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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E.

Semester: VIII

Branch: Biotechnology

Duration: 3 hrs.

Course Code: 22BT8HSBEB / 19BT8HSBEB

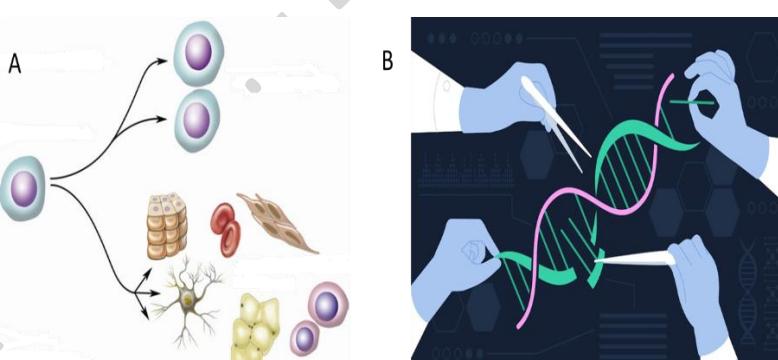
Max Marks: 100

Course: Bioethics and Biosafety

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I			CO	PO	Marks
1	a)	A pioneer private biotech corporate collaborating with private university in UK carried out research on MDR genes of different Indian race TB and drug development. The process employed in screening, developing and final testing of the technique was unique and intellect of experts in both organizations. The outcome of the research was a very first novel and highly potential single drug to cure TB. Further assume that the drug could be of potentially beneficial to populated countries like India (being predominant in TB cases) and some low income countries. Discuss the possible and specific public issues (ELSI) that can be raised from the above situation.	CO 1	PO 1,8	10
	b)	Discuss the relevance of basic science to development of technology with suitable examples from BT domain.	CO 1	PO 1	5
	c)	Expand TKDL. Discuss how it could function as prior art reference to foil the attempts to patent by western community.	CO 1	PO 1	5
OR					
2	a)	In 2002, a joint venture between Monsanto and Mahyco introduced a GM crop in India which could resist bollworms. Identify and discuss the GM crop. Highlight the major positive impacts it has caused till date in our country.	CO	PO	10
	b)	What are the challenges that Biotechnology research and industries face with respect to hunger amelioration in our country.	CO 1	PO 1	5
	c)	Distinguish public funding from private funding emphasizing mainly on the purpose of such funding.	CO1	PO2	5
UNIT - II					
3	a)	With suitable hypothetical scenario discuss the following components of issues in Biotechnology i. Interference with nature ii. Fear of unknown	CO2	PO1, 8	10

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.

	b)	<p>Consider the following two hypothetical scenario and answer the questions</p> <p>A drug company manufactures antibiotic against <i>Salmonella</i> infections. The preclinical studies showed that the drug had 30% efficacy while 70% toxicity. The LD50 of the drug was almost in the region of ED50. The same company manufactured a vaccine against COVID 19 strain and in the preclinical studies it showed that the vaccine is effective against 20 mice out of 100. While in the rest of the mice it caused notable side effects.</p> <ol style="list-style-type: none"> Which ethical component does the above case study addresses? Justify suitably. Can such therapeutic measures have taken to the next level of clinical studies? Justify. 	CO1	PO1, 8	05
	c)	Add a note on issues related to technology transfer across the globe with relevant to Biotechnology.	CO2	PO8	5
		OR			
4	a)	'Sometimes the business ethics supersede the bioethics. With relevant past, present and future case studies discuss the statement.	CO2	PO6, 8	10
	b)	Do you endorse Bio-art? Justify suitably with valid reasons.	CO1	PO1	05
	c)	The people are scared of consuming the genetically modified foods. Infer with suitable reasons for the people perception.	CO2	PO6, 8	05
		UNIT - III			
5	a)	<p>Referring to the following images, answer the questions below.</p>  <ol style="list-style-type: none"> The images relate to what advanced technique in the field of health sector. Highlight the potential applications of those techniques. Provide the possible ELSI that could raise from the applications of these techniques. 	CO1	PO1	10
	b)	ART has become one of the beneficial technologies for the society but sometimes raises some serious ethical and religious issues. Justify.	CO3	PO8	5
	c)	Discuss the ELSI which can be predicted from the release of GM microbes in the environment.	CO3	PO6	5

