



61648

VI Semester B.Sc. Examination, Sept./Oct. 2022
(CBCS Scheme)
BIOTECHNOLOGY – VIII
Industrial Biotechnology

Time : 3 Hours

Max. Marks : 70

Instruction : Draw a neat labeled diagram wherever necessary.

SECTION – A

I. Write short notes on the following :

(5×2=10)

- 1) Bioreactor
- 2) Log phase
- 3) Lyophilization
- 4) Inducer
- 5) Membrane filtration.

SECTION – B

II. Answer **any four** of the following :

(4×5=20)

- 6) Describe the maintenance of strain improvement by recombinant DNA method.
- 7) Give an account on fermentation media.
- 8) Explain the different types of spargers and impellers.
- 9) Discuss solid state and surface fermentation.
- 10) Explain the industrial production of beer.

P.T.O.

61648



SECTION – C

III. Answer **any three** of the following :

(3×10=30)

- 11) Define fermenter. Explain different control system in fermenter.
- 12) What is down stream processing ? Add a note on solvent recovery and cell disruption.
- 13) Give the steps involved in production of Vitamin B₁₂.
- 14) What is SCO ? Comment on the methods of preparation and its importance.
- 15) Write a note on :
 - a) Industrial production of amylase.
 - b) Mass culturing of Spirulina.

SECTION – D

IV. Answer the following :

(10×1=10)

- 16) Name the anti foam agents.
 - 17) Inoculum.
 - 18) Name the micro-organisms used in the production of citric acid.
 - 19) Expand PHA.
 - 20) What is brewing ?
 - 21) Name the enzyme used in food industry.
 - 22) What is sterilization ?
 - 23) Name the raw materials used in penicillin production.
 - 24) What is scale up process ?
 - 25) Give an example for SCP.
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61626

VI Semester B.A./B.Sc. Examination, September/October 2022
(CBCS) (F+R) (2016-17 and Onwards)
MATHEMATICS
Mathematics – VIII

Time : 3 Hours

Max. Marks : 70

Instruction : Answer all Parts.

PART – A

I. Answer any five questions.

(5×2=10)

1) a) Evaluate $\lim_{z \rightarrow -i} \frac{z^2 + 1}{z^6 + 1}$.

b) Show that $\left| \frac{z-2}{z+2} \right| = 3$ represents a circle.

c) Show that $u = e^x \cos y + xy$ is harmonic.

d) Define Bilinear transformation.

e) Show that $f(z) = \sin z$ is analytic.

f) State Liouville's theorem.

g) Find the real root of the equation $x^3 - x - 2 = 0$ over the interval (1.5, 2) upto two approximation by Bisection method.

h) Write iteration formula for Runge-Kutta method of fourth order.

PART – B

II. Answer four full questions.

(4×10=40)

2) a) Find the locus of the point z satisfying the relation $|z + 1| + |z - 1| = 4$.b) Prove that the necessary condition for a function $f(z) = u+iv$ to be analytic is $u_x = v_y$ and $u_y = -v_x$.

OR

P.T.O



- 3) a) Prove that $\lim_{z \rightarrow 0} \left(\frac{\bar{z}}{z} \right)$ does not exist.
- b) Show that $f(z) = \log z$ is analytic and hence prove that $f'(z) = \frac{1}{z}$.
- 4) a) Find the analytic function whose real part is $x^2 - y^2 + \frac{x}{x^2 + y^2}$.
- b) Find the orthogonal trajectory of the family of curves $x^2 - y^2 + x = c$.

OR

- 5) a) Show that an analytic function with constant modulus is a constant.
- b) Show that $u = e^x \sin y + x^2 - y^2$ is harmonic and find its harmonic conjugate.
- 6) a) Evaluate $\int_0^{2+i} (\bar{z})^2 dz$ along the line $y = \frac{x}{2}$.
- b) State and prove Cauchy's Integral Formula.

OR

- 7) a) Evaluate $\oint_C \frac{1}{z(z-1)} dz$ where 'C' is the circle $|z| = 3$.
- b) State and prove fundamental theorem of algebra.
- 8) a) Prove that the Bilinear transformation preserves the cross ratio of four points.
- b) Discuss the transformation $W = Z^2$.

OR

- 9) a) Show that the transformation $W = \frac{1}{z}$ transforms circle into circle or to a straight line.
- b) Find the Bilinear transformation which maps $Z = 1, i, -1$ onto $W = 0, 1, \infty$.

PART - C

III. Answer **two full** questions.

(2x10=20)

- 10) a) Find the root of the equation $x^3 - 4x + 1 = 0$ by Regula - Falsi method upto three decimal places.
- b) Find the cube root of 24, correct to three decimal places by Newton-Raphson method.

OR



11) a) Solve by Gauss – Jacobi method :

$$x + y + 54z = 110$$

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72.$$

b) Find the largest eigenvalue of the matrix $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$ by power method.

