25 . BT.

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9019

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Biotechnology
U19BT516 – HEAT & MASS TRANSFER
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write the expression for rate of heat transfer by conduction for unidirectional heat flow through a slab.	2	K3	CO1
2.	List the dimensionless numbers involving in free convection heat transfer.	2	K4	CO1
3.	Write the limitations of the double pipe heat exchangers	2	K2	CO2
4.	Define steam economy and capacity of evaporator.	2	K1	CO2
5.	The molar flux of component 'A' diffusing in a rubber of slab (2 m x 3 m) of thickness 15 mm is 5.75×10^{-11}kmol of A/(s m^2). Calculate the mass rate of hydrogen diffusing.	2	K3	CO3
6.	How do the penetration theory different from film theory of mass transfer?	2	K2	CO3
7.	What is HETP? Write its significance.	2	K2	CO4
8.	What are the factors to be considered for the choice of solvent for extraction?	2	K1	CO4
9.	Write the operating line equation for flash distillation.	2	K2	CO5
10.	Differentiate Langmuir and Freundlich isotherm.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	The composite wall of a furnace consists of 15 cm thick inner layer of silica brick (k = 1.04 W/m °C and 20 cm thick of insulating brick (k = 0.2 W/m °C). The inside temperature of the furnace is 800°C and the interface temperature is 705°C. Calculate i. the rate of heat loss through the furnace wall ii. the outside temperature of the brick layer iii. the % heat transfer resistance offered by the refractory layer.	13	K3	CO1
		(OR)			
	b)	A vertical pipe of 100 mm outer diameter and length 3 m is in a room where air is at 293 K. Calculate the rate of heat loss by free convection per m length of the pipe if the pipe temperature is 373K. Take the properties of air are as follows: $k = 0.02896 W/m K$, $\gamma = 18.97 \times 10^{-6} m^2/s$, $N_{Pr} = 0.696$.	13	K3	CO1
12.	a)	In a counter flow double pipe water flows through a tube (OD: 19mm, ID: 16mm) at a flow rate of 1.5m/s. The oil flows through the annulus formed by inner copper tube and outer steel tube (OD: 30mm, ID: 26mm). The steel tube is insulated from outside. The oil enters at 0.4kg/s and is cooled from 65°C to 50°C whereas water enters at 32°C. Calculate the pressure drop in the exchanger. The Data given: Fouling factor, water side: $0.0005 m^2$ K/W, Oil side: $0.0008 m^2$ K/W, Neglect wall resistances.	13	K4	CO2
		Property / Oil / Water Density (kg/m^3) / 850 / 995 Specific heat (kJ/kg K) / 1.89 / 4.2 Thermal conductivity (W/m K) / 0.138 / 0.615 Kinematic viscosity (m^2/s) / 7.44×10^{-6} / 4.18×10^{-7} Check the suitability of the exchanger.			
		(OR)			
	b)	i. With the help of temperature - enthalpy diagram, discuss the different boiling regimes.	7	K3	CO2
		ii. List out the assumptions made in Nusselt's theory of film condensation.	6		
13.	a)	NH_3 gas diffuses through N_2 under steady state condition with non-diffusing N_2 the total pressure is 1atm pressure and temperature is 25°C. The diffusion thickness is 0.25m the partial pressure of NH_3 at one point is 1.5×10^4Pa and at the other point is 5×10^3Pa. The Diffusivity $_{Ammonia\text{-}Nitrogen}$ for mixture at 1atm and 298K is $2.3*10^{-5} m^2/sec$. Calculate flux of NH_3 (Ammonia through non diffusing Nitrogen). Calculate flux for equimolal counter diffusion.	13	K4	CO3

(OR)

b)	i.	Write a note on convective mass transfer coefficients for liquids and gases.	6	K3	CO3
	ii.	Give a brief description on heat, momentum and mass transfer analogies.	7	K4	CO3

