SET–"X"

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(MPH/PHD/URS–EE–2020)

LIFE SCIENCE

Sr. No. 10365

Code **A**

Time : 1¼ Hours **Total Questions : 100** **Max. Marks : 100**

Roll No. _____ (in figure)_____ (in words)

Name : _____ Father's Name : _____

Mother's Name : _____ Date of Examination : _____

(Signature of the candidate) (Signature of the Invigilator)

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Question No.	Questions
1.	Arithmetic mean of the two regression coefficients is (1) Equal to correlation coefficient (2) Greater than correlation coefficient (3) Less than correlation coefficient (4) Equal to or greater than correlation coefficient
2.	Retroviruses are capable of causing cancer because they (1) produce a very high number of progeny viruses per infected cell (2) often contain point mutations in their pol gene (3) transduce mutant versions of cellular genes that normally regulate cell growth (4) infect cells more efficiently than other viruses
3.	*Puccinia* forms uredia and (1) Telia on wheat leaves (2) Aecia on barbery leaves (3) Pycnia on barbery leaves (4) Aecia on wheat leaves
4.	Bryophytes can be separated from algae, because they (1) Possess archegonia (2) Contain chloroplast (3) Are thalloid forms (4) Have no conducting tissue

Question No.	Questions
5.	Sexual reproduction is absent in (1) *Spirogyra* (2) *Nostoc* (3) *Ulothrix* (4) *Volvox*
6.	Which of the following compound is not amphipathic ? (1) Phosphotidylcholine (2) Cholesterol (3) Oleic acid (4) Succinate
7.	Pneumatophores are found in (1) Vegetation found in marshy and saline lake (2) Vegetation found in acidic soil (3) Xerophytes (4) Epiphytes
8.	Which of the following statement is true ? (1) Vessels are multicellular with wide lumen (2) Tracheids are multicellular with narrow lumen (3) Vessels are unicellular with narrow lumen (4) Tracheids are unicellular with wide lumen
9.	The cells of quiescent centre are characterized by (1) Dense cytoplasm and prominent nuclei (2) Light cytoplasm and small nuclei (3) Dividing regularly to add to the corpus (4) Dividing regularly to add to the tunica

Question No.	Questions
10.	Which of the following statement is false ? (1) The ovaries in frogs are structurally and functionally connected with kidney (2) Mature female frog can lay 2500 to 3000 unfertilized ova at a time (3) In male frog there are 10-12 vasa efferentia arise from testes and enter kidney on their side and open into bladder's canal (4) The eggs of frog are mesolecithal and telolecithal
11.	Which cranial nerve has the highest number of branches ? (1) Vagus nerve (2) Trigeminal nerve (3) Facial nerve (4) None of the above
12.	Which of the following ion is an ethylene inhibitor ? (1) Mg^{2+} (2) NH^{3+} (3) Ag^{+} (4) Cl^{-}
13.	A bioinformatics tool used to find out the sequence similarity in the subunits of hemoglobin is (1) FASTA (2) BLAST (3) HUMMER (4) PSI:PLOT
14.	Which of the following development process in animals is more dependent on cellular movements ? (1) Pattern formation (2) Morphogenesis (3) Cell differentiation (4) Growth

Question No.	Questions
15.	The organs radula and clitellum are found in (1) Coelenterata and Echinodermata, respectively (2) Echinodermata and Coelenterata, respectively (3) Annelida and Mollusca, respectively (4) Mollusca and Annelida, respectively
16.	Which of the following is unfavourable for protein folding ? (1) Hydrophobic interaction (2) Van der waals forces (3) Conformational entropy (4) Hydrogen bonding
17.	The wings of insects and wings of bats represent a case of (1) Divergent evolution (2) Convergent evolution (3) Parallel evolution (4) Neutral evolution
18.	Which one of the following features is common in silver fish, scorpion, dragon fly and prawn ? (1) Three pairs of legs and segmented body (2) Chitinous cuticle and two pairs of antennae (3) Jointed appendages and chitinous skeleton (4) Cephalothorax and trachea
19.	Which of the following pairs of animals is correctly matched with the kind of their body symmetry ? (1) Hydra and shark–Bilateral symmetry (2) Tapeworm and octopus–Radial symmetry (3) Amoeba and sea urchin–Asymmetry (4) Jelly fish and star fish–Radial symmetry

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20.	Which of the following statement is incorrect ? (1) Circulating body fluids in insects serve to distribute oxygen to tissues (2) The principle of countercurrent flow facilitates efficient respiration in gills of fishes (3) The residual air in lungs slightly decreases the efficiency of respiration in birds (4) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds
21.	Pancreas is absent in which group of vertebrates ? (1) Reptiles (2) Cyclostomates (3) Birds (4) Mammals
22.	Cell wall is absent in (1) Gametes (2) Amoeba (3) Mycoplasma (4) All of these
23.	Which is synthesized in G1 phase ? (1) DNA polymerase (2) Histones (3) Nucleolar DNA (4) Tubulin protein
24.	Histone proteins found in the nuclei of eukaryotes are rich in which of the following amino acids ? (1) Glycine and phenylalanine (2) Lysine and arginine (3) Glycine and arginine (4) Phenylalanine and lysine

