Question Paper

Exam Date & Time: 14-Jul-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023
SUBJECT: BBT-104 - BIOCHEMISTRY
(OBE-2021 REGULATION - REPEATERS)

Marks: 70 **Duration: 180 mins.**

Answer all the questions.

1A)	What are hydrolases? Give example.	(1)
1B)	What is an allosteric site?	(1)
1C)	What are triglycerides?	(1)
1D)	Vitamin D deficiency causes?	(1)
1E)	What are glycosaminoglycans?	(1)
1F)	Name the lipoproteins.	(1)
1G)	What is anion gap?	(1)
1H)	Write the enzyme involved in the priming reaction of fatty acid synthesis.	(1)
1I)	Name the ketone bodies. Define the term ketonemia and ketonuria.	(1)
1J)	What are uncouplers? Give two examples.	(1)
2A)	Give a brief outline on polysaccharides? Give examples.	(5)
2B)	Explain with diagram Fluid Mosaic model of cell membrane.	(5)
2C)	Give a detailed outline on transport across cell membranes.	(5)
2D)	Explain the fatty acid synthase complex.	(5)
2E)	Explain the role haemoglobin in acid base regulation.	(5)
2F)	Classify high energy compounds. Give one example each.	(5)
3A)	Give a detailed outline on classification of vitamins.	(10)
3B)	Explain in detail different factors influencing enzyme activity.	(10)
3C)	Explain the significance of HMP shunt pathway. Give the importance of G6PD enzyme and disorder associated with that.	(10)

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Question Paper

Exam Date & Time: 31-May-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - MAY 2023
SUBJECT: BBT-106 - ENVIRONMENTAL SCIENCE
(OBE-2021 REGULATION - REGULARS/REPEATERS)

Marks: 70 **Duration: 180 mins.**

Answer all the questions.

Illustrate where necessary.

1A)	Define biotic province.	(1)
1B)	What is Chipko movement?	(1)
1C)	What are seed banks and mention its advantage?	(1)
1D)	Define lentic ecosystems and mention its importance.	(1)
1E)	Energy flow in an ecosystem.	(1)
1F)	Write any two important adaptations seen in estuarine animals.	(1)
1G)	Write a short note on bioremediation.	(1)
1H)	Define pollutants.	(1)
1I)	Minamata disease.	(1)
1J)	Particulate matters.	(1)
2A)	Describe imperative approaches for conservation of biodiversity.	(5)
2B)	Describe recommended procedures for disaster management.	(5)
2C)	What is an ecosystem? Explain the abiotic components of it.	(5)
2D)	Write an elaborate note on natural resources.	(5)
2E)	What are the causes and consequences of noise pollution?	(5)
2F)	Write a note on human-tiger conflict with suitable examples.	(5)
3A)	Explain the imperative role of environmental communication and public awareness with examples.	(10)
3B)	Explain grass land ecosystem with suitable examples.	(10)
3C)	Define primary and secondary pollutants with suitable examples. Add a note on the impact of pollution on human health and disease.	(10)

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Question Paper

Exam Date & Time: 22-Jul-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023
SUBJECT: BBT-108 - PHYSICS
(OBE-2021 REGULATION - REPEATERS)

Marks: 70 **Duration: 180 mins.**

Answer all the following questions:

1A)	What is Lorentz force?	(1)
1B)	What is Meissner effect?	(1)
1C)	What are the power losses in a transformer?	(1)
1D)	What are different types of electromagnetic waves?	(1)
1E)	What do you mean by limit of resolution in a diffraction grating?	(1)
1F)	What do you mean by double refraction?	(1)
1G)	Write down the conditions for constructive and destructive interference.	(1)
1H)	Write down the Cartesian co-ordinates of a point in terms of spherical coordinates.	(1)
1I)	Write down the unit vector along A if A is a vector.	(1)
1J)	Write down a relation representing the thickness of a quarter wave plate.	(1)
2A)	What is superconductor? Explain BCS theory.	(5)
2B)	Write down the five properties of lines of forces.	(5)
2C)	If u = 3i -2j - 3k and v = 3i +3j +1k are two vectors, find u.v and the angle between them.	(5)
2D)	Describe the construction of a nicol prism and explain how to use it as a polarizer.	(5)
2E)	Derive an expression for the optical path difference between two rays reflected from the top and bottom surface of a thin film.	(5)
2F)	How to detect elliptically and partially polarized lights?	(5)
3A)	Write down the Maxwell's equations in differential and in integral forms.	(10)
3B)	Define Biot-Savart law? Write a short note on LCR resonance circuit.	(10)
3C)	(i) What do you mean by birefringence? Define uniaxial and biaxial crystals. (ii) Explain Hygen's double refraction in uniaxial crystals.	(10)

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Question Paper

Exam Date & Time: 22-Jul-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023
SUBJECT: BBT-110 - ADVANCED CHEMISTRY
(OBE-2021 REGULATION - REPEATERS)

Marks: 70 **Duration: 180 mins.**

Answer all the questions.