12) a) Use Taylor's series method to find $y(0.1)$ considering terms upto the third degree given $\frac{dy}{dx} = 1 + xy$ and $y(0) = 1$.

b) Using Euler's method solve $\frac{dy}{dx} = x - y$ for $x = 0$ (0.1) 0.5 given $y = 1$ when $x = 0$.

OR

13) a) Using Euler's modified method find $y(0.1)$, given $\frac{dy}{dx} = x^2 + 1$, $y(0) = 1$.

b) Using Runge-Kutta method, find $y(0.2)$ for $\frac{dy}{dx} = x + y$; $y(0) = 1$ taking $h = 0.2$.



61629

VI Semester B.Sc. Degree Examination, September/October 2022
(CBCS) (Fresher)
(2016-17 and Onwards)
COMPUTER SCIENCE – VII
Web Programming

Time : 3 Hours

Max. Marks : 70

Instruction : Answer all the Sections.

SECTION – A

I. Answer any ten questions. Each question carries 2 marks. (10×2=20)

- 1) What is a Frame ?
- 2) What is the purpose of MIME ?
- 3) What is web server ? Give an example.
- 4) What is a function ? Give an example.
- 5) What are pattern modifiers ?
- 6) What is alert() method ?
- 7) What is event handler ?
- 8) What is dynamic XHTML ?
- 9) What is a CSS-P ?
- 10) Explain tag with example.
- 11) What is a namespace ?
- 12) What is a CSS ? What are the levels of style sheets ?

P.T.O.



SECTION – B

- II. Answer **any five** of the following. **Each** question carries **ten** marks. (5×10=50)
- 13) a) Explain domain and sub domain with examples. 5
b) Write a note on URL. 5
- 14) a) Describe any five HTTP methods. 5
b) Write a note on Internet Security. 5
- 15) a) Explain any five methods of Math object in JavaScript. 5
b) Explain while loop with example. 5
- 16) a) Explain any five string() methods with example. 5
b) Explain constructors in JavaScript. 5
- 17) a) Explain DOM Tree traversal and Modification. 5
b) What is a Dynamic XHTML ? What are the advantages of Dynamic XHTML ? 5
- 18) a) Write a note on locating mouse cursor. 5
b) Write a Events, Attributes and Tags. 5
- 19) a) What is a DTD ? Explain internal and external DTD. 5
b) Explain how to set background image with example. 5
- 20) a) Explain XML Schema data types with example. 5
b) What are the various CSS selectors ? 5



UG – 216

VI Semester B.A./B.Sc. Examination, September/October 2022
(CBCS) (F+R) (2016 – 17 and Onwards)
COMPUTER SCIENCE – VIII
Computer Networks

Time : 3 Hours

Max. Marks : 70

Instruction : Answer all the Sections.

SECTION – A

I. Answer **any 10** questions. **Each** question carries **two** marks. (10×2=20)

- 1) List out all the disadvantages of Network.
- 2) What is ping ?
- 3) Expand CDMA and FTP.
- 4) Name the features of RS-232.
- 5) What is the function of MODEM ?
- 6) Define Packet.
- 7) What is collision detection ?
- 8) What is byte stuffing ?
- 9) Define Bridge.
- 10) What is flooding ?
- 11) Expand URL and give example.
- 12) Define Protocol.

SECTION – B

II. Answer **any 5** questions. (5×10=50)

- 13) a) What are the goals of resource sharing and explain. 5
- b) Explain the Internet probing. 5
- 14) a) Describe the shielded twisted pair of cable. 5
- b) How an optical fiber is different from other cables ? Explain. 5

P.T.O.



- 15) a) Explain frequency division multiplexing. 5
- b) Explain link state routing algorithm. 5
- 16) a) Write a note on SONET. 5
- b) Describe the long distance communication with AM and FM. 5
- 17) a) Explain the workings of Baseband and Broadband technologies. 5
- b) Discuss about the checksum error detection method. 5
- 18) a) What is the role of NIC in communication ? 5
- b) Explain various IP address classes. 5
- 19) a) Explain Dijkstra's shortest path algorithm. 5
- b) Explain the 7 layers OSI model. 5
- 20) Write short notes on the following.
- a) Router. 5
- b) E-mail operations. 5

SECTION - II

(2x10=20)

1) What are the roles of resource sharing and explain

2) Explain token ring coding

3) Describe the installed twisted pair of cable

4) How an optical fiber is different from other cables? Explain



UG – 196

VI Semester B.Sc. Examination, September/October 2022
(CBCS) (2016 – 17 and Onwards)
(Fresh + Repeaters)
MICROBIOLOGY – VIII
Industrial Microbiology and Microbial Technology

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) Answer **all** Parts.
2) Draw diagrams **wherever** necessary.

PART – A

- I. Answer the following. (5×2=10)
- 1) Inducer
 - 2) Fermentation
 - 3) Methanogens
 - 4) Agitator
 - 5) Spawn.