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25.	Random genetic drift in a population probably results from (1) Highly genetically variable individuals (2) Interbreeding within this population (3) Constant low mutation rate (4) Large population size
26.	The use of copper in copper releasing IUDs is (1) It alters the reproductive cycle in females (2) Copper decreases phagocytosis of sperms in the uterus (3) Copper ions released suppress sperm motility and the fertilization of sperms (4) Copper ions inhibits ovulation
27.	Which of the following are true for electron microscopy ? (1) specimen should be thin and dry (2) image is obtained on a phosphorescent screen (3) electron beam must pass through evacuated chamber (4) specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber
28.	Which one of the following pairs of plant structures has haploid number of chromosomes ? (1) Egg nucleus and secondary nucleus (2) Megaspore mother cell and antipodal cells (3) Egg cell and antipodal cells (4) Nucellus and antipodal cells

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29.	Apomictic embryos in *Citrus* arise from (1) Diploid egg (2) Synergids (3) Maternal sporophytic tissue in ovule (4) Antipodal cells
30.	Where will you look for the sporozoites of the malarial parasites ? (1) Salivary glands of freshly moulted female *Anopheles* mosquito (2) Saliva of infected female *Anopheles* mosquito (3) RBCs of humans suffering from malaria (4) Spleen of infected humans
31.	At which stage of HIV infection does one usually show symptoms of AIDS? (1) Within 15 days of sexual contact with an infected person (2) When the infected retrovirus enters host cells (3) When viral DNA is produced by reverse transcriptase (4) When HIV replicates rapidly in helper T-lymphocytes and damages large number of these cells
32.	During each cycle of chain elongation in translation, how many conformational changes does the ribosomes undergo that are coupled to GTP hydrolysis ? (1) Zero (2) One (3) Two (4) Three

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33.	Which one of the following about development of sea urchin embryos is true? (1) Each blastomere of a 4 cell stage possess a portion of the original animal-vegetal axis and if isolated and allowed to develop will form a complete but smaller size larva (2) Each blastomere of a 8-cell stage has the capacity to form a complete embryo but by the 16 cell stage, blastomere will develop by their presumptive fate (3) Any blastomere isolated till the pluteus larva formation will regulate to go on and develop into a full sized embryo (4) After an intricate recombination at the 16 cell stage, the resulting embryo loses its ability to form a complex larva
34.	Discovery of Emerson effect showed the existence of (1) Photorespiration (2) Light and dark reaction in photosynthesis (3) Photophosphorylation (4) Two distinct photosystems
35.	Which of the following statements is not correct about cyclic photophosphorylation? (1) It does not involve NADPH formation (2) It uses electrons supplied by photosystem 1 (3) It involves substrate level phosphorylation (4) It doesn't generate oxygen

Question No.	Questions
36.	All of following inhibits auxin transport except (1) cytokinin (2) alpha napthylthalamic acid (3) 2,3,5,-tri indo benzoic acid (4) ethylene
37.	Under normal conditions, as electrons flow down the electron transport chain of the mitochondria (1) NADH and $FADH_2$ are oxidized (2) pH of the matrix increases (3) an electrochemical gradient is formed (4) All of the above
38.	Uncoupling of oxidative phosphorylation implies that (1) the ATPase activity of mitochondria is abolished (2) mitochondria ceases to oxidize succinate (3) ATP formation ceases but respiration continues (4) ATP formation continues but respiration ceases
39.	The exonuclease activity of DNA polymerase functions to (1) Remove the RNA primer sequence (2) Proofread the new DNA strand and remove inappropriate nucleotides (3) Maximize the fidelity of DNA replication (4) All of the above

Question No.	Questions
40.	Transposons (1) insert into DNA by homologous recombination (2) can't be transferred by phage mediated transduction (3) contain the equivalent of insertion (IS) elements (4) can insert into plasmids but not the bacterial chromosomes
41.	Transcription termination of mRNA genes in eukaryotes occurs (1) at polyadenylation sites by the action of a terminator factor (2) by the formation of a strong hairpin structure in the vicinity of polyadenylation site (3) termination factor bound to the termination site in the vicinity of polyadenylation site (4) at pause sites following the polyadenylation sites
42.	GTP is required by which of the following steps in protein synthesis ? (1) Aminoacyl tRNA synthetase activation of amino acids (2) Attachment of ribosomes to endoplasmic reticulum (3) Translocation of tRNA-nascent protein complex from A site to P site (4) Attachment of mRNA to ribosomes
43.	Which of the following sequences is most likely to be a restriction enzyme recognition site ? (1) CGGCTT (2) CGCCGC (3) GTAATG (4) GTCGAC

