UNIVERSITY OF HYDERABAD
ENTRANCE EXAMINATION, June 2010
Integrated M.Sc/PhD Biotechnology-A
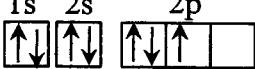
Time: 2 hours **Maximum Marks:75**

INSTRUCTIONS: PLEASE READ BEFORE ANSWERING

1. Enter your hall ticket number on this sheet and the answer (OMR) sheet
2. Answers have to be marked on the OMR answer sheet with ball-point pen following the instructions provided there upon.
3. Hand over both the question paper booklet and OMR answer sheet at the end of the examination.
4. All questions carry one mark each.
5. 0.33 mark will be deducted for every wrong answer.
6. There are total 18 pages (including this page and one separate rough work sheet at the end) in this question paper. Check this before you start answering.
7. The question paper consists of Part "A" and Part "B". The marks obtained in Part "A" will be taken into consideration in case of a tie i.e., when more than one student gets equal marks, to prepare the merit list.
8. Non-programmable scientific calculators are permitted.
9. Cell phones are not allowed

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	Part-A
1	Which of the following sequence expresses correct boiling point? A. pentane > isopentane > neopentane B. isopentane > neopentane > pentane C. neopentane > isopentane > pentane D. neopentane > pentane > isopentane
2	Which one of the following compound is Lewis base? A. aluminum chloride B. boron trifluoride

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	C. diethyl ether D. stannic chloride
3	IUPAC name of $$\text{H}_3\text{C-C-CH}_2\text{-CH-CH}_3$$ with $\text{CH}_2\text{-CH}_3$ group above the C, and Br and CH_3 below A. 2-bromo- 2-ethyl- 4-methyl pentane B. 4-bromo- 4-ethyl- 2-methyl pentane C. 4-bromo- 2,4-dimethyl hexane D. 3-bromo- 3,5-dimethyl hexane
4	What is the product of oxidation of 2-pentanol with dichromate? A. 2-pentanone B. pentanoic acid C. pentaldehyde D. 2-pentene
5	The aldol self-condensation is not possible with A. acetaldehye B. acetophenone C. ketone D. benzophenone
6	Which of the following series of H-atomic spectral lines fall in the region of UV A. Lyman B. Balmer C. Paschen D. Bracket

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7	The electron configuration 1s 2s 2p of
	
	↑↓ ↑↓ ↑↓ ↑ ☐
	
	    A. is ground state of nitrogen atom
	    B. violates Hund's rule
	    C. violates Pauli's exclusion principle
	    D. violates Aufbau principle

8	Oxidation number of Mn in $KMnO_4$ is
	
	    A. +III
	    B. +V
	    C. +VII
	    D. +IX

9	Bronze is an alloy of
	
	    A. copper & zinc
	    B. copper & iron
	    C. copper & nickel
	    D. copper & tin

10	Coordination number of an atom/ion in an octahedral structure
	
	    A. 8
	    B. 6
	    C. 4
	    D. 3

11	Which of the following about atomic/ionic radii is correct?
	
	    A. $Ca < Ca^{2+}$; $Fe < Fe^{2+} < Fe^{3+}$; $Br^- < Br$
	    B. $Ca < Ca^{2+}$; $Fe < Fe^{3+} < Fe^{2+}$; $Br^- < Br$
	    C. $Ca^{2+} < Ca$; $Fe^{2+} < Fe^{3+} < Fe$; $Br < Br^-$
	    D. $Ca^{2+} < Ca$; $Fe^{3+} < Fe^{2+} < Fe$; $Br < Br^-$

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12	Structure of SF_4 is
	A. tetrahedral
	B. square planar
	C. trigonal bipyramidal
	D. see-saw shape

13	Natural rubber is
	A. addition polymer
	B. condensation polymer
	C. copolymer
	D. thermosetting polymer

14	IUPAC name of $[Pt(NH_3)_5Cl]Br_3$
	A. chloro petnaammine platinum (III) bromide
	B. petnaammine chloro platinum (III) bromide
	C. chloro petnaammine platinum (IV) bromide
	D. petnaammine chloro platinum (IV) bromide

15	S_N1 reaction on optically active substrate mainly gives
	A. Inversion of configuration
	B. retention of configuration
	C. racemic product
	D. depends on solvent