PART – B

- II. Answer **any four** of the following. (4×5=20)
- 6) Explain screening of industrially important microorganisms.
 - 7) Write a brief note on SSF process.
 - 8) Significance of pH and temperature parameters during fermentation.
 - 9) Explain briefly on methods involved in enzyme immobilization.
 - 10) Describe biotransformation of steroids.

PART – C

- III. Answer **any three** of the following. (3×10=30)
- 11) Explain on various types of media components used during fermentation. Add a note on media formulation.
 - 12) Explain in detail the structure and construction of a typical fermenter.
 - 13) Describe in detail the steps involved in wine production.
 - 14) Give a detailed account on industrial production of citric acid.
 - 15) Explain down stream processing in relation to various chromatographic techniques employed.

P.T.O.



PART – D

IV. Answer in **one** word or **a** sentence.

(10x1=10)

- 16) Penicillium chrysogenum
- 17) Primary metabolite
- 18) Humulin
- 19) Cyanocobalamine
- 20) Louis Pasteur
- 21) Antifoams
- 22) Inoculum
- 23) Membrane filter
- 24) Amylase
- 25) Wort.



UG – 158

Sixth Semester B.Sc. Examination, September/October 2022
(CBCS – Fresh + Repeaters) (2018 – 19 and Onwards)

PHYSICS – VIII

Electronics, Magnetic Materials, Dielectrics and Quantum Mechanics – II

Time : 3 Hours

Max. Marks : 70

Instruction : Non-programmable Scientific calculators are permitted.

PART – A

Answer **any five** of the following questions. **Each** question carries **eight** marks. **(5×8=40)**

1. a) Why is input current of an op-amp is zero ? What is the value of CMRR of an ideal op-amp ?
b) With the help of a diagram, derive an expression for the output voltage of difference amplifier using op-amp. **(2+6)**
2. a) State Barkhausen criterion for oscillation.
b) Explain with diagram, the working of phase shift oscillator with an expression for frequency. **(2+6)**
3. a) What are weighted and non-weighted codes ? Explain.
b) With the help of circuit diagram and truth table explain the working of a full adder circuit. **(3+5)**
4. a) Define the terms magnetic permeability and magnetic susceptibility.
b) Obtain an expression for susceptibility of a diamagnetic substance using Langevin's classical theory. **(2+6)**
5. a) What is internal field or Lorentz field.
b) Obtain an expression for internal field or Lorentz field of a dielectric. **(2+6)**
6. a) Explain the term probability density.
b) Arrive at Schrodinger time dependent equation for a free particle in one dimension. Write the equation for three dimensions. **(2+6)**

P.T.O.



7. a) Derive an expression for energy eigen values of a particle in one dimensional box of infinite height.
 b) Derive the expression for normalised wave function. (5+3)
8. Develop the Schrodinger equation for a linear harmonic oscillator. Mention the energy eigen value expression. 8

PART – B

Solve **any five** of the following problems. **Each** problem carries **four** marks. (5×4=20)

9. In an op-amp inverting amplifier $R_1 = 1 \text{ k}\Omega$, $R_f = 100 \text{ k}\Omega$. The DC supply voltage to the op-amp is $\pm 10 \text{ V}$. Calculate the output voltage, if the input voltage is 0.5 V .
10. Design an adder circuit using op-amp to obtain an output voltage given by $V_0 = - [0.5V_1 + 0.8V_2 + 2V_3]$ where V_1 , V_2 and V_3 are input voltages. Assume $R_f = 10 \text{ k}\Omega$.
11. Convert $(ABBA \cdot AB)_{16}$ to binary and octal and $(11101)_2$ to BCD.
12. Calculate the permeability of iron rod of cross sectional area 200 mm^2 , if the flux produced is $40 \times 10^{-8} \text{ wb}$, for the magnetising field of 15 Am^{-1} .
13. Calculate the polarisation and susceptibility in a crystal, when 5 V is applied across a dielectric of thickness 1 mm . Give dielectric constant of material is 4 . Given $\Sigma_0 = 8.85 \times 10^{-12} \text{ F/M}$.
14. The atomic weight and density of sulphur are 32 and $2 \times 10^3 \text{ Kg m}^{-3}$ respectively. The electronic polarizability of the atom is $3.28 \times 10^{-40} \text{ Fm}^2$. If sulphur solid has cubic structure, calculate the dielectric constant.
 Given $N_A = 6.023 \times 10^{23} \text{ mol}^{-1}$
 $\Sigma_0 = 8.85 \times 10^{-12} \text{ F/M}$.
15. Find the momentum of an electron confined to a one dimensional box of side 8 \AA for the ground state and first excited state. Given $h = 6.625 \times 10^{-34} \text{ Js}$.
16. The energy of a linear harmonic oscillator in its second excited state is 0.15 eV . Calculate its frequency and time period of oscillation.
 Given $h = 6.625 \times 10^{-34} \text{ Js}$.