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44.	Polymerase chain reaction is considered as a revolutionary technology because all of the following, except (1) it enables an unlimited production of a DNA fragment *in vitro* (2) it is a highly sensitive technology (3) its experimental protocol is simple (4) it enables the direct production of a synthetic gene that did not exist before
45.	If two genes are unlinked the recombination frequency will be (1) 25% (2) 50% (3) 75% (4) 100%
46.	Which of the following is a kinetin derivative ? (1) Adenine (2) Thymine (3) Uracil (4) Cytosine
47.	ELISA utilizes enzymes that (1) have a high turnover rate (2) yield a stable coloured product (3) are stable on conjugation to proteins (4) all of the above
48.	Which of the following disease is not an autoimmune disease ? (1) Rheumatoid arthritis (2) Lupus erythematosus (3) Bovine spongiform encephalitis (4) Grave's disease

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49.	Live vaccine is (1) low dose of infectious bacteria administered as prophylactic (2) a dose of bacterial strain in a modified form which retains immunogenicity but is not pathogenic (3) a low dose of toxin that is produced by the bacterium (4) a sample of cells from a patient who recently recovered from the diseases
50.	The speed of migration of ions in an electric field depends upon (1) magnitude of charge and mass of molecules (2) magnitude of charge and shape of molecules (3) shape and size of the molecules (4) magnitude of charge, shape and mass of molecules
51.	Ribozymes are also termed as (1) Catalytic RNA (2) RNAzyme (3) Nucleozyme (4) Both (1) and (2)
52.	Which of the following statement is incorrect ? (1) Golden rice is rich in Vitamin-A (2) Human protein (alpha-1 antitrypsin) obtained from transgenic animals is used to treat emphysema (3) Human protein enriched milk, which contained the human alpha-lactalbumin was produced by cow molly (4) Platelet derived growth factor which helps in wound healing is synthesized by DNA recombinant technology

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53.	Downstreaming process in biotechnology refers to (1) The process which include separation and purification of the product after the completion of the biosynthetic stage (2) Large scale production of the product by using bioreactors (3) The cells harbouring cloned genes of interest being grown on a small scale (4) The microbes which act upon the substrate are cultured and added into the fermenter
54.	Which of the following is correct match ? (1) Reserpine–Tranquilizer (2) Cocaine–Opiate narcotic (3) Morphine–hallucinogenic (4) Bhang–Analgesic
55.	The pituitary gland's posterior lobe produces following two hormones (1) vasopressin and oxytocin (2) cortisone and corticosterone (3) progesterone and estradiol (4) testosterone and aldosterone
56.	Which of the following is most likely to occur if communication between the SA node and the AV node became blocked ? (1) The rate of ventricular contraction will decrease (2) Afterload will increase (3) Stroke volume will increase to 5L/beat (4) None of the above

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57.	In the first phase of menstrual cycle (1) Oogonia differentiate into primary oocytes (2) Thickness of the stratum basalis decreases dramatically (3) Graafian follicle ruptures (4) The dominant follicle is opsonized
58.	Which of the following statement is incorrect about small intestine ? (1) Site of carbohydrate, protein and fat digestion (2) Site of majority of water absorption in the GI tract (3) First site of protein hydrolysis (4) Most rapid absorption of galactose
59.	Which of the following is not an example of primary succession ? (1) Moss growing on mountain cliffs (2) Grassland growing on the site of a previous rainforest (3) Vegetation colonising old lava fields on a volcanic island (4) Marsh vegetation on a mud flat
60.	Which of the following has maximum biodiversity ? (1) Mangroves (2) Temperate forest (3) Taiga (4) Coral reef
61.	The ozone layer protects us from harmful (1) UV-A radiation (2) UV-B radiation (3) UV-C radiation (4) Both (2) and (3)

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62.	The one-horned rhinoceros is specific to which of the following sanctuaries? (1) Bharatpur (2) Vedanthangal (3) Kaziranga (4) Corbett Park
63.	Which of the following is not an invasive alien species in the Indian context? (1) Lantana (2) Cynodon (3) Parthenium (4) Eichhornia
64.	Ananda Chakraborty received the first U.S. patent for a GM entity. The entity was (1) The GloFish (2) A transgenic mouse expressing the growth hormone gene (3) Cloned E.Coli (4) Pseudomonas engineered to degrade petroleum
65.	To which of the following residues of the protein, the protein kinases do not add phosphate groups ? (1) Serine (2) Cytosine (3) Threonine (4) Tyrosine
66.	Which of the following is not a secondary messanger ? (1) Cyclic GMP (2) Diacyl glycerol (3) Inositol triphosphate (4) Phosphotidyl inositol
67.	Mutation in an oncogene falls under which of the following classes ? (1) Loss of function mutation (2) Frame shift mutation (3) Gain of function mutation (4) Dominant negative mutation