14.	a)	In a equipment used for the absorption of SO_2 from air by water at a particular section the gas and liquid phase concentrations of the solute are 10mole% and 4 mass % respectively. The solution density is 61.8lb/ft^3. At the given temperature of 40°C and pressure of 10atm, the distribution of SO_2 between air and water can be approximately described as $p_A = 25\ x_A$, where p_A is the partial pressure of SO_2 in the gas phase in atm. The individual mass transfer coefficients are k_x = 10 kmol /(hr m$^2\Delta$x), and k_y = 8 kmol /(hr m$^2\Delta$y). Calculate the overall mass transfer coefficient, K_G in kmol /(hr m$^2\Delta$p in mm of Hg) and interface solute concentrations at both phases.	13	K4	CO4

(OR)

b)	i.	Explain the cross current and counter current multistage extraction with their relative merits and demerits.	6	K3	CO4
	ii.	List out the different contactors used for extractor and explain any two in detail.	7		

15.	a)	A mixture of component A and B containing 45% mole percent A is to be separated to give an overhead product of 95% more volatile component and a bottom product containing 5 mole per cent of more volatile component. The feed is at its boiling point and vapour leaving the column is condensed but not cooled and provides reflux and product, Calculate the minimum reflux ratio and number of theoretical plates required when total reflux is used. Take the relative volatility of the mixture is 2.4. Assume A is more volatile component.	13	K4	CO5

(OR)

	b)	Discuss in detail on mass transfer zone and breakthrough in an adsorption column using solid phase and solute concentration profiles with time and position.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	A continuous single effect evaporator concentrates 5 TPH of a 1 wt % salt solution entering at 311K to a final concentration of 5 wt %. The vapor space of the evaporator is at 1 atm abs. and the steam supplied at 143. 3 kPa. The overall coefficient is 1705 W/m^2 K. Evaporator tubes are 37.5 mm OD, 34.2 mm ID and of height 150 cm arranged on 47.65 mm square pitch. i. Design a suitable evaporator. ii. If there is 5 K BPE, how does this effect the performance and design of evaporator	15	K5	CO2
		(OR)			
	b)	95% of SO_2present in 8% (mole basis) in SO_2 - air mixture is recovered by fresh water in a packed absorption tower. Gas and water flow rates are 5 TPH/hr and 100 TPH /hr. Calculate the height. Equilibrium data for SO_2 - air mixture:	15	K5	CO4

SO_2 in solution (%w)	0.1	0.2	0.3	0.5	0.7	1	1.5
Partial Pressure (mm Hg)	3.2	8.5	14.1	26	39	59	92

Height of gas film transfer unit: 0.7 m, Height of liquid film transfer unit: 0.7 m, Take slope of equilibrium relation as 35. Assume the flooding velocity as 0.87 kg/m^2 s and operating velocity as 66% of flooding.

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 2010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Biotechnology
U15MA304 – COMPLEX ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS
(Regulation 2015)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Show that the function $f(z) = \|z\|^2$ is differentiable only at the origin.	2	K1	CO1
2.	Show that an analytic function with constant modulus is also constant	2	K1	CO1
3.	Find the residue of $f(z) = \frac{z^2}{(z-1)(z+2)^2}$ at its simple pole.	2	K1	CO2
4.	Identify the type of singularity of function $sin\left(\frac{1}{1-z}\right)$.	2	K3	CO2
5.	Find the constant term in the Fourier expansion of $x^2 - 2$, in the range $\|z\| \leq 2$.	2	K1	CO3
6.	Find $f(x) = x$ in (0,1) as a Fourier sine series.	2	K1	CO3
7.	Find the Fourier transform of $f(x) = \begin{cases} 1 \; for \; \|x\| < a \\ 0 \; for \; \|x\| > a > 0 \end{cases}$	2	K1	CO4
8.	Find the Fourier sine transform of $e^{-3x} + 3e^{-2x}$.	2	K1	CO4
9.	Classify the partial differential equation $x^2 f_{xx} + (1 - y^2) f_{yy} = 0$ for $-1 < y < 1, -\infty < x < \infty$.	2	K2	CO5
10.	A string is stretched and fastened to two ends "l" apart. Motion is started by displacing the string into the form $y = y_0 \sin\left(\frac{\pi x}{l}\right)$ from which it is released at time t = 0. Build this problem as the boundary value problem.	2	K3	CO5