PART – C

Answer **any five** of the following questions. **Each** question carries **two** marks. **(5×2=10)**

17. a) Why open loop op-amp configurations are not used in linear applications ?
 - b) Can an op-amp be used as a buffer amplifier ? Explain.
 - c) Why is binary system is preferred to decimal system in digital circuits ?
 - d) Why transformer core are made of soft iron but not steel ? Explain.
 - e) Does the diamagnetism depend on temperature ? Explain.
 - f) What is the condition for a crystal to exhibit piezo-electric effect ?
 - g) Why $\Psi = ax^2$ is not acceptable wave function in quantum mechanics ?
 - h) Is the ground state of a particle trapped in a three dimensional box degenerate ? Explain.
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UG – 192

VI Semester B.Sc. Examination, September/October 2022
(CBCS) (Repeaters)
(2016-17 and Onwards)
ZOOLOGY (Paper – VIII)
Animal Physiology and Techniques in Biology

Time : 3 Hours

Max. Marks : 70

Instructions : a) **Draw** labelled diagrams **wherever** necessary.
b) Answer should be completely in **English**.

PART – A

I. Answer **any five** of the following : (5×3=15)

- 1) Name any three symbionts found in ruminants.
- 2) Name the metallic ion found in :
 - a) Haemoglobin
 - b) Haemocyanin
 - c) Chlorocruorin.
- 3) What is ureotelism ? Give an example.
- 4) Define negative feedback mechanism. Write an example.
- 5) List the difference between osmoregulators and osmoconformers.
- 6) Write a note on goitre.
- 7) Give the principle and applications of micrometry.

PART – B

II. Answer **any five** of the following : (5×5=25)

- 1) Define oxygen dissociation curve. Explain any two factors affecting it.
- 2) Schematically represent urea cycle.
- 3) What is metamorphosis ? Explain hormonal control of metamorphosis in amphibians.
- 4) Discuss the methods of heat gain in homeotherms.
- 5) Write an explanatory note on obesity.

P.T.O.



- 6) What is microtechnique ? With reference to the same comment on the use of :
- Xylol
 - Alcohol.
- 7) Distinguish between TEM and SEM.

PART – C

III. Answer **any three** of the following :

(3×10=30)

- Describe the physiology of transport of carbondioxide.
- Explain physiochemical changes during muscle contraction.
- Discuss the endocrine functions of thyroid gland. Add a note on its hyposecretion.
- Write notes on :
 - Jaundice
 - Anaemia.
- Write notes on :
 - Fuld and Spiro's theory of blood clotting.
 - Staining process in microtechnique.
- Explain the principle and application of :
 - Autoradiography
 - Chromatography.

PART – B



61622

Sixth Semester B.Sc. Degree Examination, September/October 2022
(CBCS Scheme)

PHYSICS

Paper – VIII : Electronics, Magnetic Materials, Dielectrics and Quantum
Mechanics – II

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **five** questions from **each** Part.

PART – A

Answer **any five** questions. **Each** question carries **eight** marks. (5×8=40)

1. a) What is meant by OP-AMP ? Draw the symbol of OP-AMP. 2
b) Derive an expression for voltage gain of an inverting amplifier with a neat circuit diagram using an op-amp and hence draw input and output waveforms. 6
2. Explain with a neat circuit diagram the operation of a first order low pass filter using an op-amp and hence derive an expression for the magnitude of voltage gain. 8
3. a) State De-Morgan's theorems. Write the theorems in logical form. 4
b) What is half adder ? Draw the circuit diagram of half adder using basic gates and hence draw the truth table. 4
4. State Curie-Weiss law and hence derive the expression for the same. 8
5. a) What is meant by piezoelectric effect ? Give one application of piezoelectric effect. 2
b) Derive an expression for electronic polarizability. 6
6. a) What is meant by eigen value and eigen function ? 2
b) Derive Schrodinger's time dependent equation for a non-relativistic particle. 6
7. Derive an expression for Schrodinger's wave function for a particle in one dimensional box of infinite height and hence obtain energy Eigen values. 8
8. Derive an expression for energy eigen value of one-dimensional linear harmonic oscillator and hence draw the vibrational transitions. 8

P.T.O.



UG – 030

II Semester B.Sc./B.C.A./B.Sc. (FAD/IDD) Examination, Sept./Oct. 2022
(CBCS-Repeaters-2014-15 and Onwards)
LANGUAGE ENGLISH – II

Time : 3 Hours

Max. Marks : 70

- Instructions :** i) Answer *all* the questions.
ii) Write the question numbers *correctly*.

SECTION – A
(Course Book)

I. Answer **any five** of the following questions in **one** or **two** sentences **each** : (5×2=10)

- 1) Where have the terrorists planted the bomb, in 'The Terrorist, He Watches' ?
- 2) What did Pakkiri show his mother when he returned from school, in 'Our Town' ?
- 3) Name the virtues of active ahimsa as stated by Mahatma Gandhi, in 'On Ahimsa'.
- 4) How has travelling alone worked to the narrator's advantage, in 'Starting from Mile Zero' ?
- 5) Why did the Sāmbhar attack the car, in 'Beast Tales of Burma' ?
- 6) The Brazilian government declared Pele as a _____ treasure.
- 7) Pamuk's parents did not recognize his talent. True/False.

