श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकीसंस्थान, तिरुवनंतपुरम्-11
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY
THIRUVANANTHAPURAM—695 011

ENTRANCE EXAMINATION - ACADEMIC SESSION AUGUST 2018

PROGRAMME: MPHIL (Biomedical Technology) - **BIOLOGY**

Time:60 Minutes **Max. Marks: 60**

(Select the most appropriate answer)
(There are **no negative** marks for wrong answers)

Sl No	Questions
1.	The smallest particle that takes part in a chemical reaction is a) Atom b) Molecule c) Proton d) Neutron
2	A material with different properties in different directions is called: a) Amorphous b) Austenite c) Anisotropic d) Crystalline
3	National Science day is celebrated on 28th February to honour a) Sir C. V. Raman b) Homi Bhabha c) S.N.Bose d) Vikram Sarabhai
4	The device which converts heat into mechanical work is a) Motor b) Generator c) Heat Engine d) Energy Converter
5	The short wavelength limit of x-rays depend upon a) nature of the target b) voltage across the x-ray tube c) nature of the filament used d) none of these

6	Which of the following is not a biopolymer? a) Keratin b) Collagen c) polyisoprene d) Polyethylene terephthalate
7	Which bond in the list has the highest bond energy? a) H-H b) H-O c) H-F d) H-I
8	Which of the following is a polymer? a) Glucose b) Sucrose c) Fructose d) Cellulose
9	In gel permeation chromatography, the separation of polymers is determined by a) size of the molecule b) mass of the molecule c) flow rate of the mobile phase d) nature of the mobile phase
10	Dry ice is a) solid ammonia b) solid carbon dioxide c) solid nitrogen d) solid carbon monoxide
11	Components of 'Bordeaux mixture' are a) Copper sulphate and lime b) Potassium permanaganate and lime c) Magnesium sulphate and Calcium carbonate d) None of these
12	One Dalton is equal to a) 10^{-9} gm b) 10^{-12} gm c) 3.32×10^{-24} gm d) 10^{-10} gm
13	Relation between amino acid and protein is similar to one that found in between a) Glucose and chitin b) Thymine and uracil c) Nucleosides and nucleic acid d) Nucleotides and nucleic acid

14	Km of an enzyme is a) One half of Vmax b) Dissociation constant c) Normal physiological substrate concentration d) Substrate concentration that gives half maximum velocity
15	Doctors recommend Suflower oil as it is a rich source of: a) Vitamins b) Unsaturated fatty acids c) Rich in energy and reduce weight gain d) Rich in saturated fatty acids
16	Which of the following has the same atomic number and atomic weight a) Chlorine b) Nitrogen c) Helium d) Hydrogen
17	A solution with pH = 5 is _____ than a solution with pH = 7. a) 1/100 times more acidic b) 1/10 times more acidic c) 10 times more acidic d) 100 times more acidic
18	In a solar cell, light energy is converted into a) Heat Energy b) Sound Energy c) Electrical Energy d) Nuclear Energy
19	The GSAT satellite was launched from: a) Vikram Sarabhai Space Centre, Trivandrum b) Satish Dhawan Space Centre, Sriharikota c) Space Applications Centre, Ahemdabad d) Liquid Propulsion Space Centre, Valiamala, Trivandrum
20	Which of the following radiation is ionizing? a) Lasers b) Microwave radiation c) X rays d) Infra red radiation
21	What are the features of a cell strain and a cell line in terms of their proliferative capacity? a) Cell line can proliferate indefinitely but not cell strain. b) Cell strain can proliferate indefinitely but not cell line. c) Both cell line as well as cell strain can proliferate indefinitely. d) Both cell line as well as cell strain can't proliferate indefinitely.

