

Course Code: SOS-B-PH301

OP JINDAL UNIVERSITY

Mid-Semester Examination, Oct-2023

B.Sc. 3rd Semester

Thermal Physics



Time: 2 Hrs.

Max. Marks: 50

Note:

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		L

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	State and Prove Carnot's Theorem?	5	CO-3	K3
	b.	Prove that $C_P - C_V = R$	5	CO-4	K3
	c.	Deduce Clausius – Clapeyron equation. $\frac{dP}{dT} = \frac{L}{T(V_2 - V_1)}$	5	CO-4	K3
	d.	Explain Tds 1 st & 2 nd equations.	5	CO-4	K3
	e.	Explain the concept of Entropy and derive an expression for Entropy in Perfect gas.	5	CO-3	K3

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Derive Maxwell's thermodynamic equations connecting the thermodynamic quantities.	10	CO-6	K3
	b.	Derive an expression for Energy equations.	10	CO-4	K3
	c.	What are thermodynamic potentials? Explain.	10	CO-4	K2
	d.	State and Prove the Second law of thermodynamics.	10	CO-2	K2

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. Hons. 3rd Semester [03UG021]

Physics

Mathematical Physics-II

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Define periodic function and write orthogonality conditions for sine and cosine function.	5	CO1	K1
	b.	Evaluate period of $f(x) = \sin(3x + 1) - \tan x$	5	CO1	K1
	c.	Define even and odd function with necessary diagram.	5	CO1	K1
	d.	Explain term by term differentiation and Integration? Find whether term by term differentiation is possible for $\{f(x) = x^2, -\pi \leq x \leq \pi\}$	5	CO2	K2
	e.	Write Dirichlet's theorem and conditions.	5	CO2	K1

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Define Fourier Series and evaluate Fourier coefficients a_0 , a_n , and b_n .	10	CO1	K2
	b.	Find the Fourier series of the following function: $\left\{ \begin{array}{l} f(x) = 0 \text{ when } -\pi \leq x \leq 0 \\ f(x) = k \text{ when } 0 \leq x \leq \pi \end{array} \right\}$	10	CO1	K3
	c.	Find the series of sine and cosines of multiples of x which represents $f(x)$ in the interval $-\pi \leq x \leq \pi$ where $\left\{ \begin{array}{l} f(x) = 0 \text{ when } -\pi \leq x \leq 0 \\ f(x) = \frac{\pi x}{4} \text{ when } 0 \leq x \leq \pi \end{array} \right\}$	10	CO1	K3
	d.	Find the Fourier series of function as $f(x) = (\sin x)$ for $\pi \leq x \leq 2\pi$	10	CO1	K3

Course Code: SOS-B-PH303

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

BSc 3rd Semester [03UG021]

Physics

Digital Systems and Applications

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Draw the PIN diagram of IC741 8-PIN metal can and IC741 8-PIN mini DIP.	5	CO1	K1
	b.	Describe about ICs based on fabrication. What do you mean by Wafer.	5	CO1	K2
	c.	Why we use digital circuits. Write the difference between analog and digital circuits.	5	CO2	K2
	d.	(i) Find the decimal equivalent of the binary number (11011001.01) (ii) Convert the following decimal numbers into octal 7292, 1564	5	CO2	K1
	e.	Do the following conversions: (i) $(11011011110.101)_2$ to octal. (ii) $(7634.246)_8$ to binary.	5	CO2	K1

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Discuss about operational amplifier. Its advantages, applications, packages and terminals.	10	CO1	K3
	b.	By using all types of logic gate prove that NAND gate as a universal gate. Write the advantages and drawbacks of ICs.	10	CO2	K3
	c.	Simplify the following Boolean expressions and draw its logic gate diagram: (i) $Y = (A+B)(B+C)(C+A)$ (ii) $Y = \bar{A}B + B(\bar{A}+B) + C(B+C)$	10	CO2	K2
	d.	Simplify the following Boolean function by using Karnaugh Map (K-Map): (i) $F(A, B, C, D) = \sum(4, 6, 7, 15)$ (ii) $F(A, B, C, D) = \sum(1, 3, 7, 11, 15)$ (iii) $F(A, B, C) = \sum(1, 2, 3, 5, 7)$ (iv) $F(A, B, C) = \sum(0, 2, 5, 7)$	10	CO2	K2

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. 3rd Semester (03UG021/03UG022/03UG023)

Physics/ Chemistry/ Mathematics

GE-III Computer Networks and Internet Technologies

Time: 2 Hrs.