Question No.	Questions
68.	Cytokines in the immune system (1) Are proteins or glycoproteins (2) Bind to cell surface receptors to mediate their effects (3) Are able to kill pathogens directly (4) Often act in synergy to induce immune response
69.	The different lineage of the lymphocytes can be distinguished by characterizing the expression of their membrane molecules called the cluster of differentiation (CD). Which of the following CD is only found in B-cells ? (1) CD-4 (2) CD-8 (3) CD-32 (4) CD-45
70.	Dendritic cells are characterized by (1) Their ability to release histamine (2) Their interface between the innate and adaptive immune system (3) Expression of CD3 (4) Expression of IgM molecules
71.	Applications of southern blotting includes (1) DNA fingerprinting (2) Preparation of RFLP maps (3) Identification of transferred genes (4) All of these

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72.	Which of the following processes does not occur in prokaryotes ? (1) Transcription (2) Splicing (3) Translation (4) Replication
73.	Which of the following is not the cloning vector utilized in recombinant DNA technology ? (1) Plasmid (2) Cosmids (3) Bacterial Artificial Chromosomes (4) Yeast Intact chromosomes
74.	Excess oxygen consumed after vigorous exercise is (1) To pump out lactic acid from muscles (2) To increase the concentration of lactic acid in muscles (3) To reduce dissolved CO_2 in blood (4) To make ATP for gluconeogenesis
75.	Which of the following is not true for cholesterol metabolism (1) The key regulator in cholesterol biosynthesis is HMG-CoA reductase (2) Biosynthesis takes place in cytoplasm (3) NADH is cofactor for reduction reactions (4) Cholesterol is transported by LDL in plasma

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76.	At zwitter ionic form, amino acid will act as (1) Proton donor (2) Proton acceptor (3) Proton donor and acceptor (4) None of these
77.	Which of the following amino acid is likely to occupy the interior of the globular protein ? (1) Methionine (2) Aspartate (3) Lysine (4) Arginine
78.	Negative staining is used for examining which of the following ? (1) virus particles (2) protein molecules (3) bacterial flagella (4) virus particles, protein molecules and bacterial flagella
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80.	Which is not an example of transmembrane transport between differen subcellular compartments ? (1) Transport from the stroma into thylakoid space (2) Transport from the cytoplasm into the lumen of the endoplasm reticulum (3) Transport from the endoplasmic reticulum into the Golgi complex (4) Transport from mitochondrial intermembrane space into th mitochondrial matrix

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81.	Which is correct regarding the peptides in the Ramachandran Plot ? (1) The sequence of the peptide can be deduced (2) It is not possible to conclude whether a peptide adopts entirely helix or entirely beta sheet conformation (3) Peptides that are unstructured will have all the backbone dihedral angles in the disallowed regions (4) The occurrence of a beta-turn conformation in a peptide can be deduced
82.	Glycophorin is involved in which of the following disease ? (1) Viral fever (2) Malaria (3) Common cold (4) Asthma
83.	In crop movement programme, haploids are important because they (1) require one half of nutrients (2) are helpful in study of meiosis (3) grow better under adverse conditions (4) form perfect homozygous
84.	Which among the following is the real product of the honey bee ? (1) Honey (2) Propolis (3) Pollen (4) Bee wax
85.	In cheese manufacture, the microorganisms are important for (1) the ripening only (2) the souring of milk only (3) the development of resistance to spoilage only (4) both the souring and the ripening processes

Question No.	Questions
86.	Coir is the commercial product of coconuts (1) Endocarp (2) Endosperm (3) Mesocarp (4) Pericarp
87.	Which of the following is non-symbiotic biofertilizer ? (1) Anabaena (2) Rhizobium (3) VAM (4) Azotobacter
88.	Which of the following is not a point mutation ? (1) Substitution (2) Transposition (3) Insertion (4) Transversion
89.	What will be the effect of the deletion mutation of a gene at the telomere? (1) Organism will die (2) Organism will develop serious hazards due to absence of the gene and its product (3) Mild effect on the phenotype (4) No effect
90.	Identify a Mendelian disorder from the following (1) Down's Syndrome (2) Klinefelter's Syndrome (3) Turner's Syndrome (4) Phenylketonuria
91.	Which of the following is helpful in distinguishing DNA of one individual from another ? (1) PCR (2) Reverse transcriptase (3) cDNA (4) RFLP

