



The Maharaja Sayajirao University of Baroda
Faculty of Science

ADMISSION ENTRANCE EXAMINATION

SUBJECT: Five Year Integrated M.Sc. in Cell & Molecular Biology

DAY: Thursday DATE: 13th June 2019 TIME: 02:00 Pm to 04:00 pm

Important Instructions:

1. This test booklet is to be opened only when instructed by the invigilators to do so.
2. This booklet carries 100 questions on 14 printed pages. All questions carry equal marks.
3. For every correct answer, candidate will earn 1 mark. 0.25 mark will be deducted for every wrong answer.
4. **Test Registration Number** must be entered correctly in the OMR sheet, as advised by the invigilators. The **Question Booklet code (A, B, C, or D)** must also be mentioned on the OMR sheet (if not printed already) as instructed.
5. Answers must be marked in the OMR sheet using a **black or dark blue ball point pen only**. The circle should be filled in completely, leaving no gaps.

Correct way of marking answer:

A B C D

Incorrect ways of marking answer:

A B C D A B C D

A B C D

6. **Gadgets** (mobile phone, smart watch, ear phone, music players, etc.) **are strictly prohibited** in the exam hall. If any candidate is found in possession of any of these at his/her exam seat, he/she is liable to be disqualified.

	A. Norway	B. Spain	C. Russia	D. Bulgaria
9	The GST council has fitted over 1300 goods and 500 services under how many GST tax slabs in India			
	A. 2	B. 3	C. 5	D. 4
10	Tom's age after 15 years will be 5 times his age 5 years back. What is the present age of Tom?			
	A. 2.5 years	B. 10 years	C. 9 years	D. 5 years
11	The length of a rectangular plot is $5\frac{1}{3}$ times that of its breadth. If the area of the plot is 270 square metres, then what is its perimeter?			
	A. 101 m	B. 90 m	C. 120 m	D. 125 m
12.	Rigveda Samhita is divided into ten books. What are the books called?			
	A. Shreni	B. Mandalas	C. Upanishads	D. Puranas
13	Which was the first remote sensing mission undertaken by ISRO?			
	A. IMS1	B. IRS-1A	C. SARAL	D. Aryabhata
14	If South-East becomes North, North-East becomes West and so on. What will West become?			
	A. North-East	B. North-West	C. South-East	D. South-West
15.	Which of the following nobel laureate also won Bharat Ratna award?			
	A. Rabindra nath tagore	B. Amartya Sen	C. Kailash Satyarthi	D. Venkatraman Ramakrishnan
	Part B- CHEMISTRY and PHYSICS			
16	What is the correct IUPAC name of the following compound?			
	$\text{H}_3\text{CH}_2\text{C}-\text{C}\equiv\text{C}-\underset{\text{H}}{\overset{\text{H}}{\text{C}}}-\text{CH}_2\text{CH}_3$			
	A. (E)-Oct-5-en-3-yne	B. (E)-Oct-3-en-5-yne	C. (Z)-Oct-5-en-3-yne	D. (Z)-Oct-3-en-5-yne
17	Arrange the following compounds in the increasing order of reactivity, when treated with a base.			

	A. Intermolecular forces C. Kinetic energy	B. Potential energy D. Total energy	
25	99 % of a first order reaction completes in 32 minutes, therefore, 99.9 % reaction will complete in. A. 51 minutes B. 64 minutes C. 60 minutes D. 48 minutes		
26	Among LiCl, NaCl, KCl and MgCl, the salt _____ has covalent character. A. LiCl B. NaCl C. KCl D. MgCl		
27	Choose the correct properties of Ψ A. Finite and imaginary B. Infinite and multiple value C. Finite and single value D. Real and multiple		
28	Iodine can exist in the oxidation states: A. +1, +3, +5 B. -1, +1, +3 C. +3, +5, +7 D. -1, +1, +3, +5, +7		
29	Which of the following will form chelate: A. Ethylenediamine B. Ammonia C. Aniline D. Cyanide		
30	In nature, Mg^{2+} is present in which of the following Complex/compound? A. Chlorophyll B. Carotene C. Haemoglobin D. Vitamin-C		
31	Octahedral geometry in a complex will be produced by _____ hybridization A. sp^3 B. d^2sp^3 C. sp^2 D. d^2sp^2		
32	Two isotonic solutions will have same: A. Vapour pressure B. Boiling point C. Freezing point D. Osmotic pressure		
33	Identify the correct statement regarding enzymes: A. Enzymes are specific biological catalysts that can normally function at very high temperatures ($T \sim 1000$ K). B. Enzymes are normally heterogeneous catalysts that are very specific in their action. C. Enzymes are specific biological catalysts that cannot be poisoned D. Enzymes are specific biological catalysts that possess well defined active sites.		
34	Dissolving 120 g of urea (mol wt 60) in 1000g of water gave a solution of density 1.15 g/mL. The molarity of the solution is		