PART – B

(5 x 16 = 80 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	If $u = \frac{2\sin 2x}{e^{2y}+e^{-2y}-2\cos 2x}$, find $w = f(z)$ such that $f(z)$ is analytic.	8	K1	CO1
		ii.	Find the bilinear transformation which maps $z = 1, i, -1$ respectively onto $w = i, 0, -i$ respectively.	8	K1	CO1
			(OR)			
	b)	i.	If $f(z) = u + iv$ is an analytic function and $u - v = e^x(\cos y - \sin y)$, find $f(z)$ In terms of z.	8	K1	CO1
		ii.	Find the image of $\lvert z - 2i\rvert = 2$, under the transformation $w = \frac{1}{z}$.	8	K1	CO1
12.	a)	i.	Evaluate $\int_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$, where C is $\lvert z\rvert = 3$.	8	K5	CO2
		ii.	Make use of Taylor's series to find $f(z) = \cos z$ about the point $z = \frac{\pi}{4}$.	8	K3	CO2
			(OR)			
	b)	i.	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\sin\theta}$.	8	K5	CO2
		ii.	Make use of Laurent's series to find $f(z) = \frac{(z-2)(z+2)}{(z+1)(z+4)}$ valid in $1 < \lvert z\rvert < 4$.	8	K3	CO2
13.	a)	i.	Find the Fourier series expansion of period $2l$ for the function $f(x) = (l - x)^2$ in the range $(0,2l)$. Deduce the sum of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$.	8	K1	CO3
		ii.	Find the Fourier series expansion of the function $f(x) = \begin{cases} 1 + \frac{2x}{\pi}, & -\pi \le x \le 0 \\ 1 - \frac{2x}{\pi}, & 0 \le x \le \pi \end{cases}$	8	K1	CO3
			(OR)			
	b)	i.	Find the half range sine series of $f(x) = x\cos x$ in $(0, \pi)$.	8	K1	CO3
		ii.	Find the Fourier series of $f(x) = x^2$ in $-\pi < x < \pi$. Hence show that $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \cdots = \frac{\pi^4}{90}$.	8	K1	CO3
14.	a)	i.	Make use of Fourier transform to find $e^{-a^2x^2}, a > 0$.	8	K3	CO4
		ii.	Find the Fourier cosine transform of $f(x) = \frac{e^{-ax}}{x}$ and hence find $F_C\left[\frac{e^{-ax} - e^{-bx}}{x}\right]$.	8	K1	CO4

(OR)

b)	i.	Make use of Fourier transform to evaluate $\int_0^\infty \frac{x^2\,dx}{(x^2+a^2)(x^2+b^2)}$.	8	K3	CO4
	ii.	Find the Fourier transform of $f(x)$ if $f(x) = \begin{cases} 1-\lvert x\rvert, & \lvert x\rvert < 1 \\ 0, & \lvert x\rvert > 1. \end{cases}$ Hence deduce that $\int_0^\infty \left(\frac{\sin t}{t}\right)^2 dt = \frac{\pi}{2}$.	8	K1	CO4
15.	a)	A string is stretched and fastened at two points $x = 0$ and $x = l$ apart. Motion is started by displacing the string in to the form $y = k(lx - x^2)$ from which it is released at time t=0. Find the displacement at any point on the string at a distance of from one end at time t.	16	K3	CO5

(OR)

	b)	A rod of length 20 cm has its ends A and B kept at temperature $30^\circ C$ and $90^\circ C$ respectively until steady state conditions prevail. If the temperature at both end is then suddenly reduced to $0^\circ C$ and maintained so, find the temperature distribution of the rod.	16	K3	CO5

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9017

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Biotechnology
U19BT302 – ESSENTIALS OF MICROBIOLOGY
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is Ziehl–Neelsen staining?	2	K1	CO1
2.	Write short note on Koch's postulates.	2	K1	CO1
3.	What is retrovirus? Give any two examples.	2	K1	CO2
4.	Write any two functions of bacterial pilli.	2	K1	CO2
5.	Define enrichment media.	2	K1	CO3
6.	Differentiate between commensalism and parasitism.	2	K1	CO3
7.	Write short note on dry heat sterilization.	2	K1	CO4
8.	Name two antifungal drugs.	2	K1	CO4
9.	What is bioleaching?	2	K1	CO5
10.	What is the causative microorganism of typhoid and cholera?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the different staining techniques used in microbiology with neat sketch.	8	K2	CO1
		ii.	With neat diagram explain the Fluorescent Microscopy	5		
			(OR)			
	b)	i.	Classify the bacteria based on shape and arrangements with examples	6	K2	CO1
		ii.	What is attenuated bacteria? Explain it with Pasteur's experimental demonstration.	7		

