in the space provided.
- For each question you may select only ONE answer. Selecting more than one option qualifies as a wrong answer. You can use a pen/pencil for answering the questions.
- Each correct answer in Part A and B carries a weightage of 1 mark while a wrong answer carries a penalty of -0.25 .
- Write the Roll Number given on your Admit Card in the answer sheet and question paper in the space provided.
- Please preserve your Admit Card. It will be required at the time of admission.
- The Admit Card numbers of those shortlisted for admission on the basis of this Entrance Test will be published on the College Notice Boards as well as on the College Web Site on Monday, $10^{\text {th }}$ May, 2010.
- The final admission will be done on a first come, first served basis, after the marksheets of the Class XII examinations of the Meghalaya Board of School Education are available, provided the eligibility criteria as laid down in the prospectus are fulfilled. Shorlisted students from other boards and streams whose Class XII results are declared later will also be considered for admission provided they report not later than 2 days after the result declaration of their respective board examinations along with their marksheets (Original or Downloaded).
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## Directions for Questions 1 to 70:

Choose the best answer in each of the following by marking it on the answer sheet given to you.

1. The physical expression of a trait is called the:
a. Genotype
b. Phenotype
c. Allotype
d. Isotype
2. The chromosome that determines maleness in humans is:
a. w
b. X
c. $Y$
d. Z
3. The region of chromatin that usually undergoes transcription is:
a. nucleosomes
b. heterchromatin
c. both euchromatin and heterochromatin
d. euchromatin
4. Mutation theory was proposed by:
a. Charles Robert Darwin
b. Hugo de Vries
c. Baptiste de Lamarck
d. August Weismann
5. Analogous Structures are the result of:
a. Divergent Evolution
b. Adaptive Radiation
c. Convergent Evolution
d. Radical Evolution
6. What force will change the velocity of a body of mass 1 kg from $20 \mathrm{~m} / \mathrm{s}$ to $30 \mathrm{~m} / \mathrm{s}$ in two seconds?
a. 10 N
b. 5 N
c. 2 kg wt
d. 25 N
7. A passenger in a moving train tosses a coin. If the coin falls behind him, the train must be moving with:
a. an acceleration
b. a deceleration
c. a uniform speed
d. all of these
8. Three resistances each of $4 \Omega$ are connected to form a triangle. The resistance between the terminals is:
a. $12 \Omega$
b. $2 \Omega$
c. $6 \Omega$
d. $8 / 3 \Omega$
9. The radius of the earth is 4 times that of the moon and its mass is 80 times that of the moon. If acceleration due to gravity on the surface of the earth is $10 \mathrm{~m} / \mathrm{s}^{2}$, that on the surface of the moon
it will be:
a. $1 \mathrm{~m} / \mathrm{s}^{2}$
b. $2 \mathrm{~m} / \mathrm{s}^{2}$
C. $3 \mathrm{~m} / \mathrm{s}^{2}$
d. $4 \mathrm{~m} / \mathrm{s}^{2}$
10. A kilowatt hour is the unit of:
a. power
b. energy
c. electric charge
d. electric current
11. The condition when each additional set of chromosomes is identical to the parent species is called:
a. Autopolyploidy
b. Allopolypoidy
c. both (a) and (b)
d. neither (a) nor (b)
12. Organelles involved in extranuclear inheritance are:
a. mitochondria and chloroplast
b. golgi bodies and endoplasmic reticulum
c. lysomes and peroxisomes
d. nucleus and ribosomes
13. A chromosome in which the centromere is located near the end is said to be:
a. Telocentric
b. Acrocentric
c. Submetacentric
d. Metacentric
14. The primary component of middle lamella consists of:
a. cellulose
b. lignin
c. pectin
d. keratin
15. Cytoskeleton is the name given to the distribution of:
a. microtubules and microfilaments
b. microactin
c. microactin and microtubules
d. microfilaments
16. Oxygen consumed in biological oxidation reactions is excreted primarily as:
a. Water
b. ATP
c. Carbon dioxide
d. Pyruvate
17. In humans the main catabolic product of purines is:
a. Ammonia
b. Uric acid
c. Urea
d. Hypoxanthine
18. What is the molarity of $5 \%(\mathrm{w} / \mathrm{v})$ Urea? Its molecular weight is 60 :
a. 0.83
b. 1.2
c. 8.3
d. 0.12
19. The most abundant species of RNA in a typical cell is:
a. Ribosomal RNA (rRNA)
b. Transfer RNA (tRNA)
c. Messenger RNA (mRNA)
d. none of these
20. The place that an animal occupies in a biotic community which expresses its functional status is termed as:
a. Habitat
b. Niche
c. Tropic level
d. Home
21. Those species that are likely to move into endangered category in the near future if the causal factors continue to operate are called:
a. Vulnerable species
b. Rare species
c. Threatened species
d. Endangered species
22. Charles Darwin put forth his theory of Evolution based on his observation of the finches of:
a. Malay peninsula
b. Ireland
c. Galapagos islands
d. Caribbean islands
23. Dividing tissue present in between xylem and phloem of stem in plants is:
a. secondary cambium
b. apical meristem
c. intercalary meristem
d. vascular cambium
24. The tap root of plants is direct prolongation of:
a. Plumule
b. Radicle
c. Stem
d. Cotyledons
25. Transpiration in plants is very low during storms due to:
a. Presence of moisture in the wind
b. Low temperature during storms
c. High velocity of winds
d. High temperature during storms
26. The differentially permeable membrane allows the passage of:
a. water only
b. solvent only
c. solute only
d. selected solutes and solvents
27. Rate of transpiration increases:
a. when there is no light
b. in water
c. when temperature increases
d. in rainy season
28. The metal present in plastocyanin is
a. Cu
b. Fe
c. Zn
d. Mo