II. Answer **any three** of the following questions in about **80-100** words **each** : (3×5=15)

- 1) How did Pakkiri enjoy nature as he went to Kaveripattinam, in 'Our Town' ?
- 2) What makes MK Gandhi say that Mahavira, Buddha and Tolstoy were soldiers, in 'On Ahimsa' ?
- 3) How did living in America change the narrator's life, in 'Starting from Mile Zero' ?
- 4) Describe the conflict between man and the beast, in 'Beasts of Burma'?
- 5) What are the pleasures of drawing, according to Pamuk ?

III. Answer **any one** of the following in about **200-250** words : (1×10=10)

- 1) How does the poem 'The Terrorist, He Watches' bring out the anxious, suspense ridden moments ?

P.T.O.



- 2) Examine the important milestones of Pele's soccer career, which shot him to international fame ?
- 3) How has travelling alone helped the writer evolve as a person, in 'Starting from Mile Zero' ?

IV. Rewrite as directed. **(Vocabulary)**

- 1) Construct two sentences using the following word as i. Verb ii. Noun. **(2×1=2)**
Liberal.
- 2) Fill in the blanks using the right expression from those given in the brackets. **(2×1=2)**
 - a) The boy makes _____ decision all the time. (hasty/fast)
 - b) Rama brought _____ oranges from Nagpur. (fresh/new)
- 3) Form antonyms for the given word : **(1×1=1)**
Comfort.

SECTION – B

(Workbook – Communication Skills)

- V. 1) Change the following sentences into indirect speech : **(2×1=2)**
 - a) The principal said, "Do well in your tournament !"
 - b) Raveena said, "I will not be available for 3 days".
- 2) Change the following sentences into passive voice : **(2×1=2)**
 - a) Bharath painted a beautiful art on the wall.
 - b) Renuka broke the crystal vase.
- 3) Combine the following sentences using the linker 'despite' : **(1×1=1)**
The little boy was tired. He won the race.
- 4) Frame suitable question to get the underlined word as answer : **(1×1=1)**
The crow stole the cheese.
- 5) Add a suitable question tag to the following statement : **(1×1=1)**
James Watt invented the steam engine, _____ ?

- VI. Read the following passage and answer the questions set on it : 5
- Global warming is the cumulative rise in average global temperatures on earth measured over a long period. It has been attributed to the large-scale deforestation by man for different purposes. We consume a lot of fuel annually.



With an increase in the human population, it has become impossible to meet people's fuel requirements. Natural resources are limited, and we must use them judiciously. If we exploit natural resources like forests and water bodies, it will create an imbalance in the ecosystem. Global warming is not limited to the rise in temperature. It has other effects too.

Many parts of the world are witnessing natural disasters like hurricanes, floods, and avalanches. All these phenomena are a direct result of global warming. To prevent our environment from the harmful effects of global warming, we must start restoring our ecosystem. Man has been exploiting natural resources without giving the environment anything in return. This needs to be stopped. We must all join forces to make this world a better place for our future generations who deserve this planet as much as we do. The basic step that we can follow to increase the overall health of our planet is planting trees. Afforestation should be our primary goal. The earth can become a better place if we pledge to plant as many trees as we can in our lifetime.

- 1) What is global warming ?
- 2) Why are natural disasters caused ?
- 3) What happens when we exploit natural resources ?
- 4) Name the natural disasters mentioned.
- 5) What is the basic step to protect earth ?

VII. Write a paragraph of about **80 – 100** words reflecting on the COVID-19 using the hints given :

5

COVID-19 – pandemic – the year 2020 – disease spread – respiratory infection – cold – cough – high temperature – loss of smell, taste – world standstill – movement restricted – lockdown – lost jobs – lost family and friends – depression – poverty – suffering.

VIII. Summarize the following passage and your summary must have at least four main points. Give a suitable title for the summary.

5

Our environment is one of the most important aspects to survive on this planet. Moreover, it is the only thing that can make life sustainable. Without it, we cannot survive even a single day. For instance, our skin will burn, the lungs will get ruptured, our blood pressure would rise. Furthermore, we will not have food and water to survive. And this will also be possible because of the imbalance of heat and atmospheric pressure. Thus, it is important that we should take care of the environment. Also, abandon all the exploitation that we are causing it.



World Environment on 5th June every year. People from more than 100 countries celebrate this day. Furthermore, the world environment day is run by the United Nations Environment Programme (UNEP). Since the year 1973. Above all the main purpose of celebrating this day was to spread awareness. The awareness was about the conservation of our environment. Moreover, to also take various preventive measures to avert the effects of Global warming. Since we all know that Global warming is the root cause of the ruin of our environment. Therefore, it is our duty to protect our environment. And stop all the exploitation that is destroying it. Because in the end, it is our basic need for our survival and our generations ahead.