	A. 1.78 M	B. 2.00 M	C. 2.1 M	D. 2.22 M
35	Marsh gas is a mixture of A. H ₂ , O ₂ and CO ₂ B. H ₂ O, CH ₄ , CO ₂ C. CH ₄ , H ₂ S, CO ₂ D. C ₂ H ₄ , H ₂ S, CO			
36	For a radioactive material, half-life is 10 minutes. If initially there are 600 number of nuclei, the time taken (in minutes) for the disintegration of 450 nuclei is :- A. 20 B. 10 C. 30 D. 15			
37	A pendulum is hung from the roof of a sufficiently high building and is moving freely to and fro like a simple harmonic oscillator. The acceleration of the bob of the pendulum is 20 m/s ² at a distance of 5 m from the mean position. The time period of oscillation is:- A. 2π s B. π s C. 2 s D. 1S			
38	The efficiency of an ideal heat engine working between the freezing point and boiling point of water, is A. 26.8% B. 20% C. 6.25% D. 12.5%			
39	The electrostatic force between the metal plates of an isolated parallel plate capacitor C having a charge Q and area A, is :- A. independent of the distance between the plates. B. linearly proportional to the distance between the plates C. proportional to the square root of the distance between the plates. D. inversely proportional to the distance between the plates.			
40	A geosynchronous satellite is one which A. Revolves around the earth in the same speed as that of the earth's revolution around the sun B. Revolves around the earth in the same speed as that of the earth's rotation around its axis C. Its period of revolution matches the period of revolution of the moon D. None of the above			
41	When light waves travel from a denser to a rarer medium, what happens? A. There is refraction of light irrespective of the angle of incidence B. There is total internal reflection when the angle of incidence is smaller than the critical angle C. There is total internal reflection when the angle of incidence is greater than the critical angle D. Both (a) and (b)			

42	<p>The ear of some animals can distinguish ultrasonic sound waves, but not human ear. What is the frequency of ultrasonic sound waves?</p> <p>A. They have frequency lower than 10 milli Hz B. They have frequency lower than 10 kilo Hz C. They have frequency higher than 20 kilo Hz D. They have frequency higher than 20 milli Hz</p>	
43	<p>Two balls of masses 2 kg and 3 kg slide along a frictionless horizontal surface with speeds of 4 m/s and 2 m/s, respectively. After an inelastic collision, the balls stick together and move at a speed of 2 m/s. What direction did the two balls move before the collision?</p> <p>A. In the same direction B. In opposite directions C. At an angle not equal to 0° or 180° D. Not enough information given to select an answer</p>	
44	<p>A loop of current creates a magnetic field. How can you increase the strength of this magnetic field?</p> <p>A. By increasing the number of loops B. By increasing the current flowing through the loop C. By increasing the diameter of the loop D. Both (a) and (b)</p>	
45	<p>Which of the following two paths need more work to push a unit charge in a uniform electric field in between two fixed points A and B?</p> <p>(i)  (ii)  (iii) </p> <p>A. Path (i) B. Path (ii) C. Path (iii) D. Work done is same for all the three paths</p>	
46	<p>Two resistors, R_1 and R_2 are connected to a battery producing a voltage V. Then which of the following is true?</p> <p>A. unequal current flows through R_1 and R_2 if connected in series B. There is equal voltage across R_1 and R_2 if connected in series C. There is equal voltage across R_1 and R_2 if connected in parallel D. There is equal current flowing through R_1 and R_2 if connected in parallel</p>	
47	<p>Which of the following statements is the zeroeth law of thermodynamics?</p> <p>A. Energy can neither be created nor destroyed</p>	