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92.	Short sub-sequence of a cDNA sequence is (1) Expressed sequence tag (2) Sequence tagged site (3) Contig (4) YAC
93.	In sickle-cell disease, a glutamate → valine substitution results in formation of HbS molecules, which (1) abnormally and cannot adequately carry O_2 (2) have abnormally high affinity for binding to O_2 (3) stabilize the wall of red blood cells against oxidative damage (4) cause high levels of repulsions between HbS molecules
94.	Which property of p53 enables it to prevent the development of cancer ? (1) It is a transcription factor that causes protein production which stimulates the cell cycle (2) It prevents replication of cells with damaged DNA (3) It prevents cells from triggering apoptosis (4) It stimulates synthesis of DNA repair enzymes that replace telomere sequence lost during cell division
95.	According to Shelford's law of tolerance and organism with wide tolerance limit for an environmental factor usually show (1) Wide distribution with low population size (2) Wide distribution with high population size (3) Narrow distribution with low population size (4) Narrow distribution with high population size

Question No.	Questions
96.	Which of the following is a non-parametric test ? (1) F-test (2) Z-test (3) Wilcoxon test (4) All of the above
97.	In NMR spectrum the nuclei in up field resonate at (1) High frequency (2) Low frequency (3) It is constant throughout the spectrum (4) It doesn't depends on chemical shift
98.	Which statement is correct with respect to the food chain ? (1) Every component of food chain forms trophic level (2) Inter-relation between different food chains is known as a food web (3) All the chains formed by nutritional relations is used to understand energy flow (4) All of the above
99.	Which of the following would occur through specialized transduction ? (1) acquisition of Hfr plasmid (2) transfer of genes for toxin production (3) transfer of genes for capsule formation (4) transfer of a plasmid with genes for degrading pesticides

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100.	Identify the mismatched pair (1) Tundra–Permafrost (2) Savanna–Acacia trees (3) Prairie–Epiphytes (4) Coniferous forest–Evergreen trees

SET–"X"

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LIFE SCIENCE

Code **B**

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23.	Which one of the following about development of sea urchin embryos is true? (1) Each blastomere of a 4 cell stage possess a portion of the original animal-vegetal axis and if isolated and allowed to develop will form a complete but smaller size larva (2) Each blastomere of a 8-cell stage has the capacity to form a complete embryo but by the 16 cell stage, blastomere will develop by their presumptive fate (3) Any blastomere isolated till the pluteus larva formation will regulate to go on and develop into a full sized embryo (4) After an intricate recombination at the 16 cell stage, the resulting embryo loses its ability to form a complex larva
24.	Discovery of Emerson effect showed the existence of (1) Photorespiration (2) Light and dark reaction in photosynthesis (3) Photophosphorylation (4) Two distinct photosystems

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25.	Which of the following statements is not correct about cyclic photophosphorylation? (1) It does not involve NADPH formation (2) It uses electrons supplied by photosystem 1 (3) It involves substrate level phosphorylation (4) It doesn't generate oxygen
26.	All of following inhibits auxin transport except (1) cytokinin (2) alpha napthylthalamic acid (3) 2,3,5,-tri indo benzoic acid (4) ethylene
27.	Under normal conditions, as electrons flow down the electron transport chain of the mitochondria (1) NADH and $FADH_2$ are oxidized (2) pH of the matrix increases (3) an electrochemical gradient is formed (4) All of the above
28.	Uncoupling of oxidative phosphorylation implies that (1) the ATPase activity of mitochondria is abolished (2) mitochondria ceases to oxidize succinate (3) ATP formation ceases but respiration continues (4) ATP formation continues but respiration ceases

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29.	The exonuclease activity of DNA polymerase functions to (1) Remove the RNA primer sequence (2) Proofread the new DNA strand and remove inappropriate nucleotides (3) Maximize the fidelity of DNA replication (4) All of the above
30.	Transposons (1) insert into DNA by homologous recombination (2) can't be transferred by phage mediated transduction (3) contain the equivalent of insertion (IS) elements (4) can insert into plasmids but not the bacterial chromosomes
31.	Which cranial nerve has the highest number of branches ? (1) Vagus nerve (2) Trigeminal nerve (3) Facial nerve (4) None of the above
32.	Which of the following ion is an ethylene inhibitor ? (1) Mg^{2+} (2) NH^{3+} (3) Ag^{+} (4) Cl^{-}
33.	A bioinformatics tool used to find out the sequence similarity in the subunits of hemoglobin is (1) FASTA (2) BLAST (3) HUMMER (4) PSI:PLOT

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34.	Which of the following development process in animals is more dependent on cellular movements ? (1) Pattern formation (2) Morphogenesis (3) Cell differentiation (4) Growth
35.	The organs radula and clitellum are found in (1) Coelenterata and Echinodermata, respectively (2) Echinodermata and Coelenterata, respectively (3) Annelida and Mollusca, respectively (4) Mollusca and Annelida, respectively
36.	Which of the following is unfavourable for protein folding ? (1) Hydrophobic interaction (2) Van der waals forces (3) Conformational entropy (4) Hydrogen bonding
37.	The wings of insects and wings of bats represent a case of (1) Divergent evolution (2) Convergent evolution (3) Parallel evolution (4) Neutral evolution
38.	Which one of the following features is common in silver fish, scorpion, dragon fly and prawn ? (1) Three pairs of legs and segmented body (2) Chitinous cuticle and two pairs of antennae (3) Jointed appendages and chitinous skeleton (4) Cephalothorax and trachea