Max. Marks: 50

Note: Use linear diagram and drawings to explain long answer type questions.

M CO KL

Section A (10 marks)

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Define Internet?	2	CO1	K1
	b.	What do mean by Data Communication?	2	CO1	K1
	c.	What is the difference between MAC address and IP address?	2	CO1	K1
	d.	Define Ethernet.	2	CO2	K2
	e.	What two functions are performed by an antenna?	2	CO3	K2

Section B (16 marks)

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	Indicate some significant differences between broadcast radio and microwave.	4	CO3	K2
	b.	What are the fundamental characteristics for effective data communication?	4	CO3	K2
	c.	What are some major limitations of twisted-pair wire?	4	CO3	K2
	d.	What is the difference between LAN, MAN, WAN and WMAN ?	4	CO1	K1
	e.	Explain the functions and protocols and services of each layer?	4	CO1	K1

Section C (24 marks)

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	Explain difference between UDP and TCP.	8	CO2	K2
	b.	What is network topology? Explain the different network topologies.	8	CO2	K2
	c.	Explain the OSI reference model with neat diagram	8	CO2	K2
	d.	How repeater works? Explain.	8	CO3	K2
	e.	What is RJ-45 and NIC? Explain in detail.	8	CO3	K2

Course Code: MCH 2101

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. Chemistry (03PG012)

INORGANIC CHEMISTRY-III

Time: 2 Hrs.

Max. Marks: 50

M CO KL

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Draw all types of crystal system.	5	1	2
	b.	Define color centres.	5	1	1
	c.	Explain the Schottky defects and Frankel defects in detail.	5	1	1
	d.	Draw the plane in a unit cell for the miller indices [111] and [101].	5	1	2
	e.	Differentiate between intrinsic and extrinsic semiconductor.	5	2	2
	f.	Explain doping in semiconductors.	5	2	2

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Define the law of constancy of interfacial angles and law of rational indices.	10	1	2
	b.	Diagrammatically explain all types of plane defects.	10	1	2
	c.	Classify the conductor, semiconductor, and insulators on the basis of band theory.	10	2	1
	d.	Explain the thermodynamics of Schottky and Frenkel defect.	10	1	2

Course Code: **SOS-B-CH301****OP JINDAL UNIVERSITY**

Mid Semester Examination, October-2023

B.Sc. 3rd Semester [03UG022]

BSc Honors Chemistry

Inorganic Chemistry

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	What is metallurgy? To Explain the procedure of metals extraction.	5	1	1
	b.	Define Bronsted-Lowry concept of Acid Base theory.	5	2	2
	c.	Explain Zone refining process of metallurgy.	5	1	1
	d.	Define Lewis Acid Base concept with suitable examples.	5	2	2
	e.	Give any 10- 10 examples of acids and bases.	5	2	2

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Explain Ellingham Diagram for for reduction of metal oxides using carbon and carbon monoxide as reducing agent.	10	1	1
	b.	To write short notes on: a) Mond's process b) Van Arkel-de Boer process c) Electrolytic kroll process	10	1	1
	c.	What is HSAB principal? To write their applications.	10	2	2
	d.	To compare Brosted Lawry Acid base and Lewis acid base concept .	10	2	2

Course Code: SOS-B-CH302

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. (H) 3rd Semester [03UG022]**CHEMISTRY****CC- VI: Organic Chemistry- II**

Time: 2 Hrs.

Max. Marks: 50

Note: Attempt all sections

M CO KL

Section A (10 marks)

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Give an example of 2° alkyl halide.	2	1	1
	b.	Draw the structure of Benzyne.	2	1	1
	c.	What is an S _N i reaction?	2	1	2
	d.	What are Pinacols?	2	2	1
	e.	What is the use of PCC?	2	2	2

Section B (16 marks)

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	What happens when Chlorobenzene is treated with Potassium amide dissolved in liquid ammonia at very low temperature? Explain the mechanism of the reaction.	4	1	2
	b.	How will you prepare the following? i. Ethyl chloride from ethyl alcohol ii. Chlorobenzene from corresponding diazonium salt	4	1	2
	c.	What is an S _N 1 reaction? Discuss the mechanism and write its important features.	4	1	2
	d.	Discuss Markonikov's rule for the synthesis of alcohol from alkene using an example and write its mechanism.	4	2	2
	e.	Complete the following reactions: i. $\text{Phenol} + \text{Benzoyl chloride} \xrightarrow{\text{NaOH}}$ ii. $\text{Phenol} + \text{Zinc dust} \rightarrow$	4	2	2

