AR18

CODE: 18BST209 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, December,2022

BIOLOGY

(Common to CE, CSE & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT – I

1. a) Why do we need to study biology? Discuss how biological observations of the 18th century that lead to major discoveries. (6M)
   b) Discuss biology and summarize the main basic principles of biology in detail. (6M)

(OR)

2. a) Analyse the Brownian motion and the origin of Thermodynamics. (6M)
   b) Interpret the need to study biology and explain the main difference between science and engineering. (6M)

UNIT – II

3. a) Explain the ultra-structure of Prokaryotes and Eukaryotes. (6M)
   b) Explain the ecological aspects of single-celled organisms. (6M)

(OR)

4. a) Describe the concept of species and strains along with the identification of micro-organisms. (6M)
   b) Write about the carbon utilization in Autotrophs, Heterotrophs and lithotrophs. (6M)

UNIT – III

5. a) Demonstrate the Mendel's Laws of Segregation and Independent Assortment. (6M)
   b) Define the polymeric structures with examples. (6M)

(OR)

6. a) Define biomolecule and bring out functional aspects of nucleic acids in life. (6M)
   b) Write about the concept of Genetic code and Genetic recombination. (6M)

UNIT – IV

7. a) Define enzymes. Write about their molecular analysis. (6M)
   b) Explain briefly about structural elements. (6M)

(OR)

8. a) Write about the Enzyme kinetics and Kinetic parameters. (6M)
   b) Write about the structure and functions of Proteins. (6M)

UNIT – V

9. a) Write a brief account of the Endothermic reaction and demonstrate the glycolysis cycle. (6M)
   b) Write a brief account of Thermodynamics as applied to biological systems. (6M)

(OR)

10. a) Demonstrate Krebs cycle in life along with the characterization of an exergonic reaction. (6M)
    b) Discuss the synthesis of Glucose through photosynthesis in plants. (6M)

AR18

CODE: 18ECT206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, December, 2022

PROBABILITY AND STOCHASTIC PROCESSES

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. State and Prove Bayes theorem of probability? [12M]

(OR)

2. a) Explain the following
(i) Discrete Sample Spaces (ii) Probability as a relative frequency
(iii) Conditional Probability (iv) Independent Events [6M]

b) State the total probability theorem. [6M]

UNIT-II

3. a) Write shoes notes on Binomial distribution [6M]

b) A discrete random variable x has possible values $x_i = i^2$, i= 1,2,3,4,5, which occur with probabilities 0.4,0.25,0.15,0.1, and 0.1 respectively .Find the mean value x =E[x] of x. [6M]

(OR)

4. a) Define moment generating function? State properties of moment generating function? [6M]

b) Show that the mean value and variance of the random variable having the uniform distribution functions are [6M]

$$\frac{(a+b)}{2} \text{ and } \frac{(b-a)^2}{12}.$$

UNIT-III

5. a) Prove that the density function of sum of two statistically independent random variables is equal to the convolution of their individual density functions. [6M]

   b) Define Marginal density function? Find the Marginal density functions of below joint density function. [6M]
   fxy(x, y) =1/12 xy, 0<x<1, 0<Y<1.

(OR)

6. State and prove Central Limit Theorem. [12M]

UNIT-IV

7. State the properties auto correlation function. [12M]

(OR)

8. a) Define Auto correlation function and explain its properties. [6M]

   b) A random process is described by $X(t)=A^2\cos^2(\omega_c t+\Phi)$ where A and ω_c are constants and Φ is a random variable uniformly distributed between $\pm\pi$. Is X(t) wide sense stationary. [6M]

UNIT-V

9. State the properties of power spectrum density. [12M]

(OR)

10. a) State and prove Wiener-Khinchin relation. [10M]

    b) Find whether given power spectrum $\frac{\omega 2}{\omega 6+3\omega 2+3}$ is valid or not. [2M]

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AR13

CODE: 13EC2003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, December, 2022

SWITCHING THEORY AND LOGIC DESIGN
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) The eight bit 2's complement form of $(-23)_{10}$ is _____.
   b) What is the parity type of the binary number 11011001?
   c) Which logic gate is given by the following logic operation, "If and only if all of the inputs are on, the output will be off"?
   d) How many minimum number of 2 -input NAND gates are required to realize the Boolean function Y=A.B+C.D.
   e) Minimize the following Boolean function A+AB+ABC+ABCD+----
   f) What is the principle of De-Multiplexer?
   g) Which type of 4-bit adder circuit eliminates carry ripple delay?
   h) Which combinational circuit is called a distributor?
   i) Give the difference between latch and flip-flop.
   j) What is the functionality of Johnson counter?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Perform the following **6M**
      i) $(137.64)_{10} = (\ )_6 = (\ )_2$
      ii) $(1111.1011)_2 = (\ )_8 = (\ )_{16}$
   b) Write the equivalent $(743)_{10}$ in BCD, 2421 and 6421 codes. **6M**

(OR)

3. Detect and correct errors if any in the Hamming codes and write the correct code. **12M**
   (i) 1100110 (ii) 0011101

UNIT-II

4. a) Express the following function in sum of minterms and product of maxterms **6M**
   F(A,B,C)= B'.C+A'.C+B.C'
   b) Simplify the following Boolean expressions to a minimum number of literals
   i) X'.Y'+X.Y+X'.Y ii) X'.Y+X.Y'+X.Y+X'.Y'.

(OR)

5. Implement all logic gates using only NOR gates. **12M**

UNIT-III

6. a) Implement 3-bit gray code to binary code converter. **6M**
   b) Using K-map minimize the following Boolean function **6M**
   F (A, B, C, D, E) = ∑ m (0, 5, 6, 8, 9, 10, 11, 16, 20, 42, 25, 26, 27)

(OR)

7. Simplify the following Boolean function using tabular method. F(W,X,Y,Z)=∑m(0,2,4,5,6,7,8,10,13,15) **12M**

UNIT-IV

8. a) Explain the operation of full subtractor? Implement full subtractor using half subtractor and logic gates. **6M**
   b) Implement the three-variable Boolean function using a 8-to-1 multiplexer **6M**
   F (A, B, C)=A.C'+A.B'.C+A.B.C'.

(OR)

9. a) Describe the functionality of 4-bit BCD adder using a neat diagram. **6M**
   b) Write a short note on seven segment display. **6M**

UNIT-V

10. Design a mod 7 asynchronous counter using JK flip-flop. **12M**

(OR)

11. a) Convert S-R flip flop to D-flip flop **7M**
    b) Discuss briefly about 4-bit control buffer register **5M**

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