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39.	Which of the following pairs of animals is correctly matched with the kind of their body symmetry ? (1) Hydra and shark–Bilateral symmetry (2) Tapeworm and octopus–Radial symmetry (3) Amoeba and sea urchin–Asymmetry (4) Jelly fish and star fish–Radial symmetry
40.	Which of the following statement is incorrect ? (1) Circulating body fluids in insects serve to distribute oxygen to tissues (2) The principle of countercurrent flow facilitates efficient respiration in gills of fishes (3) The residual air in lungs slightly decreases the efficiency of respiration in birds (4) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds
41.	Which of the following is helpful in distinguishing DNA of one individual from another ? (1) PCR (2) Reverse transcriptase (3) cDNA (4) RFLP
42.	Short sub-sequence of a cDNA sequence is (1) Expressed sequence tag (2) Sequence tagged site (3) Contig (4) YAC

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43.	In sickle-cell disease, a glutamate → valine substitution results in formation of HbS molecules, which (1) abnormally and cannot adequately carry O_2 (2) have abnormally high affinity for binding to O_2 (3) stabilize the wall of red blood cells against oxidative damage (4) cause high levels of repulsions between HbS molecules
44.	Which property of p53 enables it to prevent the development of cancer ? (1) It is a transcription factor that causes protein production which stimulates the cell cycle (2) It prevents replication of cells with damaged DNA (3) It prevents cells from triggering apoptosis (4) It stimulates synthesis of DNA repair enzymes that replace telomere sequence lost during cell division
45.	According to Shelford's law of tolerance and organism with wide tolerance limit for an environmental factor usually show (1) Wide distribution with low population size (2) Wide distribution with high population size (3) Narrow distribution with low population size (4) Narrow distribution with high population size
46.	Which of the following is a non-parametric test ? (1) F-test (2) Z-test (3) Wilcoxon test (4) All of the above

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47.	In NMR spectrum the nuclei in up field resonate at (1) High frequency (2) Low frequency (3) It is constant throughout the spectrum (4) It doesn't depends on chemical shift
48.	Which statement is correct with respect to the food chain ? (1) Every component of food chain forms trophic level (2) Inter-relation between different food chains is known as a food web (3) All the chains formed by nutritional relations is used to understand energy flow (4) All of the above
49.	Which of the following would occur through specialized transduction ? (1) acquisition of Hfr plasmid (2) transfer of genes for toxin production (3) transfer of genes for capsule formation (4) transfer of a plasmid with genes for degrading pesticides
50.	Identify the mismatched pair (1) Tundra–Permafrost (2) Savanna–Acacia trees (3) Prairie–Epiphytes (4) Coniferous forest–Evergreen trees

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SET–"X"

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(MPH/PHD/URS–EE–2020)

LIFE SCIENCE

Code **C**

Sr. No. 10363

Time : 1¼ Hours | Total Questions : 100 | Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

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(Signature of the candidate) (Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. **All questions are compulsory.**
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only Black or Blue <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

SEAL

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88.	Which one of the following features is common in silver fish, scorpion, dragon fly and prawn ? (1) Three pairs of legs and segmented body (2) Chitinous cuticle and two pairs of antennae (3) Jointed appendages and chitinous skeleton (4) Cephalothorax and trachea
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SET–"X"

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(MPH/PHD/URS–EE–2020)

LIFE SCIENCE

Sr. No. 10364

Code **D**

Time : 1¼ Hours **Total Questions : 100** **Max. Marks : 100**

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

Mother's Name : _____ Date of Examination : _____

(Signature of the candidate) (Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. **All questions are compulsory.**
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

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41.	At which stage of HIV infection does one usually show symptoms of AIDS? (1) Within 15 days of sexual contact with an infected person (2) When the infected retrovirus enters host cells (3) When viral DNA is produced by reverse transcriptase (4) When HIV replicates rapidly in helper T-lymphocytes and damages large number of these cells
42.	During each cycle of chain elongation in translation, how many conformational changes does the ribosomes undergo that are coupled to GTP hydrolysis ? (1) Zero (2) One (3) Two (4) Three
43.	Which one of the following about development of sea urchin embryos is true? (1) Each blastomere of a 4 cell stage possess a portion of the original animal-vegetal axis and if isolated and allowed to develop will form a complete but smaller size larva (2) Each blastomere of a 8-cell stage has the capacity to form a complete embryo but by the 16 cell stage, blastomere will develop by their presumptive fate (3) Any blastomere isolated till the pluteus larva formation will regulate to go on and develop into a full sized embryo (4) After an intricate recombination at the 16 cell stage, the resulting embryo loses its ability to form a complex larva