OR					
6	a)	<p>Scenario 1: A child of 5 year old is suffering from severe heart disease. The cardiologist examines the child in detail with only relevant diagnostic procedures and reports to the cardio surgeon. Both the doctors sit across with parents of the child and explains them in detail the condition of the child and the possible treatment techniques before heading to further actions.</p> <p>Scenario 2: An Employee from a private entity was suffering from cough and fever. He visits a doctor in a government hospital and explains the symptoms. The doctor in turn advices for diagnosis the results of which emerges as TB infected. The hospital staff also takes the complete personal information of the patient. The patient keeps the reports very securely and even doesn't bring it to the notice of his own family. The very next day when he goes to office he learns that his colleagues start to distance from him. Later he learns that one of his colleagues is a nearest relative of a medical staff in the hospital.</p> <p>i. Which of the scenario are right as per code of medical ethics? Justify your decision.</p> <p>Infer from the scenario 1 the essentiality of child autonomy.</p>	<i>CO3</i>	<i>PO8</i>	10
	b)	The ability to design a synthetic cell of even a eukaryotic cell has raised more fears than assuming the benefits among the society. Justify.	<i>CO3</i>	<i>PO8</i>	5
	c)	“Human genome project is the potential source for further researching to gain breakthrough in health sector but draws huge opposition from the society”. Discuss.	<i>CO2</i>	<i>PO6, 8</i>	5
UNIT - IV					
7	a)	<p>Assume that a virus which is indigenous to US is been shifted to India under the Indo-US collaborative research program. The virus is known to cause the disease in a variety of sheep found in US different from Indian varieties. There exist the efficient vaccine as well as potential cure for the disease.</p> <p>Which BSL do you recommend for handling this non-indigenous virus in India and why? Describe the essential containment facilities of BSL of your choice in this context.</p>	<i>CO3</i>	<i>PO6</i>	10
	b)	Discuss the major economic impacts caused in the past due to deliberate use of WMDs against targeted countries.	<i>CO4</i>	<i>PO6, 8</i>	5
	c)	“Any strain that is to be more (or less) hazardous than the parent (wild type) strain should be handled at a higher (or lower) containment level than that is appropriate for the RG of the parent organism”. Justify the statement with suitable examples.	<i>CO3</i>	<i>PO6, 8</i>	5
		OR			

	8	a)	Compare and contrast the diverse groups of microbes with respect to initial risk assessment. Infer the role of NIH concerned with research employing such microbes.	CO4	PO6, 8	10
		b)	Following are the observations made with respect to a pharma company engaged with clinical trials for their newly developed drug. <ol style="list-style-type: none"> The drug to be tested for efficacy or toxicity was tested on insects in pre-clinical trials. The sample size had just 10 for starting a clinical trial the results of which are used to apply for crores of people. 	CO4	PO6, 8	5
		c)	Describe the major essential features a highest biosafety level that one can adopt to handle most potential pathogen.	CO4	PO8	5
UNIT - V						
	9	a)	Discuss the role BCH and AIA in a protocol that addresses and monitors transboundary movement of LMOs.	CO4	PO6, 8	10
		b)	GEAC and RCGM are the important authority that monitor the progresses and approval processes relevant to Biotechnological inventions in India. Describe the same.	CO4	PO6, 8	10
OR						
	10	a)	Following are two hypothetical scenarios with respect to crop improvement in our country. <p>Scenario 1: The Agri-based private company A willing to improve the potato crop by internal breeding between the selected varieties from various parts of the country. The technology involves exchange of traits or transfer of traits following the theories of mendelian genetics that involve intra-species gene transfer. Further the company eyes to go ahead with field trials to check efficiency.</p> <p>Scenario-2: The Agri-based company willing to improve the sugarcane crop to control the fungal disease. The technology used is transfer of bacterial gene that codes for enzymes which could lyse the cell wall of pathogenic fungi. The vector for the gene transfer is Agrobacterium-mediated. Further the company eyes to go ahead with field trials to check efficiency.</p> <ol style="list-style-type: none"> Will the concerned public agencies consider above case studies equally while prescribing the guidelines? Justify. Which of the case studies directly come under DBT agencies? Give the name the agencies? Issue the proper guidelines to the selected case study towards conduction field trials.	CO4	PO8	10
		b)	Discuss the advantages of usage of bioweapons for mass destruction by any person and also the main disadvantage to the one indulged in Bioterrorism.	CO4	PO8	5
		c)	Comment on the role of FSSAI in regulating the food and its ingredients.	CO4	PO8	5