Section C (24 marks)

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	Discuss the stereochemical aspect of S _N 2 reaction. Also explain various factors affecting it.	8	1	3
	b.	Write the mechanism of the following reactions: i. S _N Ar reaction ii. Mercuration– Demercuration of Alkenes	8	1	3
	c.	What is pinacol-pinacolone rearrangement? Discuss its mechanism.	8	2	3
	d.	What is Reimer-Tiemann Reaction? Describe its mechanism.	8	2	3



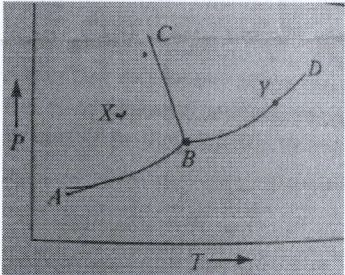
Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Explain why KCl-NaCl-H ₂ O system should be regarded as a 3 component system whereas KCl-NaBr-H ₂ O system should be regarded as a 4 component system?	5	CO1	2
	b.	Define the terms :- Phase, Components and degree of freedom	5	CO1	1
	c.	Discuss the phase diagram of water system	5	CO1	3
	d.	What is Clausius-Clapeyron equation and its applications to solid- liquid?	5	CO1	1
	e.	Derive Nernst distribution law explain and applications.	5	CO2	3

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Determine the number of degrees of freedom in each of the following systems. Suggest the variables that could correspond to these degrees of freedom. a) Liquid water and water vapour in equilibrium b) Liquid water and water vapour in equilibrium at a pressure of 1 atm.	10	CO1	3
	b.	Calculate the phase diagram for a one-component system shown in fig a) Calculate the degree of freedom at points B, X and Y b) How many phases exist along AB, BC, and BD 	10	CO1	3
	c.	Explain the conditions for thermal equilibrium?	10	CO1	2
	d.	Derive equation for Gibbs-Duhem-Margules equation?	10	CO1	3

CC V: GROUP THEORY

Time: 2 Hrs.

Note:

Max. Marks: 50

M CO KL

Section A (10 marks)

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Show that the set of complex numbers $G = \{1, i, -1, -i\}$ under multiplication is a Group.	2	1	K1
	b.	Show that the mapping $f: \mathbb{R}_+ \rightarrow \mathbb{R}$ defined by $f(x) = \log x$, for all x in \mathbb{R}_+ is isomorphism.	2	5	K1
	c.	Explain two Properties of Homomorphism.	2	5	K1
	d.	Prove that If H and K are the subgroups of G, then HK is a subgroups of G iff $HK=KH$.	2	2	K1
	e.	Define permutation. If $A = \begin{pmatrix} 123 \\ 231 \end{pmatrix}$ and $B = \begin{pmatrix} 123 \\ 312 \end{pmatrix}$ then find AB, BA and A^{-1} .	2	3	K1

Section B (16 marks)


Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	State and Prove Uniqueness of Identity and Inverse of element for group.	4	1	K2
	b.	Show that the set of rational numbers forms an abelian group under composition defined by $a*b = ab/2$.	4	1	K1
	c.	Find the order of each element of the group $G = \{0, 1, 2, 3, 4, 5\}$, the composition in G is "addition modulo 6".	4	1	K2
	d.	Define Permutation group and find the inverse of the permutation $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 4 & 2 \end{pmatrix}$.	4	3	K1
	e.	Show that any two groups of order 3 are isomorphic.	4	5	K2

Section C (24 marks)

Answer any 3 questions [03 x 08 marks=24 marks]

3	a.	Prove that if H_1 and H_2 are two subgroups of a group G, then their intersection is also subgroup of G.	8	2	K2
	b.	Verify: (a) $(1\ 2\ 3)(4\ 5) = (4\ 5)(1\ 2\ 3)$ (b) $(1\ 2\ 3)(2\ 3) \neq (2\ 3)(1\ 2\ 3)$	8	3	K1
	c.	Prove that any group of three elements is necessarily abelian.	8	1	K2
	d.	Define Subgroup and Explain the TWO Criteria of Subgroup.	8	2	K2
	e.	Prove that the two cyclic groups of equal orders are isomorphic.	8	5	K2

