MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

I SEMESTER B.TECH. INTERNAL EXAMINATIONS JANUARY 2022

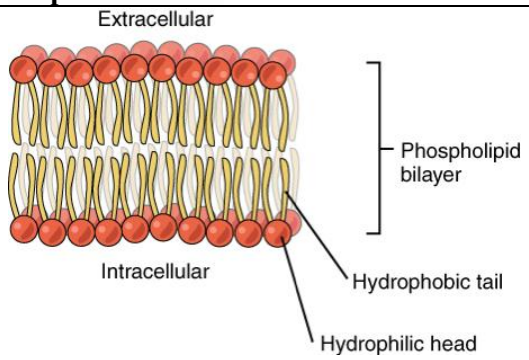
MIDTERM TEST

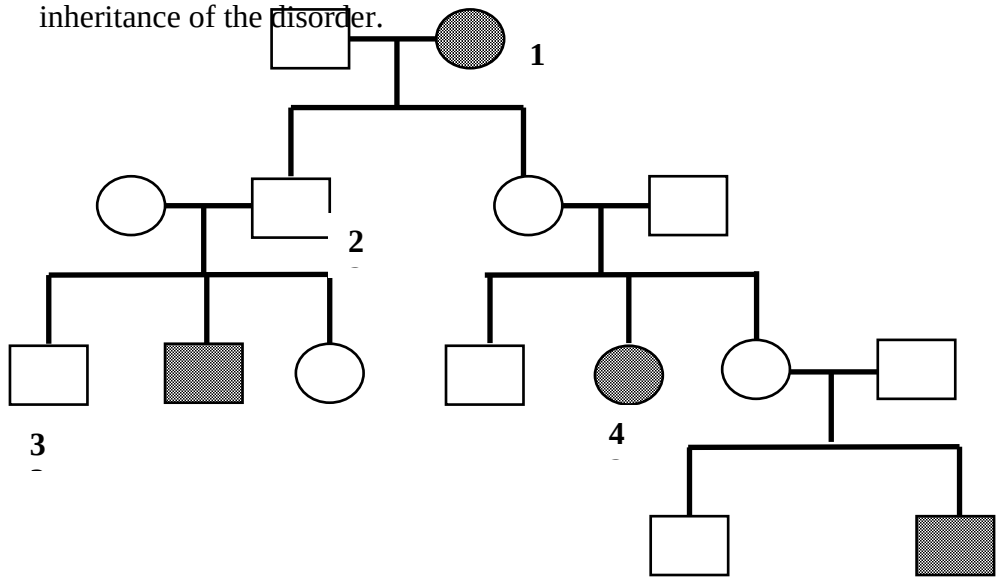
SUBJECT: Biology for Engineers [BIO 1051]

Date of Exam: **22/01/2022** Time of Exam: **10:30 AM – 12:00 PM** Max. Marks: **30**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitable assumed

	Q1-4 CARRY THREE MARKS EACH	
Q1.	You are doing a genetics experiment with the fruit fly. In the "P" generation, you cross two true-breeding flies. The female parent is **brown** and wingless and the male parent is black with **normal** wings. All of the flies in the F1 generation are brown and have normal wings. a) The genotypes of the flies in the P generation are: b) The genotype of the flies in the F1 generation is c) You now take an F1 female and cross her to a true-breeding black, wingless male . When you count the F2 generation, you really get: 78 brown winged flies 739 black winged flies 876 brown wingless flies 125 black wingless flies **Map the distance**	**1** **1** **1**
Q2.	 Observe the given figure of the cell membrane. A beta pleated sheet is traversing through the membrane. Depict the possibility of the following aminoacids in the betapleated sheet interacting with the membrane . Depict this in the given diagram. a. Phenylalanine b. Glutamic acid c. Tyrosine	**1*3**
Q3.	The sequence of the DNA strand is given as below. 5'GTGTCCGTCAAATATTGTGAGATGTTATATCCCGCCGTCAACACCA TCAACAGGTAAAATCGCCTGCTGGGGCAAAGGCGGTGGGG 3' **a.** Which nucleotide base has free Phosphate and Hydroxyl group? b. The region in yellow depicts the promoter region and the grey denotes the terminator region. Give the sequence of the transcribed RNA	**1** **2**
Q4.	Calculate value of ΔG^0 for the following enzyme catalyzed reaction occurring under equilibrium conditions at 25ºC and pH 7. (R=8.315 J/mol K and T= 298 K). Equilibrium concentrations of the reaction components are: Glucose 1-phosphate⟶ Glucose 6-phosphate Glucose 1- phosphate=4.5 × 10 -3 M	**3**

	and Glucose 6- phosphate= 9.6 × 10-2 M. K'eq=?	
	Q5-6 CARRY 4 MARKS EACH	
Q5.	Q1. In one of a genetic condition extreme sensitivity towards ultraviolet rays was observed. The condition generally afftected the eyes and the skin exposed to the sun. The Pedigree of the disorder is depicted as under. A) What is the mode of inheritance of the disorder? B) Give the genotypes of the four individuals marked based on the mode of inheritance of the disorder.  C) What would the genotype result in if "4" marries a normal male?	1 0.5*4 1
Q6.	A. The telomerase enzyme helps in extending telomeric sequences. How can telomerase be used as a target for treating cancerous cells? B. In a hypothetical situation, if there would be 200 amino acids how many nucleotides will be present in the genetic code?	**2** **2**