12.	a)	i.	Compare and contrast between the cell wall structure of gram positive and gram negative bacteria.	7	K2	CO2
		ii.	Explain the replication of virus with diagram.	6		
			(OR)			
	b)	i.	Give an account on the classification and general characteristics of fungi.	7	K2	CO2
		ii.	What is mycoplasma? Explain its characteristics and colony morphology in detail.	6		
13.	a)	i.	Explain the nutritional requirements of bacteria.	7	K2	CO3
		ii.	Discuss the different methods for measurement of microbial growth.	6		
			(OR)			
	b)	i.	Give an account on the microbial preservation techniques.	7	K2	CO3
		ii.	Describe the different methods of strain improvement.	6		
14.	a)	i.	Discuss in detail about the chemical antimicrobial agents	7	K2	CO4
		ii.	Explain the physical methods of sterilization with illustration.	6		
			(OR)			
	b)	i.	Classify the antimicrobial drugs and explain their mode of action.	8	K2	CO4
		ii.	Describe in detail about mechanism of drug resistance by microorganisms.	5		
15.	a)	i.	Describe in detail about the phosphate biofertilizer.	7	K2	CO5
		ii.	Explain the wastewater treatment using microbes.	6		
			(OR)			
	b)	i.	Explain the different methods used for preservation of food products.	8	K2	CO5
		ii.	Describe the morphology, pathogenesis, lab diagnosis of HIV.	5		

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)		Explain the working principle of SEM and TEM with neat sketch.	15	K2	CO1
			(OR)			
	b)	i.	A huge amount of biological solid waste is discharged into the environment. The waste matter is organic in nature. As a microbiologist explain the conversion of biowaste to methane in detailed process.	8	K6	CO5
		ii.	What is microbial growth curve? Explain the primary and secondary metabolites with suitable examples.	7		

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 1001

B.E. / B.Tech DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Biotechnology
U19GE304 – UNIT OPERATIONS
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	4.9 g of H_2SO_4 is present in 500ml of solution. Find the normality and molarity of the solution.	2	K3	CO1
2.	Differentiate density and specific gravity.	2	K2	CO1
3.	Define stoichiometric equation with an example.	2	K2	CO2
4.	Write the importance of the law of conservation of mass.	2	K1	CO2
5.	Differentiate atmospheric and gauge pressure.	2	K2	CO3
6.	A manometer is used to measure the pressure in a tank. The fluid used has a specific gravity of 0.85, and the manometer column height is 55 cm. If the local atmospheric pressure is 96 kPa, determine the absolute pressure within the tank.	2	K2	CO3
7.	What are the applications of butterfly valve?	2	K2	CO4
8.	List out some of the variable head type flowmeters.	2	K1	CO4
9.	What are rotary pumps?	2	K2	CO2
10.	What is the difference between compressor and blower?	2	K3	CO3