Roll No.		Course Code: SOS-B-MA302			
OP JINDAL UNIVERSITY					
Mid Semester Examination, October-2023					
B. Sc. (Hons.) Mathematics 3 rd Semester					
Mathematics					
Theory of Real Function (Analysis II)					
Time: 2 Hrs.		Max. Marks: 50			
Note:					
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Section A (10 marks)					
All Questions are compulsory [05 x 02 marks=10 marks]					
1	a.	Write definition of limit of a function.	2	2	1
	b.	Check that limit exists or not – $\lim_{x \rightarrow 0} f(x) = x - 2 $	2	2	1
	c.	Write definition of Discontinuity of First Kind.	2	2	1
	d.	Define Continuity on Closed Interval of a function.	2	3	
	e.	Write the definition of Uniform Continuous Function .	2	3	1
Section B (16 marks)					
Answer any 4 questions [04 x 04 marks=16 marks]					
2	a.	Use ϵ - δ technique and verify that $\lim_{x \rightarrow 2} f(x) = 10$ Where $f(x) = \frac{2(x^2+x-6)}{x-2}$, $x \neq 2$	4	2	2
	b.	Check that the given function is continuous or not at the given point $f(x) = x \sin \frac{1}{x}$ at $x=0$	4	2	2
	c.	Check the Continuity of the given function and if function is discontinuous then write the type of discontinuity $f(x) = \frac{1}{1-e^{-x}}$ When $x \neq 0$, $f(0) = 0$	4	2	2
	d.	If $f(x)$ and $g(x)$ be continuous function at $x=a$ then $f(x) - g(x)$ be also continuous at $x=a$.	4	2	2
	e.	Show that the function $f(x) = \sin x$, $x \in (0, \infty)$ is uniform continuous on the given interval	4	3	2
Section C (24 marks)					
Answer any 3 questions [03 x 08 marks=24 marks]					
3	a.	If $f(x)$ and $g(x)$ be continuous function at $x=a$ then $f(x).g(x)$ be also continuous at $x=a$.	8	2	2
	b.	State and Prove Intermediate Value Theorem .	8	3	3
	c.	State and Prove Location of Roots Theorem.	8	3	3
	d.	Let $f(x), g(x), h(x)$ be a function such that $h(x) \leq f(x) \leq g(x)$ for every $x \neq x_0$ and let $\lim_{x \rightarrow x_0} h(x) = L$ and $\lim_{x \rightarrow x_0} g(x) = L$ then $\lim_{x \rightarrow x_0} f(x) = L$	8	2	3
	e.	Show that $\cos x$ is continuous for all value of x in the interval $\left[0, \frac{\pi}{2}\right]$	8	3	3

Course Code: SOS-B-MA501/ SOS-B-MA303

O P JINDAL UNIVERSITY

Mid Semester Examination, April-2023

B.Sc. 5th / 3rd Semester

MATHEMATICS [03UG023]

Multivariable Calculus (Calculus - III)

Time: 2 Hrs.

Max. Marks: 50



Note:

M CO KL

Section A (10 marks)

All Questions are compulsory [05 x 02 marks=10 marks]

1	a.	Define limit and continuity of function of two variables.	2	1	1
	b.	$yz - \ln z = x+y$. Find $\partial z/\partial x$ and $\partial z/\partial y$	2	1	1
	c.	Find the linearization of $f(x, y) = x^2 - xy + \frac{1}{2}y^2 + 3$ at the point (2, 3).	2	1	1
	d.	A company manufactures right circular cylindrical molasses storage tanks that are 25 ft high with a radius of 5 ft. How sensitive are the tanks' volumes to small variations in height and radius?	2	1	1
	e.	Evaluate the integral $\int_1^2 \int_y^{y^2} dx dy$		3	1

Section B (16 marks)

Answer any 4 questions [04 x 04 marks=16 marks]

2	a.	Evaluate $\lim_{\substack{x \rightarrow 0 \\ y \rightarrow 0}} \frac{x^2 y}{x^4 + y^2}$	4	1	1
	b.	Express $\frac{\partial w}{\partial r}$ and $\frac{\partial w}{\partial s}$ in terms of r and s . where $w = x + 2y + z^2$, $x = \frac{r}{s}$, $y = r^2 + \ln s$, $z = 2r$	4	1	2
	c.	If $r^2 = x^2 + y^2 + z^2$ and $V = r^m$ then prove that $V_{xx} + V_{yy} + V_{zz} = m(m+1)r^{m-2}$	4	1	2
	d.	Find the Jacobian of (x, y) w.r.t (u, v) , if $x = e^{-u} \sin v$ and $y = e^u \cos v$	4	1	2
	e.	Evaluate the double integral $\iint_R x e^{xy} dA$, where R is the rectangular region $0 \leq x \leq 2$, $0 \leq y \leq 1$	4	5	2