16	Which one of the following does not form zwitterion?
	A. betaine
	B. tricine
	C. aspartic acid
	D. pyruvic acid

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17	If half life period of a reaction is independent of its initial concentration, then order of the reaction is A. zeroth order B. first order C. second order D. inverse of half life period
18	What is the temperature of two moles of a gas in a 16 L container under 2 atm pressure? (gas constant $\sim$ 0.08 L atm K^{-1} mol^{-1}) A. 100 K B. 200K C. 400 K D. 800 K
19	In a homogenous mixture of water and ethanol which shows an equilibrium between its liquid and gas phase, what is the number of degree of freedom to express the physical properties of the mixure? A. 4 B. 3 C. 2 D. 1
20	The paramagnetic property of oxygen molecule arises from HOMO with A. unpaired π electrons B. unpaired π* electrons C. paired π electrons D. paired π* electrons

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21	Which of the following has major contribution to the total global warming
	A. CFC, N_2O
	B. CO_2, N_2O
	C. CO_2, methane
	D. methane, CFC

22	Bt. Brinjal is a transgenic brinjal created out of inserting a gene [cry1Ac] from the soil bacterium *Bacillus thuringenesis* into Brinjal.This is served to give Brinjal plant resistance against
	A. Dictyopteran insects
	B. Coleopteran insects
	C. Dipteran insects
	D. Lepidopteran insects

23	Match the followings:

a. L- Tryptophan   i. Auxin synthesis

b. L- Glutamic acid   ii. Pollination

c. L-Methionine   iii. Fruit ripening

d. L-Lysine   iv. Ethylene synthesis

e. L-Histidine   v. Stomata opening

     A. a-i, b-v, c-iv, d-ii, e-iii

     B. a-ii, b-I, c-iii, d-iv, e-v

     C. a-i, b-iii, c-iv, d-v, e-ii

     D. a-i, b-ii, c-iv, d-iii, e-v

24	Which one of the following is connecting link between Photosystem I and Photosystem II
	A. plastocyanin
	B. Ferredoxin
	C. cytochromeC
	D. cytochrome *bf*

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25	Most readily transportable and mobilizable sugar in the plant is:
	A. glucose
	B. fructose
	C. sucrose
	D. Maltose

PART-B

26	Disinfectant agents to clean surgical wounds in order to control infections in humans are introduced by?
	A. Redi
	B. Semelweiss
	C. Jenner
	D. Lister

27	All of the following are refers to the structure of bacteria except
	A. Bacillus
	B. Coryne
	C. Coccus
	D. Vibrio

28	Which of the following bacteria are strict anaerobes?
	A. Escherichia coli
	B. Bacillus anthracis
	C. Clostridium perfringens
	D. Virbrio cholera

