U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: ES Cluster (EC, EE, EI & ET) **Duration: 1 hr.**
Course Code: 23ES3BSBFE **Max Marks: 50**
Course: Biology for Engineers

Instructions: 1. Answer all questions from Part A
2. Answer three full questions from Part B

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		Part A	CO	PO	Marks
1		Non ionizing radiation examples are A. Electronmagnetic waves B. Ultra violet rays C. Both A & B D. None of the above	CO 3	PO 6	1
2		Which among these particles could contribute to ionizing radiation? A. Neutrinos B. Muons C. Mesons D. Alpha particles	CO 3	PO 6	1
3		A nuclear power plant in Harare, Zimbabwe has faced an explosion due to multiple issues. What would be an ideal strategy to contain radiation? A. Bury the power plant with millions of tonnes of wood B. Burn the remaining power plant with Petrol or any other suitable inflammable agent C. Annihilate the power plant with 5 tonnes of TNT (Trinitrotoluene) D. Contain the power plant with a massive wall constructed with lead	CO 3	PO 6	1
4		Shorter the wavelength is _____ the frequency. A. Lower B. Higher C. Equal D. None	CO 1	-	1
5		The risk of osteoporosis and bone fractures could be best diagnosed using which among these methods A. MRI B. CT scan	CO 1	-	1

			C. Dual Energy X-ray Absorptiometry D. Trigonometry			
	6		Olfactory receptors are located in A. Nose B. Hair C. Taste buds D. Eyes	***CO** 1*	-	**1**
	7		Bioartificial liver support is an____ device A. Internal-corporeal device B. Passive device C. Active device D. D. Extracorporeal device	***CO** 1*	-	**1**
	8		Bioprosthetic Valves are made from processed animal tissues of: A. Oryctolagus Cuniculus B. Porcine and Bovine C. Selachimorpha D. D. Canis lupus familiaris	***CO** 1*	-	**1**
	9		What does GPS stand for? A. Global positioning system B. Global positioning satellite C. Global positioning software D. Global phone software	***CO** 1*	-	**1**
	10		Cytokines are measure of: A. Bone marrow density B. Blood cell growth factor C. Heart beat D. D. Respiration rate	***CO** 1*	-	**1**
	11		Which of the following epidermal layer is not found in thin skin? A. Stratum Corneum B. Stratum lucidum C. Stratum spinosum A. D. Stratum granulosum	***CO** 2*	*PO 1*	**1**
	12		Which of the following statement is not true? A. Keratinocytes protects skin and muscles from heat and chemicals B. papillary region is responsible for the figure prints C. Markel cells are used for touch sensations B. D. Apoptosis takes place in stratum granulosum	***CO** 2*	*PO 1*	**1**
	13		What is the main function of Pacinian corpuscles present in the hypodermis? A. tickling sensations	***CO** 2*	*PO 1*	**1**

			B. Itching sensation C. blood supply to the hypodermis A. D. none of the above			
	14		What is abnormal thickening of stratum Corneum called? A. Dandruff B. callus C. Comedo A. D. Abrasion	***CO** 2*	*PO 1*	**1**
	15		Which is the olfactory organ? A. Ear B. Tongue C. Nose B. D. Eyes	***CO** 2*	*PO 1*	**1**
	16		Materials used for 3D printing of human ear are: A. Hydrogels B. Biocompatible polymers C. Scaffolds D. All of the above	***CO** 2*	*PO 1*	**1**
	17		What is a potential benefit that could one day be achieved with 3D bioprinting? A. To help patients who are in need of new tissues or organs B. To aid in the testing of new drugs C. To reduce the risk of transplant rejection using host cells D. D. All of the above	***CO** 2*	*PO 1*	**1**
	18		What is a current capability of 3D bioprinting? A. Printing tissue samples for use in drug testing B. Printing small organs like ears or bones C. Printing complex, functional organs like hearts and kidneys D. D. All of the above	***CO** 2*	*PO 1*	**1**
	19		Which of the following is not a limitation of 3D bioprinting? A. The abundant and branched nature of the vasculature is difficult to reproduce B. Risk of immune rejection is high when using foreign materials C. Accurately printing tissues on the micro-scale D. D. Finding long-lasting, biocompatible materials that will not have negative side-effects	***CO** 2*	*PO 1*	**1**
	20		Scaffolds used to create a specific shape or structure for the bone tissue to grow are: A. Polyglycolic acid B. Poly-L-lactic acid	***CO** 2*	*PO 1*	**1**

			C. Polyethylene terephthalate D. All of the above			
			Part B			
	1	a)	Explain ionizing and non-ionizing radiation briefly	***CO** 3*	*PO 6*	**5**
		b)	Characterize alpha and beta radiations with various parameters such as mass, penetrating power, ionizing power and shielding	***CO** 3*	*PO 6*	**5**
	2	a)	What are the ethical and regulatory considerations for artificial organ development?	***CO** 1*	-	**5**
		b)	Describe the principle of echolocation with an example.	***CO** 1*	-	**5**
	3	a)	Explain the process of damage of repair of DNA. When exposed to radiation.	***CO** 3*	*PO6*	**5**
		b)	What are the various types of heart valves?	***CO** 1*	-	**5**
	4	a)	Explain 3D-printing techniques for ears?	***CO** 2*	*PO 1*	**5**
		b)	Explain bio-ceramic based bone constructs	***CO** 2*	*PO 1*	**5**
	5	a)	Explain the lotus leaf effect and its application	***CO** 2*	*PO 1*	**5**
		b)	Explain the working principle of electric nose	***CO** 1*	-	**5**

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