Section C (24 marks)**Answer any 3 questions [03 x 08 marks=24 marks]**

3	a.	If $z = \frac{x^2 + y^2}{x + y}$, then show that $\left(\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)^2 = 4\left(1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)$	8	1	2
	b.	If $u = \tan^{-1} \frac{y^2}{x}$, then $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = -2 \sin^3 u \cos u$	8	1	2
	c.	Obtain x^y in powers of $(x-1)$ and $(y-1)$ upto the third degree terms.	8	1	2
	d.	Evaluate the double integral $\iint_R xy \, dx \, dy$, where R is the region bounded by the X-axis, the line $y = 2x$, and the parabola $y = \frac{x^2}{4a}$	8	5	2

Course Code: SOS-B-MA304

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc 3rd Semester [03UG021]**Physics****GE III: Real Analysis and Group Theory**

Time: 2 Hrs.

Max. Marks: 50

Note:

M CO KL

Section A (20 marks)


Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Define Bounded sequence. Examine the Boundedness and monotonicity of the following sequences (i) $\langle x_n \rangle = \langle (-1)^n n \rangle$ (ii) $\langle x_n \rangle = \langle \frac{1}{2^n} \rangle$ (iii) $\langle x_n \rangle = \langle \text{last digit of } 7^n \rangle$ (iv) $\langle x_n \rangle = \langle n \rangle$	5	CO1	K1
	b.	Define Convergent sequence and prove that every convergent sequence is bounded.	5	CO1	K1
	c.	Write the difference between constant sequence and identity sequence with example.	5	CO1	K1
	d.	Define infinite series and also convergence and divergence of an infinite series with example.	5	CO2	K2
	e.	State and prove Bolzano Weierstrass theorem.	5	CO2	K2

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Define Completeness property of R and Show that Q is not complete.	10	CO1	K2
	b.	State and prove Monotone Convergence Theorem.	10	CO1	K1
	c.	Prove that a sequence cannot converge to more than one limit or the limit of a sequence is unique.	10	CO1	K2
	d.	State and prove the following tests for convergence (i) Cauchy's nth root test (ii) Limit comparison test	10	CO2	K1

Course Code: SOS-B-BT301					
OP JINDAL UNIVERSITY					
Mid Semester Examination, October-2023					
B.Sc. (Hons) 3 rd Semester					
Biotechnology					
Classical Genetics (SOS-B-BT301)					
Time: 2 Hrs.		Max. Marks: 50			
Note: Draw the diagram/flowchart wherever needed for better explanation and draw the Punnett's square wherever needed.					
		M	C	KL	
			O		
Section A (20 marks)					
Answer any 4 questions [04 x 05 marks=20 marks]					
1	a.	Explain the terms phenotype and genotype with suitable example. Example should be clearly understandable in your answers.	5	1	2
	b.	How you can get the genotype of any organism? Explain it with consideration of Mendel's experimental example(s).	5	1	2
	c.	What do you understand by the term Allele? Explain with suitable example showing contrasting characters.	5	1	2
	d.	ABO blood grouping system is a perfect example of which genetic phenomenon? Explain it and draw the diagram/flowchart if required to explain it better.	5	2	2
	e.	Explain allelic vs non-allelic interactions. Which one is considered epistatic and which one is non-epistatic? Here, you need to write precisely.	5	2	2
Section B (30 marks)					
Answer any 3 questions [03 x 10 marks=30 marks]					
2	a.	Write a detailed note on chromosomal basis of inheritance. Why Morgan chose fruit fly for his experiments? Draw the diagrams and/or flowcharts wherever needed for better explanation.	10	1	2
	b.	Why Mendel chose Sweet Pea for his experiments? Explain Mendel's Laws with example considering Seed shape [ROUND(R)/Wrinkled(r)] and Seed Color [YELLOW(Y)/green(y)] and make the Punnett's Square (for F ₂) with same example.	10	1	2
	c.	Explain non-allelic interactions with suitable examples. Kindly do not forget to mention the phenotypic ratio of each type.	10	2	2
	d.	Explain allelic interactions with suitable examples.	10	2	2

Course Code: SOS-B-BT302

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. (H) 3rd Semester [03UG024]

Biotechnology

General Microbiology

Time: 2 Hrs.

Max. Marks: 50

Note: 1. Attempt all the questions of a section in a same place.
2. Draw diagram wherever required.