IX. Do as directed :

(2×1=2)

1) What enquiries would you make in the following situations ?

- a) You want to know the fee structure of Calligraphy course offered at your college.
- b) You want to know on which platform the Shatabdi train arrives.

2) Read the following conversation and organize the message in the format given below :

(3×1=3)

Mr. Sumith : Hello, May I speak to Ms. Disha ?

Receptionist : Hello Mr. Sumith, I am sorry sir, Ms. Disha is currently unavailable. Do you have any message for her?

Mr. Sumith : Yes madam, Please inform Ms. Disha that the investors are coming for a meeting on 20th of this month. Please ask her to call me at 9980990987, when she is back.

Receptionist : Sure Mr. Sumith, I will pass on the message to Ms. Disha. Have a nice day sir!

Mr. Sumith : Thank you Madam!

Message for :

Message from :

Information :

Contact :

3) You have called your friend to share an important information. Leave the message to your friend's sister.

(3×1=3)

- a) Your teacher has informed you to prepare a chart for class.
- b) You and your friend are a team.
- c) You need to collect information on all the Indian States.



UG – 206

VI Semester B.Sc. Examination, September/October 2022
(Repeaters) (CBCS – 2016 – 17 and Onwards)
GENETICS – VII
Developmental and Evolutionary Genetics

Time : 3 Hours

Max. Marks : 70

Instruction : Draw diagrams wherever necessary.

PART – A

- I. Answer **any five** of the following : (5×3=15)
- 1) What are Homeotic selector genes ?
 - 2) Define Genotypic frequency.
 - 3) What is tissue specific methylation ?
 - 4) Write short notes on 'fitness'.
 - 5) Mention the types of Quantitative Characters.
 - 6) Write short notes on Environmental variance.
 - 7) Mention the significance of polygenic inheritance in animals.

PART – B

- II. Answer **any five** of the following : (5×5=25)
- 1) Explain genetical differential expression of haemoglobin genes.
 - 2) Write a short note on fate mapping.
 - 3) Describe the nuclear transplantation experiments in Amphibians.
 - 4) Discuss on synthetic theory of evolution.
 - 5) Explain the polygenic inheritance of skin color in man.
 - 6) Write short notes on 'Regression'.
 - 7) Comment on Genotypic and Environmental interactions.

P.T.O.



PART – C

III. Answer **any two** of the following : (2×10=20)

- 1) Give an account on the genetics of anterior-posterior polarity in the development of Drosophila.
- 2) Describe different methods of speciation.
- 3) Explain :
 - a) QTL
 - b) Inheritance of ear length in corn.
- 4) An agricultural experiment was conducted to test the effects of change of soil (4 blocks) and variety of wheat (5 different strains) on the yield of grain. Each block was divided into five plots and plots of each block were assigned at random to the five varieties. The yields in bushels per acre are given in the table. Find out the phenotypic, genotypic and environmental variances.

Replication	Variety				
	A	B	C	D	E
I	68	71	54	95	73
II	82	78	67	116	85
III	77	74	65	103	88
IV	59	70	54	90	76

PART – D

IV. Answer **any one** of the following : (1×10=10)

- 1) Explain the genetics of flower development in Arabidopsis.
- 2) Describe :
 - a) Migration in speciation.
 - b) Random drift.



61622

Sixth Semester B.Sc. Degree Examination, September/October 2022
(CBCS Scheme)

PHYSICS

Paper – VIII : Electronics, Magnetic Materials, Dielectrics and Quantum
Mechanics – II

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **five** questions from **each** Part.

PART – A

Answer **any five** questions. **Each** question carries **eight** marks. (5×8=40)

1. a) What is meant by OP-AMP ? Draw the symbol of OP-AMP. 2
b) Derive an expression for voltage gain of an inverting amplifier with a neat circuit diagram using an op-amp and hence draw input and output waveforms. 6
2. Explain with a neat circuit diagram the operation of a first order low pass filter using an op-amp and hence derive an expression for the magnitude of voltage gain. 8
3. a) State De-Morgan's theorems. Write the theorems in logical form. 4
b) What is half adder ? Draw the circuit diagram of half adder using basic gates and hence draw the truth table. 4
4. State Curie-Weiss law and hence derive the expression for the same. 8
5. a) What is meant by piezoelectric effect ? Give one application of piezoelectric effect. 2
b) Derive an expression for electronic polarizability. 6
6. a) What is meant by eigen value and eigen function ? 2
b) Derive Schrodinger's time dependent equation for a non-relativistic particle. 6
7. Derive an expression for Schrodinger's wave function for a particle in one dimensional box of infinite height and hence obtain energy Eigen values. 8
8. Derive an expression for energy eigen value of one-dimensional linear harmonic oscillator and hence draw the vibrational transitions. 8

P.T.O



PART – B

Solve **any five** problems. **Each** problem carries **four** marks. (5×4=20)