	<p>B. The entropy of the universe is increasing</p> <p>C. If two systems A and B are in thermal contact, then they are at the same temperature with a third body in thermal contact with A and /or B</p> <p>D. The entropy of the universe is zero at 0 K.</p>	
48	<p>What is the viscous drag experienced by a small particle of size 20 \AA moving through a fluid of viscosity 20 Pascal-sec at a constant speed of 20 \mu m/s ?</p> <p>A. $0.8 \times 10^{-12} \text{ kg-m-s}^{-2}$</p> <p>B. $1.5 \times 10^{-11} \text{ kg-m-s}^{-2}$</p> <p>C. $1.5 \times 10^{-11} \text{ m-s}^{-2}$</p> <p>D. None of the above</p>	
49	<p>Which experiment can prove that light consists of particles called photons?</p> <p>A. Bragg diffraction</p> <p>B. Interference of light</p> <p>C. Photoelectric effect</p> <p>D. Photovoltaic effect</p>	
50	<p>If the refractive index of a plano-convex lens is 1.6 and the radius of curvature is 60 cm then the focal length of the lens is</p> <p>A. 50 B. 100 C. -50 D. -100</p>	
51	<p>Which of the following phenomena is used in optical fibre?</p> <p>A. reflection B. total internal reflection C. interference D. scattering</p>	
52	<p>Twelve wires of equal resistance r are joined to form a cube. The effective resistance between two diagonal ends will be_____</p> <p>A. $3r$ B. $5r/6$ C. $6r/5$ (D. $12r$</p>	
53	<p>A bar magnet is released from rest along the axis of a very long, vertical copper tube. After some time the magnet</p> <p>A. Will stop in the tube B. will move with constant speed</p> <p>C. Will move with an acceleration g D. will oscillate</p>	
54	<p>Let C_v and C_p are the molar heat capacities of an ideal gas at constant volume and constant pressure respectively. Which of the following is a universal constant?</p> <p>A. C_p/C_v B. $C_p C_v$ C. $C_p - C_v$ D. $C_p + C_v$</p>	
55	<p>An AND gate can be prepared by repetitive use of</p> <p>A. NOT gate B. OR gate C. NAND gate D. XOR gate</p>	
Part C (for Biology subject)		
56	<p>NADPH is generated in which of the following pathway?</p> <p>A. Kreb's cycle</p> <p>B. Pentose Phosphate pathway</p>	

	C. Glycolysis D. Urea cycle	
57	Reptiles and birds are mainly A. Ureotelic B. Ammonotelic C. Uricotelic D. None	
58	Diabetes insipidus condition A. occurs due to hyposecretion of insulin by pancreas. B. urine contains excessive sugar (glucose). C. occurs due to over-secretion of vasopressin. D. occurs due to under-secretion of vasopressin leading to very dilute urine and hence constantly feels thirsty.	
59	A linear peptide is made up of 6 residues of an amino acid of molecular weight 118Da. The molecular weight of the peptide will be A. 618 B. 690 C. 600 D. 708	
60	The causative agent of scalded skin syndrome is A. Salmonella typhi B. Shigella sonnei C. Staphylococcus aureus D. Mycobacterium fortuitum	
61	Which of the following is an imino acid: A. Proline B. Histidine C. Cysteine D. Glycine	
62	In SDS-PAGE, the SDS imparts A. Uniform negative charge per unit length of protein B. Uniform negative charge irrespective of protein length C. Uniform positive charge per unit length of protein D. Uniform positive charge irrespective of protein length	
63	BCG vaccine is derived by attenuating A. Mycobacterium avium B. Mycobacterium bovis C. Mycobacterium vaccae D. Mycobacterium fortuitum	
64	Average molecular weight of an amino acid is A. 11 dalton B. 110 dalton C. 1100 dalton D. 110 kilodalton	
65	Polymerase chain reaction (PCR) was invented by A. Fredrick Sanger B. Kary Mullis C. David Baltimore D. Arthur Kornberg	
66	Antibody present in colostrum (milk secreted by mother during initial days of lactation) is. A. IgA B. IgG C. IgD D. IgM	

67	Syphilis is caused by A. Neisseria gonorrhoeae C. Trichomonas vaginalis B. Treponema pallidum D. Candida albicans	
68	In the Stanley Miller's experiment, the formation of was observed. A. Nucleotides C. Amino acids B. Polypeptides D. Nucleic acids	
69	Which of the following techniques will be useful for tracing the origin of particular tribe? A. blood grouping. B. mitochondrial DNA analysis. C. DNA fingerprinting. D. karyotyping.	
70	Bacterial infection can be treated by an antibiotic that blocks protein synthesis. why it does not affect human cell? A. Human and bacterial ribosomes are different B. Antibiotic molecules can't enter human cells. C. Antibiotic gets degraded by human cell. D. different genetic code of human and bacteria.	
71	In phloem and xylem the transport is A. Unidirectional ,bidirectional respectively B. Bidirectional and active transport respectively C. Active transport and unidirectional respectively D. Bidirectional and unidirectional respectively	
72	In an animal cell after removal of nuclei DNA is still present. The source is A. Peroxisome B. Lysosome C. Chloroplast D. Mitochondria	
73	A heterozygous colorblind woman marries a color blind man. What is the ratio of carrier daughters, color blind daughters, normal sons and color blind sons in F1 generation? A. 1:2:2:1 B. 1:1:1:1 C. 2:1:1:2 D. 1:1:2:2	
74	Full form of RNAi is A. Ribonucleic acid interference B. Ribonucleic acetate inhibition C. Ribonucleic aspartate integration D. Ribosome nucleic acid inhibition	
75	Polysome is involved with A. Transcription C. Translation B. Replication D. Post transcription	
76	The glucose homeostasis is maintained in the body by A. Insulin B. Glucagon	