29	Which one of the following antibiotics is selectively toxic to fungi?
	A. Amphotericin B
	B. Erythromycin

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	C. Augmentin D. Ceclor

30	Borellia burgdorferi causes the disease
	
	    A. Lyme's Disease
	
	    B. Rocky Mountain Spotted Fever
	
	    C. Hanta
	
	    D. Rabies

31.	Which of the following is NOT true of Neisseria gonorrhea?
	
	    A. Is a mucosal pathogen
	
	    B. Requires a vaginal pH of 5 or more to grow
	
	    C. Can disseminate in the immunosuppressed
	
	    D. Complications include ectopic pregnancy, PID and sterility

32	Community-acquired pneumonia is caused by which of the following?
	
	    A. Klebsiella pneumoniae
	
	    B. Chlamydia pneumoniae
	
	    C. Streptococcus pneumoniae
	
	    D. Mycoplasma pneumonia

33	Which of the following is correct regarding the Mycobacterium Tuberculosis?
	
	    A. Penetrates the alveoli when inhaled
	
	    B. Destroys tissue in the lymph system
	
	    C. Forms lesions around which granulomas form
	
	    D. All of the above

34	What is the most common anaerobe in the normal body flora?
	
	    A. Salmonella enteriditis
	
	    B. Campylobacter jejuni
	
	    C. Yersinia pestis
	
	    D. Escherichia coli

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35	Who developed the Germ Theory of Disease?
	A. Koch
	B. Fleming
	C. van Leeuwenhoek
	D. Pasteur
36	Where is the site of ribosome synthesis?
	A. Cytoplasm
	B. Nucleoli
	C. Mitochondria
	D. Endoplasmic reticulum
37	What are the respective sizes of a virus and a plant cell?
	A. 3mm, 30mm
	B. 30nm, 30μm
	C. 30μm, 30nm
	D. 3cm, 30cm
38	What cellular compartment becomes acidic (high concentration of hydrogen ions) during mitochondrial electron transport?
	A. Mitochondrial stroma
	B. Cytoplasm
	C. Endoplasmic reticulum
	D. Space between inner and outer mitochondrial membranes
39	The structure pictured is the Haworth structure of
	A. Beta D galactose
	B. Beta-D- glucose
	C. Alpha-D- glucose
	D. Alpha-D- galactose

40	What happens to an enzyme when it denatures? A. The activation energy of the reaction is doubled B. The activation energy of the reaction is lowered C. Its optimal conditions for temperature of the enzyme are doubled D. The shape of the enzyme molecule is changed
41	A man who is affected with phenylketonuria marries a woman who is heterozygous at that locus. What is the probability that their first child will have phenylketonuria? A. 1/8 B. 1/4 C. 1/2 D. 3/4
42	Which of the following represents a testcross? A. WW x ww B. Ww x WW C. WW x WW D. Ww x Ww
43	RNA molecules that exhibit catalytic activity are called A. mRNAs B. Ribosomes C. Ribonucleases D. Ribozymes
44	All of the following contribute to promoter binding by RNA polymerase in *E. coli* except the A. Rho factor B. -35 consensus sequence C. -10 consensus sequence D. β' subunit of RNA polymerase

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45	Rubisco catalyses the carboxylation and also the oxygenation of ribulose 1,5-biphosphate. The initial products of these reactions include which of the following?
	i) Glyceraldehyde 3-phosphate
	ii) 2-phosphoglycerate
	iii) 3-phosphoglycerate
	A. I only
	B. II only
	C. III only
	D. II and III
46	A moving particle with a mass of 40 kg produces a net force of 20 N. How much distance does it cross after 10sec starting from its rest?
	A. 25 m
	B. 50 m
	C. 100 m
	D. 200 m
47	Assume a simple pendulum with a length of 0.2 m takes nearly 0.9 second for a complete cycle. If its length is increased to 0.8m, how long will it take to complete a cycle?
	A. 0.45 s
	B. 0.9 s
	C. 1.8 s
	D. 3.6 s
48	What is the work done (approximately), when a force of 100 N is applied at an angle of 30 deg to the horizontal axis and used to move a particle by a distance of 2m?
	A. 100 J
	B. 142 J
	C. 173 J
	D. 282 J

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49	A liquid has specific gravity of 1.5 (with reference to water at 4°C). What will be the approximate weight of 5 mL of that liquid? A. 0.3g B. 1.5g C. 3.3g D. 7.5g
50	How many are the number of orbitals allowed for the electron which has the azimuthal quantum number 2 A. 2 B. 3 C. 4 D. 5
51	A cylindrical container with radius 1m & height 7m is filled with water. What is the pressure exerted by water at the bottom of the container? A. 2.2×10^5 Pa B. 2.2×10^4 Pa C. 7×10^5 Pa D. 7×10^4 Pa
52	Pycnometer is used to calculate A. capillary force B. surface tension C. viscosity D. specific gravity
53	At higher altitudes from the sea level the atmospheric temperature decreases. Which of the following correctly explains this phenomenon? A. decrease in atmospheric pressure B. increase in atmospheric pressure C. moving away from radiation D. surface area of earth increases

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54	What is the refractive index of a medium, when light in the air falls with incident angle of 45 deg on the medium is refracted by an angle of 30 deg?
	A. 2
	B. 1/2
	C. $\sqrt{2}$
	D. 1/$\sqrt{2}$

55	When two plane mirrors are kept at an angle of 90o and an object is kept in between, how many images will be observed on mirrors?
	A. 1
	B. 2
	C. 3
	D. 4

56	Image of an object at infinite distance on a convex mirror is
	A. virtual & upright
	B. virtual & inverted
	C. real & upright
	D. real & inverted

57	In general, for a semiconductor, when temperature is increased, current resistivity
	A. decreases linearly
	B. increases linearly
	C. decreases non linearly
	D. increases non linearly

58	When two resistors with 0.5 Ω and 0.25 Ω are connected parallel, what is the final effective resistance of the system?
	A. 0.125 Ω
	B. 0.75 Ω

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	C. 6 Ω D. 8 Ω

59	What will be the change in magnitude of magnetic field (B) at the centre of a coil which has 50 turns is modified into 100 turns such that other parameters are kept same.
	