9. If an amplifier has a bandwidth of 100 kHz and voltage gain of 800, what will be the new band width and gain if 2 percent negative feedback is introduced ?
10. Calculate the frequency of Wein bridge oscillator. Given $R = 3.3 \text{ k}\Omega$ and $C = 0.01 \text{ microfarad}$.
11. A magnetic material has a magnetization of 2300 A/m and produces a flux density of 0.00314 Wb/m^2 . Calculate the magnetizing force and relative permeability of the material.
12. A magnetic field strength of copper is 10^6 Am^{-1} . If the magnetic susceptibility of copper is -0.8×10^{-5} , calculate flux density and magnetization of copper.
13. The dielectric constant of sulphur is 3.4. Assuming cubic lattice for its structure, calculate the electronic polarizability of sulphur.
Given : Number of atoms/unit(N) = $3.88 \times 10^{28}/\text{m}^3$.
14. A parallel plate capacitor is made up of a dielectric of thickness 1 mm and dielectric constant 10. If the potential difference across the capacitor is 20 V. Calculate the polarization and dielectric displacement.
15. Find the energy of an electron confined to a one dimensional box of side 0.8 nm for the ground state and first excited state.
16. The energy of the linear harmonic oscillator in its second excited state is 0.15 eV. Calculate its frequency.

PART – C

17. Answer **any five** of the following. **Each** question carries **two** marks. (5×2=10)
- a) Does the input resistance of the amplifier increase with negative feedback ? Explain.
 - b) Is an oscillator also an amplifier ? Explain.
 - c) Why NAND gate and NOR gate are called universal gates ?
 - d) Does an iron bar retain its magnetization when melted ? Explain.
 - e) Is total polarizability of a material dependent on frequency ? Explain.
 - f) Why the product $\psi\psi^*$ is taken to determine the probability ?
 - g) What is the meaning of bound state in quantum mechanics ?
 - h) Can a particle with zero energy exist in the box ? Explain.



61621

Sixth Semester B.Sc. Degree Examination, September/October 2022
(CBCS Scheme)

PHYSICS

Paper – VII : Atomic, Molecular and Nuclear Physics

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **any five** questions from **each** Part.

PART – A

Answer **any five** of the following. **Each** question carries **eight** marks. (5×8=40)

1. a) Mention any two limitations of Bohr's atomic model.
b) Explain Sommerfeld's relativistic atomic model. (2+6)
2. a) State Pauli's exclusion principle.
b) Obtain an expression for the maximum number electrons in a given shell of quantum number 'n'. (2+6)
3. a) Explain quantum theory of Raman effect.
b) Mention any two applications of Raman effect. (6+2)
4. a) State any two assumptions behind Rutherford's theory of α -ray scattering.
b) Obtain the relation between the impact parameter and the angle of scattering. (2+6)
5. a) Derive an expression for the Q-value in alpha decay.
b) Write a note on Geiger-Nuttal law. (6+2)
6. a) What is Cyclotron ?
b) Describe the construction and working of the Cyclotron. (1+7)

P.T.O.

61621

-2-



7. a) Explain the Quark model.
b) Mention any four properties of Quarks. (4+4)
8. a) Define nuclear reaction rate.
b) Distinguish between direct nuclear reaction and compound nuclear reaction. (2+6)

PART – B

Solve **any five** of the following problems. **Each** problem carries **four** marks. (5×4=20)

9. In Stern-Gerlach experiment silver atoms travel a distance of 0.16 m in a non-homogeneous magnetic medium of field gradient 60Tm^{-1} . If the velocity of silver atoms is 410ms^{-1} , calculate the separation between the two traces on a collector plate placed at a distance 0.55 m from the pole pieces of the magnet. Given : mass of silver atom = $1.79 \times 10^{-25}\text{kg}$ and $\mu = 9.2 \times 10^{-24}\text{JT}^{-1}$.
10. Calculate the magnetic field required to produce a Zeeman shift of 1.2Å for a wavelength of spectral line 5000Å . Given : $e/m = 1.76 \times 10^{11}\text{C kg}^{-1}$.
11. Calculate the rotational constant and the diameter of CO molecule. Given : Moment of inertia of the molecule = $1.453 \times 10^{-46}\text{kg m}^2$ and reduced mass of CO molecule = $1.14 \times 10^{-26}\text{kg}$.
12. A count rate meter measured 5000 counts per minute. After 5 minutes it is 2000 counts per minute. Find the decay constant and half life.
13. Potassium-40 decays into calcium by β^- emission. Write down the equation representing this decay and find Q value of the decay.
Given : mass of $\text{K}^{40} = 39.96399\text{amu}$, and mass of $\text{Ca}^{40} = 39.96259\text{amu}$, and $1\text{amu} = 931\text{MeV}$.
14. When a beam of 10^{14} particles per unit area per second on a ${}^7_3\text{Li}$ target of thickness 0.004 mm, 3×10^8 neutrons were produced. Calculate the cross section for this reaction. Given : Density of Li = 500kg m^{-3} .