22	Upon gel electrophoresis, DNA content of cells treated with cytotoxic compounds X and Y showed fragmented and intact patterns respectively. What is (are) the type(s) of cell death involved? a) X caused necrotic cell death where as Y caused no cell death. b) X caused necrotic cell death whereas Y caused apoptotic cell death. c) X caused apoptotic cell death whereas Y caused no cell death. d) X caused apoptotic cell death whereas Y caused necrotic cell death.
23	What is Mycoplasma? a) A type of Mycobacterium that causes the tuberculosis disease affecting lungs. b) It is a product derived from Mycobacterium plasma for biomedical applications. c) A bacterium with mycelated fungi-like object with a flowering plasma-like structure. d) All of the above
24	Behavior of metaphasic chromosome in a dividing cell can be best studied using the technique a) X-ray microscopy b) Cell fractionation c) Phase contrast microscopy d) Scanning electron microscopy
25	Albinism, a total lack of melanin pigment is due to a recessive gene. A normal man and a normal woman, both of whom had one albino parent, marry. What is the probability of their having an albino child? a) All b) None c) 50% d) 25%
26	The transition between meiosis I and meiosis II is called a) interkinesis b) cytokinesis c) diakinesis d) karyokinesis
27	Prions (the smallest disease causing agent) is made of: a) Nucleic acid only b) Proteins only c) Lipids only d) All the above

28	The process used to remove electrolytes from a solution of protein: a) Electrolysis b) Dialysis c) Proteolysis d) Electrophoresis
29	Lysosomes are present in all animal cells except: a) Brain cells b) Leucocytes c) Erythrocytes d) Cells of Sertoli
30	The most striking example of point mutation is found in a disease called a) Night blindness b) Thalessemia c) Down syndrome d) Sickle cell anaemia
31	The molecular scissors used to cut DNA into specific genes of interest are called a) Exonucleases b) Restriction endonucleases c) Ligases d) Polymerases
32	B-lymphocytes are primarily involved in a) Humoral immunity b) Autoimmune disorders c) Graft rejection d) Cell-mediated immunity
33	Cellular structures which always disappear during mitosis are: a) Plastids and mitochondria b) Nuclear envelope and nucleolus c) Cell wall and plasmalemma d) Cell wall and nucleolus
34	Wild type E.coli cells are growing in normal medium with glucose. They are transferred to a medium containing only lactose as the sugar. Which one of the following changes takes place? a) The lac operon is repressed b) All operons are induced c) E.coli cells stop dividing d) The lac operon is induced
35	5-bromouracil is a base analogue of: a) Uracil b) adenine c) guanine d) thymine

36	Cellular proteins destined for secretion are sorted and packaged in the a) Lysosomes b) Endosomes c) Endoplasmic reticulum d) trans Golgi network
37	Select the false statement a) Enzymes increase the rate of reaction without being changed by itself b) Enzymes accelerate reactions by increasing the activation energy c) Enzymes exhibit specificity d) Enzymes are sensitive to both temperature and pH
38	Migration of a protein in an SDS polyacrylamide gel is inversely proportional to? a) Molecular weight b) log of molecular weight c) negative charge d) isoelectric point
39	Which of the following is not a function of iron? a) Oxygen transport b) Role in oxidative metabolism c) Cofactor in enzymes d) Gene regulation
40	Which of the following is a function of Macrophages? a) locate microscopic foreign bodies and ingest them b) Produce and secrete antibodies c) Interact with infected host cells through receptors on T-cell surface d) Interact with macrophages and secrete cytokine
41	Which of the following is a gaseous chemical messenger in cell signaling? a) Hydrogen sulfide b) Carbon monoxide c) Nitric oxide. d) All of the above.
42	What is cytokinesis and karyokinesis? a) Division of cellular content and division of nuclear content, respectively. b) Division of cellular content and fusion of nuclear content, respectively. c) Fusion of cellular content and division of nuclear content, respectively. d) Fusion of cellular content and fusion of nuclear content, respectively.