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Derive an ideal gas law and mention the terms involved in it.	8	K1	CO1
		ii.	Calculate the temperature at which 0.654 moles of neon gas occupies 12.30 litres at 1.95 atmospheres.	5	K2	
			(OR)			
	b)		Three gases (8.00 g of methane, CH_4, 18.0 g of ethane, C_2H_6, and an unknown amount of propane, C_3H_8) were added to the same 10.0 L container. At 23.0 °C, the total pressure in the container was measured to be 4.43 atm. Calculate the partial pressure of each gas in the container.	13	K3	CO1
12.	a)		In the production of sulfur trioxide, 100 kmol of SO_2 and 100 kmol of O_2 are fed to a reactor. If the percent conversion of SO_2 is 80, calculate the composition of the product stream on mole basis.	13	K3	CO2
			(OR)			
	b)		Explain the general procedure for solving material balance problems.	13	K2	CO2
13.	a)	i.	What is a non-newtonian fluid?	3	K1	CO3
		ii.	Explain the types of non-newtonian fluid with examples.	10		
			(OR)			
	b)		Two pipelines of equal length are connected in series. If the diameter of second pipe is two times that of first pipe, determine the ratio of head loss between first and second pipe.	13	K3	CO3
14.	a)		Air at 37.8°C and 101.3 kPa absolute pressure flows at a velocity of 23 m/s past a sphere having a diameter of 42 mm. Calculate the drag coefficient C_D and the force on the sphere.	13	K3	CO4
			(OR)			
	b)		Describe with neat sketch, the construction and working principle of pitot tube.	13	K1	CO4
15.	a)		Draw a neat diagram and explain centrifugal pump in detail. Write its application.	13	K1	CO5
			(OR)			
	b)		With a neat diagram explain the working principle, advantages and disadvantages of diaphragm pump.	13	K1	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	An evaporator is fed with 15,000 kg/h of a solution containing 10% NaCl, 15% NaOH and rest water. In the operation, water is evaporated and NaCl is precipitated as crystals. The thick liquor leaving the evaporator contains 45% NaOH, 2% NaCl and rest water. Calculate (a) kg/h water operated (b) kg/h thick liquor	15	K3	CO2
		(OR)			
	b)	What are the five major types of valves used for flow control and explain their functions.	15	K2	CO3

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9018

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023

Third Semester

Biotechnology

U19BT303 – INTRODUCTION TO BIOCHEMISTRY

(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	State the role of biological buffers. Give an example.	2	K2	CO1
2.	Justify Chargaff's Rule of Base Pairing.	2	K3	CO1
3.	Brief a note on the structural composition of starch and glycogen.	2	K1	CO2
4.	Define reducing and Non-Reducing sugar with examples.	2	K2	CO2
5.	Differentiate between fibrous proteins and globular proteins	2	K2	CO3
6.	What is Histone Protein?	2	K2	CO3
7.	How do contractile proteins play role in structural alignment of cells?	2	K1	CO4
8.	Compare and contrast nucleosides and nucleotides.	2	K2	CO4
9.	Mention any TWO examples for high energy compounds with their role.	2	K1	CO5
10.	How is pyruvate is activated prior to its entry into the TCA cycle?	2	K4	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a) i.	List any FIVE common functional groups of biomolecules along with its structure.	5	K1	CO1
	ii.	Hydrogen bonding gives water its unusual properties- Justify the statement with suitable explanation.	8	K4	CO1

(OR)

	b)	With a neat labeled sketch, explain the level of protein structure with suitable examples.	13	K2	CO1
12.	a)	Exemplify the steps involved in the biosynthesis of cholesterol.	13	K2	CO2
		(OR)			
	b)	With a neat illustration, describe the biochemical pathway of Hans krebscycle.	13	K2	CO2
13.	a)	i. Discuss the detailed biochemical steps involved in the denovo synthesis of purine nucleotides.	10	K2	CO3
		ii. Infer the role of salvage pathway in nucleic acid metabolism.	3	K3	CO3
		(OR)			
	b)	Narrate the steps involved in the biochemical pathway of Urea cycle.	13	K2	CO3
14.	a)	Explain the mechanism of myosin ATPase activity. And explain how it helps in Muscle contraction.	13	K2	CO4
		(OR)			
	b)	Describe a detailed note on microfilaments and their role in organelle movements.	13	K2	CO4
15.	a)	Elaborate on Electron transport chain with neat flowchart.	13	K2	CO5
		(OR)			
	b)	With detailed calculations, determine the total number of ATPs produced during the beta oxidation of palmitic acid.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Human brain alone requires about 120 g of glucose each day which is more than half of all the glucose stored as glycogen in muscle and liver. However, the supply of glucose from these stores is not always sufficient; between meals and during longer fasts, or after vigorous exercise, glycogen is depleted. For these times, organisms need a method for synthesizing glucose from noncarbohydrate precursors. Exemplify the biochemical pathway in which pyruvate and related three- and four-carbon compounds are converted into glucose.	15	K5	CO2
		(OR)			
	b)	i. Explain the metabolic disorders associated with aminoacid metabolism.	15	K3	CO3
		ii. List some of the important molecules derived from amino acid metabolism and brief on it.			