	C. Insulin & Glucagon	D. Somatostatin	
77	Respiratory pathways are more appropriately called		
	A. amphibolic pathway	B. catabolic pathway	
	C. anabolic pathway	D. none of the above	
78	<i>Erythroblastosis foetalis</i> , mismatch of the blood grouping can happen with		
	A. Rh negative mother with Rh positive first child		
	B. Rh positive mother with Rh positive first child		
	C. Rh negative mother with Rh positive second child		
	D. Rh positive mother with Rh negative second child		
79	HIV is a retrovirus, and it incorporate		
	A. Its DNA into the host genome		
	B. Its RNA into the host genome		
	C. Its protein into the host genome		
	D. none of the above		
80	MRSA refers to		
	A. Methicillin-resistant <i>Staphylococcus aureus</i>		
	B. Methicillin-responsive <i>Staphylococcus aureus</i>		
	C. Most resistant <i>Staphylococcus aureus</i>		
	D. Minimal responsive <i>Staphylococcus aureus</i>		
81	Which of the following is a polysaccharide of animal origin		
	A. Pectin		
	B. Cellulose		
	C. Chitin		
	D. Arabinoxylans		
82	At meta phase, chromosomes are attached to the spindle fibres by		
	A. Satellites	B. Centromere	
	C. Kinetochore	D. None of the above	
83	An organic substance bound to an enzyme and required for its activity is		
	A. Apoenzyme		
	B. Holoenzyme		
	C. Co enzyme		
	D. Iso enzyme		
84	Phylogenetic system of classification is based on		
	A. Morphological features		
	B. Chemical Constitutes		

	<p>C. Evolutionary relation ships D. All of the above</p>	
85	<p>Which of the following hormone is released by posterior lobe of pituitary?</p> <p>A. FSH B. ADH C. ACTH D. MSH</p>	
86	<p>Humoral immunity is mediated by</p> <p>A. T cells B. B cells C. Plasma Cells D. NK cells</p>	
87	<p>Oxygen dissociation curve of haemoglobin is</p> <p>A. Sigmoid B. Hyperbola C. Bell shaped D. Linear</p>	
88	<p>A connecting link between plant and animal is</p> <p>A. Euglena B. Plasmodium C. Chlorella D. None of the above</p>	
89	<p>Gonads are derived from</p> <p>A. Ectoderm B. Endoderm C. Mesoderm D. None of the above</p>	
90	<p>In <i>Arabidopsis thaliana</i>, the haploid chromosome number is 05. How many chromosomes would you expect to find in the endosperm?</p> <p>A. 05 B. 10 C. 15 D. 20</p>	
91	<p>Cell wall of cyanobacteria is mainly composed of</p> <p>A. Chitin B. Cellulose C. Chitosan D. Peptidoglycan</p>	

92	Rust disease is caused by A. <i>Mucor</i> B. <i>Phytophthora</i> C. <i>Puccinia</i> D. <i>Ustilago</i>	
93	Chlorophyll b is found in A. land plants B. green algae C. cyanobacteria D. All of these	
94	Which of the following cell organelle is partially autonomous, encoding and synthesizing some of their own proteins A. Chloroplast B. Nucleolus C. nucleus D. Plasmid	
95	Which of the following is not the advantage of vegetative propagation A. Production of large and complete plants B. Plants produced are genetically same as the mother plant C. Avoid transmission of pathogens D. Bypasses juvenile characteristics	
96	Nitrogen fixing microorganism associated with water fern <i>Azolla</i> is A. <i>Anaebena</i> B. <i>Rhizobium</i> C. <i>Nostoc</i> D. <i>Azotobactor</i>	
97	The ultimate source of genetic variation in a population is A. Gene flow B. Mutation C. Selection D. Genetic drift	
98	How many pairs of characters/traits Gregor John Mendel studied in Pea? A. 5 traits B. 9 traits C. 7 traits D. 3 traits	
99	Energy is brought into ecosystems by which of the following? A. Fungi and other decomposers B. Animals that graze on grass C. Carnivores animals D. Plants that photosynthesize	
100	How many Barr bodies would you see in the nuclei of a person with XXY chromosomes? A. One	

	B. Two C. Three D. None	
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