M CO KL

Section A (20 marks)

Answer any 4 questions [04 x 05 marks=20 marks]


1	a.	Define the following terms related to microbiology: (one mark each) i. Pure culture ii. Bacteriological Media iii. Antibiotics iv. Lyophilization v. Autoclave	5	1	1
	b.	Explain in brief the Whittaker's Five Kingdom Concept.	5	1	1
	c.	Explain any one of the Contributor: (minimum five points) i. Edward Jenner ii. Louis Pasteur iii. Robert Koch	5	1	1
	d.	Diagrammatic representation of bacterial shapes and arrangements	5	2	2
	e.	Flowchart presentation of any one : i. Isolation of bacterial by pour plate method ii. Isolation of bacteria by Quadrant (Sector plate) method	5	2	2

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Compare between Gram positive and Gram negative bacteria.	10	1	2
	b.	Explain any two structural components of bacteria. (5 marks for each) i. Flagella ii. Cell wall of Gram positive bacteria iii. Spores and Cysts	10	1	2
	c.	Write a research problem and one of the ideas to its solution related to the field of Microbiology. (Not more than one page. Marks distribution: Problem: 6 marks and Idea: 4 marks)	10	2	3
	d.	Explain the control of microbes by any one of the agents: i. Physical Agents ii. Chemical Agents iii. Chemotherapeutic Agents	10	2	2

***** All have the same quantity of brain, just need to apply...All the best*****

Course Code: SOS-B-BT303					
OP JINDAL UNIVERSITY					
Mid Semester Examination, October-2023					
B.Sc. (Hons) 3 rd Semester					
Biotechnology					
Biochemistry (SOS-B-BT303)					
Time: 2 Hrs.		Max. Marks: 50			
Note: Draw the diagram/structure/chemical formula wherever mentioned in your answers.					
		M	C	KL	
			O		
Section A (20 marks)					
Answer any 4 questions [04 x 05 marks=20 marks]					
1	a.	What is Gibbs Free Energy? Write the Gibbs-Helmholtz Equation and explain what drives reaction to be spontaneous.	5	1	2
	b.	What do you understand by High-Energy Compounds?	5	1	2
	c.	What is disaccharides? Draw any three disaccharides structures and mention the monomer unit in your diagram/chemical structures.	5	2	2
	d.	Define aldoses and ketoses with suitable examples and their structures.	5	2	2
	e.	What is Epimer? Explain it with suitable example and draw the chemical structures of your examples.	5	2	2
Section B (30 marks)					
Answer any 3 questions [03 x 10 marks=30 marks]					
2	a.	Write detailed notes on Metabolism.	10	1	2
	b.	Explain the laws of thermodynamics with suitable examples. Define each of the terms associated with the laws of thermodynamics in your answer.	10	1	2
	c.	What do you understand by chemical interactions? Explain strong and weak interactions with type(s) with suitable examples.	10	1	2
	d.	What is carbohydrate? Write on classification of Carbohydrates. Draw the structures.	10	2	2

OP JINDAL UNIVERSITY

Mid Semester Examination, October-2023

B.Sc. (H) 3rd Semester [03UG024]**Biotechnology****Nutraceuticals and Food Processing****Time: 2 Hrs.****Max. Marks: 50**

Note: 1. Attempt all the questions of a section in a same place.

2. Draw diagram wherever required.

M CO KL**Section A (20 marks)**

Answer any 4 questions [04 x 05 marks=20 marks]

1	a.	Define the steps and methods of food processing.	5	1	1
	b.	Classify ten types of food processing.	5	1	2
	c.	Name any five value added products of milk.	5	2	1
	d.	What is the importance of kneading in bread manufacturing?	5	4	2
	e.	Answer the following about baker's yeast: i. The scientific name of baker's yeast is ii. Baker's Yeast is a fungus. (True/False) iii. Baker's yeast is a agent. (leavening/ ripening) iv. Baker's yeast produce Gas by fermenting sugar in the dough.	5	2	2

Section B (30 marks)

Answer any 3 questions [03 x 10 marks=30 marks]

2	a.	Explain scope/Importance of Food processing Industries.	10	1	2
	b.	Briefly explain different enzyme treatments on fruit and vegetable processing.	10	1	2
	c.	Explain the steps of Chocolate manufacturing briefly.	10	2	2
	d.	Write a note on one of the food processing industry of India.	10	4	2

*****Do your best..The future belongs to those who believe themselves*****