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9021

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Biotechnology
U19BT304 – INDUSTRIAL BIOTECHNOLOGICAL PRODUCTS
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is the importance of yeast extract in Industrial Fermentation?	2	K1	CO1
2.	Mention any two methods to improve the strain of industrially important microorganisms.	2	K2	CO1
3.	Distinguish between Primary and Secondary Metabolites with examples.	2	K1	CO2
4.	State the applications of Primary Metabolites.	2	K1	CO2
5.	Infer the role of precursors and inducers in Secondary Metabolite production.	2	K1	CO3
6.	List the factors that affect Secondary Metabolite production.	2	K2	CO3
7.	Write any two mechanisms of regulating enzyme synthesis.	2	K1	CO4
8.	Quote any two enzymes used in brewing with their role.	2	K1	CO4
9.	Indicate the different types of bioreactors used in animal cell culture.	2	K2	CO5
10.	What is meant by Genetic Engineering?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Classify the various unit operations in the upstream and downstream bioprocess of a new age bioproduct and explain with example.	8+5	K3	CO1
		(OR)			
	b)	Describe the industrial fermentation with details about the raw materials and medium requirement for fermentation process.	6+7	K3	CO1
12.	a)	Exemplify the submerged and surface process of Citric acid production with a neat flowchart.	8+5	K2	CO2
		(OR)			
	b)	Narrate the ABE fermentation process with a neat flowchart.	10+3	K2	CO2
13.	a)	Paraphrase the industrial production of Chloramphenicol with a neat flowchart.	8+5	K2	CO3
		(OR)			
	b)	With a neat flow sheet, explain the penicillin production process.	7+6	K3	CO3
14.	a)	Enumerate the isolation and purification of commercially important enzymes.	7+6	K3	CO4
		(OR)			
	b)	Discuss about the manufacturing, formulation and production of biofertilizers.	7+6	K3	CO4
15.	a)	Write a note on recombinant proteins and discuss the production of recombinant proteins with their applications.	9+4	K2	CO5
		(OR)			
	b)	Demonstrate the principle and manufacturing process of Hepatitis B vaccine with a neat flowchart.	8+ 5	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Suggest some of the suitable bioprocess strategies used in plant and animal cell culture with a neat flowchart.	7+8	K5	CO5
		(OR)			
	b)	With a clear process flow diagram, explain the production of biodiesel. Discuss its characterization, advantages and disadvantages of biodiesel production.	8+7	K4	CO4

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9020

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Biotechnology
U15BT302 – GENETICS AND MOLECULAR BIOLOGY
(Regulation 2015)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Recite is genetic linkage.	2	K1	CO1
2.	Which process forms the basis of heredity?	2	K2	CO1
3.	State the Mendel's law of dominance.	2	K1	CO2
4.	Write the principle of eugenics.	2	K2	CO2
5.	How can DNA breaks be repaired?	2	K2	CO3
6.	What are the three main events involved in mRNA processing?	2	K1	CO3
7.	Define translational control with example.	2	K1	CO4
8.	Where does protein glycosylation occur?	2	K2	CO4
9.	What are operons? Give example.	2	K1	CO5
10.	Define genome cloning.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss briefly the Mendelian principles and their application	13	K1	CO1
		(OR)			
	b)	With the neat sketch explain the steps involved in constructing a physical map.	13	K1	CO1
12.	a)	Explain how mutations could be beneficial with two examples.	13	K2	CO2
		(OR)			
	b)	Give an account on different types of chromosomal aberrations.	13	K1	CO2
13.	a)	Describe the steps involved in eukaryotic transcription.	13	K2	CO3
		(OR)			
	b)	Illustrate the mechanisms involved in mutagenesis.	13	K3	CO3
14.	a)	Explain the step by step event involved in prokaryotic translation.	13	K1	CO4
		(OR)			
	b)	Discuss briefly the different types of post-translational modifications.	13	K2	CO4
15.	a)	Give an account on the steps involved in top-down and bottom-up approaches of genome sequencing.	13	K2	CO5
		(OR)			
	b)	Summarize the role of lac operon and its mechanism in bacteria.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Genetics has led to the discovery of many hereditary diseases. Discuss.	15	K3	CO2
		(OR)			
	b)	Give an overview of gene silencing, how it works, its pros and cons to the future aspects of genetic engineering.	15	K1	CO5