29. The blood vessel which collects blood from an organ and opens in an intermediate organ before the heart is called:
a. vein
b. artery
c. portal vein
d. portal artery
30. The outermost covering of the brain in man is called:
a. Duramater
b. Piamater
c. Arachnoid
d. Choroid
31. The focal length of eye lens is controlled by:
a. Vitreous humour
b. Pupil
c. Iris muscles
d. Ciliary muscles
32. Metabolic rate in mammals is controlled by:
a. Pancreas
b. Liver
c. Pituitary
d. Thyroid
33. Reduced secretion of thyroxine in children causes:
a. Acromegaly
b. Cretinism
c. Goitre
d. Myxoedema
34. Fusion of two gametic nuclei is called:
a. Syngamy
b. Karyogamy
c. Amphimixis
d. Fertilization
35. The first phase of embryonic development in animals is:
a. Cleavage
b. Gastrulation
c. Fertilization
d. Gametogenesis
36. One of the following ratios represents a test cross:
a. $3: 1$
b. $9: 7$
c. $1: 2: 1$
d. $1: 1: 1: 1$
37. A gene pair hides the effect of another. The phenomenon is:
a. Epistasis
b. Dominance
c. Mutation
d. None of these
38. Which of the following crosses is suitable for an experiment on linkage?
a. $a \mathrm{aBB} x \mathrm{aaBB}$
b. AABB x aabb
c. $\mathrm{AaBb} \times \mathrm{AaBb}$
d. AAbb x AaBB
39. An exchange of segments between the two non-homologous chromosomes is called:
a. Inversion
b. Polyploidy
c. Translocation
d. Chromosomal aberration
40. Maize has ten pairs of chromosomes. The number of linkage groups are:
a. 20
b. 10
c. 40
d. 5
41. The ionization energy of nitrogen is more than that of oxygen because of:
a. greater attraction of nucleus for electrons
b. the extra stability of half filled $p$-orbitals
c. smaller size of the nitrogen atom
d. more penetrating effect
42. Maximum number of bonds between two atoms of a covalent bond can be:
a. four
b. two
c. three
d. one
43. Which of the following represents the first law of thermodynamics?
a. $q=\Delta E-w$
b. $\Delta H=q+w$
c. $\Delta \mathrm{E}=\Delta \mathrm{H}+\mathrm{P} \Delta \mathrm{V}$
d. $\Delta H=q-w$
44. The pH of a solution is 5.9 . If the hydrogen ion concentration is decreased hundred times, the solution will be:
a. more acidic
b. neutral
c. basic
d. of the same acidity
45. When limestone is burnt in a kiln the resulting product is:
a. Clinker
b. Quick lime
c. Lime mortar
d. Plaster of Paris
46. Molecular formula of Glauber's salt is:
a. $\mathrm{MgSO}_{4} .7 \mathrm{H}_{2} \mathrm{O}$
b. $\mathrm{CuSO}_{4} \cdot 5 \mathrm{H}_{2} \mathrm{O}$
c. $\mathrm{FeSO}_{4} \cdot 7 \mathrm{H}_{2} \mathrm{O}$
d. $\mathrm{Na}_{2} \mathrm{SO}_{4} \cdot 10 \mathrm{H}_{2} \mathrm{O}$
47. Which of the following exist as dimer?
a. $\mathrm{Hg}^{2+}$
b. $\mathrm{Cu}^{2+}$
c. $\mathrm{Hg}^{+}$
d. $\mathrm{Fe}^{2+}$
48. The heat content of $Y$ is greater than that of $X$, the reaction $X \rightarrow Y$ is:
a. spontaneous
b. exothermic
c. endothermic
d. instantaneous
49. The IUPAC name of compound having formula $\left(\mathrm{CH}_{3}\right)_{3} \mathrm{C}-\mathrm{CH}=\mathrm{CH}_{2}$ is:
a. 3,3,3-trimethyl-1-propene
b. 1,1,1-trimethyl-3-propene
c.. 3,3-dimethyl-1-butene
d. 1,1-dimethyl-3-butene
50. Which of the following isomerisms is not exhibited by alkanes?
a. Conformational
b. Chain
c. Position
d. Geometrical
51. An example of derived lipid is:
a. Fats
b. Waxes
c. Phospholipids
d. Cholesterol
52. Acetylene reacts with water in the presence of $\mathrm{Hg}^{2+}$ and acidic medium to give:
a. ethanol
b. ethanal
c. ethane
d. propanol
53. The positron is nearly as heavy as:
a. alpha particles
b. protons
c. electrons
d. deuterons
54. In a chemical reaction equilibrium is said to have been established when the:
a. concentration of reactants and products are equal
b. opposing reactions cease
c. rates of opposing reaction become equal
d. temperature of opposing reactions are equal
55. Twelve grams of $\mathrm{H}_{2} \mathrm{SO}_{4}$ is dissolved in water to make 1200 ml solution. The concentration, in normality, is:
a. 0.061 N
b. 0.102 N
c. 0.022 N
d. 0.204 N
56. Silver is extracted from commercial lead by:
a. Mond's process
b. Parke's process
c. Haber's process
d. Clark's process
57. Bonds can form between atoms when:
a. they acquire higher energy state
b. they get their energy lowered
c. they change their position
d. none of these
58. The chlorination of methane is an example of:
a. elimination process
b. substitution reaction
c. addition reaction
d. oxidation reaction
59. The radioactive isotope of hydrogen is:
a. hydrogen
b. protium
c. deuterium
d. tritium
60. The lowest alkene which is capable of exhibiting geometrical isomerism is:
a. 1-Butene
b. 2-Pentene
c. 2-Butene
d. 2,3-Dimethylbutane
61. Tears contain an antibacterial enzyme called:
a. ribozyme
b. lysozyme
c. ptyalin
d. endonuclease
62. VAM stands for:
a. vascular aboral medicine
b. vermi alluring modification
c. vesicular arbuscular mycorrhizae
d. variance accelerated machine
63. He established the microbiological basis of disease:
a. Anton von Leeuwenhoek
b. Ernst Haeckel
c. Charles Darwin
d. Robert Koch
64. The reactions of the TCA cycle occur in:
a. ribosomes
b. grana
c. mitochondria
d. endoplasmic reticulum
65. Fusion of gametes for the formation of a zygote is called:
a. Syngamy
b. Plasmogamy
c. Isogamy
d. Heterogamy
66. The solution for the equation $-5 x+3=-12$ is, $x=$
a. -3
b. 3
C. 5
d. -5
67. The average of $1.05+0.0025+0.75+12.1+2.0$ is:
a. 3.01
b. 3.4705
c. 3.1805
d. 3.205
68. The solution for the equation $3.75 x+0.5=2.25 x=8$ is, $x=$
a. 3
b. 10
c. -5
d. 5
69. The vitamin which prevents rupturing of the blood vessel and bleeding is:
a. Vitamin E
b. Vitamin C
c. Vitamin K
d. Vitamin $B_{2}$
70. Renal failure generally leads to:
a. Uraemia
b. Haematuria
c. Albuminuria
d. Nephrominuria