	    A. B/2
	
	    B. B
	
	    C. 2B
	
	    D. B^2

60	According to Doppler effect, when will an observer observe red shift?
	
	    A. source moves away from the observer
	
	    B. sources moves towards observer
	
	    C. both source and observer moving at constant speed
	
	    D. both source and observer do not move

61	A & B are two sets such as A ⊂ B, with in an universal set U. What is A U B?
	
	    A. A
	
	    B. B
	
	    C. A'
	
	    D. B'

62	A boy is flying a kite. The kite strikes on a tower head which is nearly 50m away from him. If thread of the kite makes 45° angle from the ground, then what is the height of the tower? Consider the effect of boy's height is negligible.
	
	    A. 10 m
	
	    B. 25m
	
	    C. 50m
	
	    D. 100m

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63	What is the product of (1+i) multiplied with (2+2i)
	A. 4+4i
	B. 4-4i
	C. 4
	D. 4i
64	If $x^2 + 7 = 0$, then x =
	A. ±7
	B. $\pm\sqrt{7}$
	C. $\pm\sqrt{7i}$
	D. $\pm i\sqrt{7}$
65	How many different kinds of groups of 3 members can be formed from the set of 5 students?
	A. 5
	B. 10
	C. 15
	D. 20
66	If the intersection angle of two straight lines is 45° and slope of one of the lines is 2, then slope of the other lines is =
	A. 1
	B. -1
	C. 1/3
	D. -1/3
67	What is the X-intercept of the line: 3x-5y-15=0
	A. -5
	B. 5
	C. -3
	D. 3

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68	How many edges will a regular polygon with an interior angle 135° contain?
	A. 4
	B. 6
	C. 8
	D. 10
69	If a standard deviation of a data set with 10 samples is 9, what is the variance value?
	A. 3
	B. 18
	C. 81
	D. 90
70	In a village of 100 homes, 20 homes have cows, 50 homes have goats and 10 homes have both. What is the probability of finding a home which has only cows?
	A. 0.1
	B. 0.2
	C. 0.33
	D. 0.5
71	If $A = \begin{pmatrix} 2 & 3 \\ 4 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 2 \\ 5 & 4 \end{pmatrix}$, then $(A+B)' = ?$
	A. $\begin{pmatrix} 5 & 5 \\ 9 & 6 \end{pmatrix}$
	B. $\begin{pmatrix} 5 & 9 \\ 5 & 6 \end{pmatrix}$
	C. $\begin{pmatrix} 7 & 7 \\ 5 & 4 \end{pmatrix}$
	D. $\begin{pmatrix} 7 & 5 \\ 7 & 4 \end{pmatrix}$
72	$\int \dfrac{1 + \sin x}{\cos^2 x}\, dx =$
	A. $\tan x - \sec x + C$
	B. $\tan x + \sec x + C$

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	C. - tan x + se x + C
	D. - tan x − se x + C
73.	$\int x\, e^x\, dx = ?$
	A. $x\, e^x + C$
	B. $x\, e^x + e^x + C$
	C. $-x\, e^x + C$
	D. $x\, e^x - e^x + C$
74.	Find the order and the degree of the equation: $(x+2)^2 \left(\frac{dy}{dx}\right)^3 + 2x \left(\frac{d^2y}{dx^2}\right)^2 - 4 = 0$
	A. 1 & 3
	B. 2 & 2
	C. 3 & 2
	D. 2 & 3
75	The Probability that a man speaks the truth is 3/5. If he tosses a coin and reports that it is a head, then what is the probability that it is truly head?
	A. 1/2
	B. 3/5
	C. 3/10
	D. 6/5

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