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53.	Which is synthesized in G1 phase ? (1) DNA polymerase (2) Histones (3) Nucleolar DNA (4) Tubulin protein
54.	Histone proteins found in the nuclei of eukaryotes are rich in which of the following amino acids ? (1) Glycine and phenylalanine (2) Lysine and arginine (3) Glycine and arginine (4) Phenylalanine and lysine
55.	Random genetic drift in a population probably results from (1) Highly genetically variable individuals (2) Interbreeding within this population (3) Constant low mutation rate (4) Large population size
56.	The use of copper in copper releasing IUDs is (1) It alters the reproductive cycle in females (2) Copper decreases phagocytosis of sperms in the uterus (3) Copper ions released suppress sperm motility and the fertilization of sperms (4) Copper ions inhibits ovulation

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57.	Which of the following are true for electron microscopy ? (1) specimen should be thin and dry (2) image is obtained on a phosphorescent screen (3) electron beam must pass through evacuated chamber (4) specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber
58.	Which one of the following pairs of plant structures has haploid number of chromosomes ? (1) Egg nucleus and secondary nucleus (2) Megaspore mother cell and antipodal cells (3) Egg cell and antipodal cells (4) Nucellus and antipodal cells
59.	Apomictic embryos in *Citrus* arise from (1) Diploid egg (2) Synergids (3) Maternal sporophytic tissue in ovule (4) Antipodal cells
60.	Where will you look for the sporozoites of the malarial parasites ? (1) Salivary glands of freshly moulted female *Anopheles* mosquito (2) Saliva of infected female *Anopheles* mosquito (3) RBCs of humans suffering from malaria (4) Spleen of infected humans

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61.	Transcription termination of mRNA genes in eukaryotes occurs (1) at polyadenylation sites by the action of a terminator factor (2) by the formation of a strong hairpin structure in the vicinity of polyadenylation site (3) termination factor bound to the termination site in the vicinity of polyadenylation site (4) at pause sites following the polyadenylation sites
62.	GTP is required by which of the following steps in protein synthesis ? (1) Aminoacyl tRNA synthetase activation of amino acids (2) Attachment of ribosomes to endoplasmic reticulum (3) Translocation of tRNA-nascent protein complex from A site to P site (4) Attachment of mRNA to ribosomes
63.	Which of the following sequences is most likely to be a restriction enzyme recognition site ? (1) CGGCTT (2) CGCCGC (3) GTAATG (4) GTCGAC
64.	Polymerase chain reaction is considered as a revolutionary technology because all of the following, except (1) it enables an unlimited production of a DNA fragment *in vitro* (2) it is a highly sensitive technology (3) its experimental protocol is simple (4) it enables the direct production of a synthetic gene that did not exist before

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65.	If two genes are unlinked the recombination frequency will be (1) 25% (2) 50% (3) 75% (4) 100%
66.	Which of the following is a kinetin derivative ? (1) Adenine (2) Thymine (3) Uracil (4) Cytosine
67.	ELISA utilizes enzymes that (1) have a high turnover rate (2) yield a stable coloured product (3) are stable on conjugation to proteins (4) all of the above
68.	Which of the following disease is not an autoimmune disease ? (1) Rheumatoid arthritis (2) Lupus erythematosus (3) Bovine spongiform encephalitis (4) Grave's disease
69.	Live vaccine is (1) low dose of infectious bacteria administered as prophylactic (2) a dose of bacterial strain in a modified form which retains immunogenicity but is not pathogenic (3) a low dose of toxin that is produced by the bacterium (4) a sample of cells from a patient who recently recovered from the diseases

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70.	The speed of migration of ions in an electric field depends upon (1) magnitude of charge and mass of molecules (2) magnitude of charge and shape of molecules (3) shape and size of the molecules (4) magnitude of charge, shape and mass of molecules
71.	The ozone layer protects us from harmful (1) UV-A radiation (2) UV-B radiation (3) UV-C radiation (4) Both (2) and (3)
72.	The one-horned rhinoceros is specific to which of the following sanctuaries? (1) Bharatpur (2) Vedanthangal (3) Kaziranga (4) Corbett Park
73.	Which of the following is not an invasive alien species in the Indian context? (1) Lantana (2) Cynodon (3) Parthenium (4) Eichhornia
74.	Ananda Chakraborty received the first U.S. patent for a GM entity. The entity was (1) The GloFish (2) A transgenic mouse expressing the growth hormone gene (3) Cloned E.Coli (4) Pseudomonas engineered to degrade petroleum