## Part B

(1 mark will be awarded for every correct answer, 0.25 will be deducted for every wrong answer)

Direction for questions 1-20: Fill in the blanks:

1. ___ is known as cell drinking.
2. Chromatin fibres are made of repeating units called $\qquad$ .
3. The increased accumulation of toxic substances in food pyramids is called $\qquad$ -
4. $\qquad$ may be made by reacting magnesium with ethyl iodide.
5. The purest form of iron is $\qquad$ .
6. The focal length of a convex lens is 30 cm and the size of the image is a quarter of the objective. The object is at a distance of $\qquad$ -.
7. $\qquad$ is the event that leads to genetic exchange between members of each homologous pair of chromosomes.
8. When a breeding experiment involves only one pair of contrasting traits it is called a $\qquad$ cross.
9. Genes that are present in one chromosome are said to be $\qquad$ .
10. An obstruction of the bile duct causes $\qquad$ .
11. The largest gland of the human body is $\qquad$ -.
12. Mucosal folds present inside the stomach are called $\qquad$ -
13. When a blood clot is formed inside a blood vessel, the condition is called $\qquad$ .
14. Sweat serves to eliminate mainly water and $\qquad$ .
15. The largest part of the human brain $\qquad$ .
16. Orbitals in atoms that have the same energy are called $\qquad$ orbitals.
17. An element having atomic number 34 belongs to the $\qquad$ block of the periodic table.
18. The ionization energy of $\mathrm{Na}^{+}$is $\qquad$ than that of $\mathrm{Mg}^{+}$.
19. Metals are good conductors of electricity due to the presence of $\qquad$ _.
20. An aqueous solution of $\mathrm{N}_{4} \mathrm{HCl}$ is $\qquad$ in nature.