43	What is the role of a catalyst? a) Reduces the activation energy b) Decomposes the reactants c) Increase the molecular motion d) increases the pressure
44	This area of brain plays a role in the execution of stereotyped movements a) Cerebellum b) Basal ganglia c) Vestibular nuclei of reticular formation. d) Cerebral corte supplementary motor area
45	Resolving power of electron microscope is --- times greater than that of a light microscope a) 100 b) 1 million c) 1000 d) 10
46	Which of the following methods would be most appropriate for sterilizing an antibiotic solution? a) Dry heat sterilization b) Filtration c) Autoclaving d) Freeze-drying
47	Movement of micro -organism in response to a chemical stimuli or signal a) Phototrphism b) Chemotrophism c) Thermoptrophism d) None of the above
48	Which of the following is a hormone of the anterior pituitary gland? a) Corticotrophin b) Glucagon c) Insulin d) Bradykinin
49	Cells that form the inner lining of the blood vessel wall are a) smooth muscle cells b) epithelial cells c) fibroblasts d) endothelial cells

50	Antibiotics such as Ciprofloxacin and flouroquinolines work by inhibiting a specific enzyme. This enzyme is normally necessary to relieve torsional strain that is caused by the unwinding of the helix. What is the name of this enzyme? a) DNA ligase b) Topoisomerase (DNA Gyrase) c) Single –stranded binding protein d) Primase
51	All the following are used in PCR **except**: a) Taq Polymerase b) Restriction Enzymes c) Oligonucleotide Primers d) Deoxynucleoside Triphosphates
52	What is the full form of FACS? a) Fluorescence Activated Cell Sorter. b) First Aid Chemical System. c) Financial Activity Control Section. d) Facial Action Coding Scheme.
53	The Nobel Prize in Physiology or Medicine 2017 was awarded to Jeffrey C. Hall, Michael Rosbash and Michael W. Young for their discoveries...? a) On the machinery of degrading and recycling cellular components. b) On a therapy against infections caused by roundworm parasites. c) On a positioning system in the brain that functions as inner GPS. d) On the molecular mechanism of controlling the circadian rhythm.
54	If the cells that you are working with are contaminated with bacteria, what would you do? a) Cells are sub-cultured and continued. b) Treat with antibiotics and re-use the cells. c) Discard it as biohazardous waste. d) None of the above.
55	In a CO_2 incubator, CO_2 is used in order to....? a) Maintain the sterility in the incubator. b) Maintain the temperature overall. c) Maintain the pH of culture media. d) All of the above.
56	If you are given a culture flask with fibroblast cells, which microscope you would use? a) Horizontal microscope. b) Vertical microscope. c) Upright microscope. d) Inverted microscope.

57	Upon staining with Trypan blue, fibroblasts cells in culture stained positive and exhibited blue color. This means? a) The fibroblasts cells are alive. b) The fibroblasts cells are dividing. c) The fibroblasts cells are dead. d) None of the above.
58	What is the full form of HEPA? a) High-Efficiency Particulate Air filter. b) High-definition Environment Protection Appliance. c) High-Energy Protective Area. d) High-End Product Assessment.
59	In bacteria, a small circle of DNA found outside the main chromosome is called a a) Plasmid b) Protein c) Genetic fingerprint d) Episome
60	The DNA of an elephant and the DNA of a mango tree will probably not differ in a) Sequence of DNA nucleotides b) Length of DNA molecules c) Number of DNA molecules d) Kinds of nucleotides utilized in forming DNA
	END

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकीसंस्थान, तिरुवनंतपुरम्-11
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY
THIRUVANANTHAPURAM—695 011

ENTRANCE EXAMINATION - ACADEMIC SESSION AUGUST 2018

PROGRAMME: MPHIL Biomedical Technology-**BIOLOGY – ANSWER KEY**

Sl No	Answer		
1.	A	34	D
2	C	35	D
3	A	36	D
4	C	37	B
5	B	38	B
6	D	39	D
7	**C**	40	A
8	D	41	D
9	A	42	A
10	**B**	43	A
11	**A**	44	A
12	C	45	C
13	D	46	B
14	D	47	B
15	B	48	A
16	**D**	49	D
17	D	50	B
18	C	51	B
19	B	52	A
20	**C**	53	D
21	A	54	C
22	D	55	C
23	C	56	D
24	C	57	C
25	D	58	A
26	A	59	A
27	B	60	D
28	B		
29	C		
30	D		
31	B		
32	A		
33	B		