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75.	To which of the following residues of the protein, the protein kinases do not add phosphate groups ? (1) Serine (2) Cytosine (3) Threonine (4) Tyrosine
76.	Which of the following is not a secondary messanger ? (1) Cyclic GMP (2) Diacyl glycerol (3) Inositol triphosphate (4) Phosphotidyl inositol
77.	Mutation in an oncogene falls under which of the following classes ? (1) Loss of function mutation (2) Frame shift mutation (3) Gain of function mutation (4) Dominant negative mutation
78.	Cytokines in the immune system (1) Are proteins or glycoproteins (2) Bind to cell surface receptors to mediate their effects (3) Are able to kill pathogens directly (4) Often act in synergy to induce immune response
79.	The different lineage of the lymphocytes can be distinguished by characterizing the expression of their membrane molecules called the cluster of differentiation (CD). Which of the following CD is only found in B-cells ? (1) CD-4 (2) CD-8 (3) CD-32 (4) CD-45

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80.	Dendritic cells are characterized by (1) Their ability to release histamine (2) Their interface between the innate and adaptive immune system (3) Expression of CD3 (4) Expression of IgM molecules
81.	Arithmetic mean of the two regression coefficients is (1) Equal to correlation coefficient (2) Greater than correlation coefficient (3) Less than correlation coefficient (4) Equal to or greater than correlation coefficient
82.	Retroviruses are capable of causing cancer because they (1) produce a very high number of progeny viruses per infected cell (2) often contain point mutations in their pol gene (3) transduce mutant versions of cellular genes that normally regulate cell growth (4) infect cells more efficiently than other viruses
83.	*Puccinia* forms uredia and (1) Telia on wheat leaves (2) Aecia on barbery leaves (3) Pycnia on barbery leaves (4) Aecia on wheat leaves

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84.	Bryophytes can be separated from algae, because they (1) Possess archegonia (2) Contain chloroplast (3) Are thalloid forms (4) Have no conducting tissue
85.	Sexual reproduction is absent in (1) *Spirogyra* (2) *Nostoc* (3) *Ulothrix* (4) *Volvox*
86.	Which of the following compound is not amphipathic ? (1) Phosphotidylcholine (2) Cholesterol (3) Oleic acid (4) Succinate
87.	Pneumatophores are found in (1) Vegetation found in marshy and saline lake (2) Vegetation found in acidic soil (3) Xerophytes (4) Epiphytes
88.	Which of the following statement is true ? (1) Vessels are multicellular with wide lumen (2) Tracheids are multicellular with narrow lumen (3) Vessels are unicellular with narrow lumen (4) Tracheids are unicellular with wide lumen

Question No.	Questions
89.	The cells of quiescent centre are characterized by (1) Dense cytoplasm and prominent nuclei (2) Light cytoplasm and small nuclei (3) Dividing regularly to add to the corpus (4) Dividing regularly to add to the tunica
90.	Which of the following statement is false ? (1) The ovaries in frogs are structurally and functionally connected with kidney (2) Mature female frog can lay 2500 to 3000 unfertilized ova at a time (3) In male frog there are 10-12 vasa efferentia arise from testes and enter kidney on their side and open into bladder's canal (4) The eggs of frog are mesolecithal and telolecithal
91.	Which is correct regarding the peptides in the Ramachandran Plot ? (1) The sequence of the peptide can be deduced (2) It is not possible to conclude whether a peptide adopts entirely helix or entirely beta sheet conformation (3) Peptides that are unstructured will have all the backbone dihedral angles in the disallowed regions (4) The occurrence of a beta-turn conformation in a peptide can be deduced
92.	Glycophorin is involved in which of the following disease ? (1) Viral fever (2) Malaria (3) Common cold (4) Asthma

Question No.	Questions
93.	In crop movement programme, haploids are important because they (1) require one half of nutrients (2) are helpful in study of meiosis (3) grow better under adverse conditions (4) form perfect homozygous
94.	Which among the following is the real product of the honey bee ? (1) Honey (2) Propolis (3) Pollen (4) Bee wax
95.	In cheese manufacture, the microorganisms are important for (1) the ripening only (2) the souring of milk only (3) the development of resistance to spoilage only (4) both the souring and the ripening processes
96.	Coir is the commercial product of coconuts (1) Endocarp (2) Endosperm (3) Mesocarp (4) Pericarp
97.	Which of the following is non-symbiotic biofertilizer ? (1) Anabaena (2) Rhizobium (3) VAM (4) Azotobacter
98.	Which of the following is not a point mutation ? (1) Substitution (2) Transposition (3) Insertion (4) Transversion

Question No.	Questions
99.	What will be the effect of the deletion mutation of a gene at the telomere? (1) Organism will die (2) Organism will develop serious hazards due to absence of the gene and its product (3) Mild effect on the phenotype (4) No effect
100.	Identify a Mendelian disorder from the following (1) Down's Syndrome (2) Klinefelter's Syndrome (3) Turner's Syndrome (4) Phenylketonuria

Answer key Life Science Ph.D Entrance Exam 2020				
Q.No.	A	B	C	D
1	2	4	3	1
2	3	2	3	3
3	1	4	4	2
4	1	4	4	2
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98	4	1	3	2
99	2	2	2	4
100	3	1	4	2