Illustrate where necessary.

1A)	What are copolymers? What are the different classes of copolymers?	(1)
1B)	With reference to IR spectroscopy what factors affect the position of peaks?	(1)
1C)	How you can determine bond length using rotational spectroscopy?	(1)
1D)	Justify: Polymers do not have exact molecular weight.	(1)
1E)	What is the criteria for a molecule to be microwave active?	(1)
1F)	Why pH is maintained between 7 to 10 in Mohr method.	(1)
1G)	Define R_f.	(1)
1H)	How do you prepare Lassaigne's extract?	(1)
1I)	Name a coordination compound used as an anticancer drug.	(1)
1J)	Write IUPAC names of $[Pt(NH_3)_5Cl]Br_3$ and $Fe(CO)_5$.	(1)
2A)	Discuss any three techniques of polymerization.	(5)
2B)	Discuss the principle of mercury intrusion porosimetry.	(2.5)
i)		
ii)	Discuss chromophore, bathochromic shift, hyperchromism, Lambert Beer law, effect of conjugation on λ_{max}.	(2.5)
2C)	Explain neutralisation titrations with an example.	(5)
2D)	Discuss estimation of sulphur and halogens.	(5)
2E)	Based on valence bond theory, explain geometries of $[Co(NH_3)_6]^{3+}$ and $[PtCl_6]^{2-}$ (Atomic no of Co is 27 and Pt is 78)	(5)
2F)	Discuss determination of the primary structure of peptides by degradation methods.	(5)
3A)	Discuss the principle and applications of NMR spectroscopy. For the following compounds in NMR spectrum mention no of peaks, position, splitting pattern, area under the peaks for ethyl bromide and 2-chloropropane. (5+3 = 8 marks)	(8)
i)		
ii)	Explain any one application of UV spectroscopy.	(2)
3B)	Explain Soxhlet extraction and thin layer chromatography. (6+4 = 10 marks)	(10)
3C)	Explain the primary and tertiary structures of protein with suitable diagrams.	(10)

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Question Paper

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MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023
SUBJECT: BBT-112 - MATHEMATICS
(OBE-2021 REGULATION - REPEATERS)

Marks: 70 **Duration: 180 mins.**

Answer all the questions.

Illustrate where necessary

1A) Find the adjoint of the matrix $A=\begin{bmatrix}-5 & 7\\ -5 & -12\end{bmatrix}$. (1)

1B) Find the values of x such that $\begin{bmatrix}x+1 & 2\\ 2x & x+1\end{bmatrix}$ is singular. (1)

1C) Determine the eigenvalues of $A=\begin{bmatrix}2 & 1\\ 0 & -2\end{bmatrix}$. (1)

1D) Find the value of a such that the line $y=2x-3$ is perpendicular to $ax+2y-1=0$ (1)

1E) Find the centre and radius of the circle having equation $x^2+y^2-6x+4y=3$. (1)

1F) Evaluate $\lim\limits_{x\to -1}\dfrac{x^4-1}{x+1}$. (1)

1G) Differentiate $\dfrac{e^x}{1+e^x}$ with respect to x (1)

1H) If $y=1+2x+3x^2+4x^3$, find $\int_0^2 y\,dx$. (1)

1I) Solve $\dfrac{dy}{dx}=\dfrac{3y-2}{x-3}$. (1)

1J) Determine the x and y intercepts of the line $4x-5y=4$. (1)

2A) If $A=\begin{bmatrix}2 & -1 & -1\\ 1 & -2 & 1\\ 1 & 1 & -2\end{bmatrix}$, find A^{-1}. (5)

2B) Find the values of a and b, given that the circle $x^2+y^2+(2a-b)x+by-3=0$ has its centre on the y-axis and has radius 2. (5)

2C) Evaluate $\lim\limits_{x\to 2}\dfrac{x^3+x^2-5x-2}{x-2}$. (5)

2D) $\dfrac{1}{}$ Differentiate with respect to x (5)

Differentiate $\frac{}{\sqrt{1+\cos^2 3x}}$ with respect to x.

2E) Evaluate $\int_0^{\pi/2} \frac{\cos x}{1+\sin^2 x} dx$. (5)

2F) Solve $\frac{dy}{dx} + \frac{y}{x} = x^2$. (5)

3A) Solve: (10)

$$\begin{aligned} x+y-2z &= 1 \\ x+3y-z &= 1 \\ 2x+y-4z &= 1 \end{aligned}$$

3B) Given $A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & -1 & 1 \\ 1 & 1 & -3 \end{bmatrix}$, verify Cayley-Hamilton theorem and hence find A^{-1}. (10)

3C) Differentiate $y = \frac{1-e^x}{1+\sin x}$ w.r.t x (5)

i)

ii) Integrate the following: $\int \frac{\sin x}{\sqrt{9-\cos^2 x}} dx$ (5)

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