15. Calculate the Q-value of the reaction ${}_7\text{Na}^{14} (\alpha, p) {}_8\text{O}^{17}$ using the given data. Mass of $\text{He}^4 = 4.0026$ amu, mass of $\text{Na}^{14} = 14.0031$ amu, mass of ${}_1\text{H}^1 = 1.0078$ amu, mass of $\text{O}^{17} = 16.9994$ amu and $1 \text{ amu} = 931 \text{ MeV}$.
16. Find the threshold energy of the reaction ${}_3\text{Li}^7 (p, n) {}_4\text{Be}^7$ in MeV. Given : Mass of $\text{Li}^7 = 7.016005$ amu, mass of $\text{Be}^7 = 7.016931$ amu, mass of ${}_1\text{H}^1 = 1.0078$ amu, mass of ${}_0\text{n}^1 = 1.008665$ amu, $1 \text{ amu} = 931 \text{ MeV}$.

PART – C

Answer **any five** of the following questions. **Each** carries **2** marks. **(5×2=10)**

17. a) Does the electron in stationary orbits radiate energy ? Explain.
b) Alpha particles have high ionizing power when compared to the Beta and Gamma particles. Explain.
c) Can radioactivity be controlled ? Explain.
d) Is nuclear matter behave like a liquid ? Explain.
e) Are nuclear energy levels equally spaced ? Explain.
f) Is photon an elementary particle ? Explain.
g) Hyperons and K-mesons are called as strange particles. Justify.
h) Is there conservation of charge in all interactions ? Explain.
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61630

VI Semester B.Sc. Examination, September/October 2022
(Semester Scheme) (CBCS)
COMPUTER SCIENCE – VIII
Computer Networks

Time : 3 Hours

Max. Marks : 70

SECTION – A

I. Answer **any ten** questions. **Each** question carries **2** marks. **(10×2=20)**

- 1) Define Computer Network.
- 2) What is a analog signal ?
- 3) What is a Frame ?
- 4) What is Burst error ?
- 5) What is Ethernet ?
- 6) What is Multicasting ?
- 7) What is MAC address ?
- 8) What is SONET ?
- 9) What is Wide Area Network ?
- 10) What is IP Encapsulation ?
- 11) What is Static Routing ?
- 12) What is DNS ?

SECTION – B

II. Answer **any five** questions. **Each** question carries **10** marks. **(5×10=50)**

- 13) a) Write a note on complexity in network system. 5
- b) What is Guided Media Transmission ? Explain Co-axial Cable. 5

P.T.O.

61630



- 14) a) What is Modem ? Explain Optical Modem. 5
- b) Explain Wavelength Division Multiplexing. 5
- 15) a) Explain any two Topologies in Computer networks. 5
- b) Explain Error Detection with CRC. 5
- 16) a) Explain Network Interface Hardware. 5
- b) Explain CSMA/CD. 5
- 17) a) Write a note on Repeaters. 5
- b) Write a note on ISDN. 5
- 18) a) Explain Link State Routing Algorithm. 5
- b) Explain seven layers of OSI model. 5
- 19) a) Write a note on Internet Architecture. 5
- b) Write a note on Address Resolution Protocol. 5
- 20) a) Write a note on TCP services. 5
- b) Explain e-Mail Operations. 5



61624

Sixth Semester B.Sc. Degree Examination, Sept./Oct. 2022
(CBCS)

CHEMISTRY
Paper – VIII : Biochemistry

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) The question paper has **two** Parts. **Answer** both the Parts.
2) Write diagrams and equations **wherever** necessary.

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks. (8×2=16)

1. Mention the contributions of the following scientists to the development of Biochemistry.
 - a) Watson and Crick
 - b) Emil Fischer.
2. Write the Haworth structure of cellobiose.
3. Define saponification number and write its significance.
4. How does an amino acid react with Ninhydrin ?
5. What are active centres of an enzyme ?
6. Mention the biological role of
 - a) Epinephrine
 - b) Insulin.
7. What are nucleotides ? Give an example.
8. Explain substrate level phosphorylation with an example.
9. What is transamination ? Give an example.
10. Write any two applications of paper chromatography.

P.T.O.



11. Write the reaction sequence in urea cycle catalysed by Arginase.
12. DNA replication is "semiconservative". Justify the statement.

PART – B

Answer **any nine** of the following questions. **Each** question carries **six** marks. (9×6=54)

13. a) Discuss the structural differences between Glycogen and Chitin. Mention their biological functions.
- b) What are oligosaccharides ? Give an example. (4+2)
14. a) Give the chemical and elemental composition of a living cell.
- b) What is the principle of thin layer chromatography ? (4+2)
15. a) What are phospholipids ? Mention their biological functions.
- b) Give one example each for saturated and unsaturated fatty acids. (4+2)
16. a) How are amino acids classified based on the polarity of 'R' groups ? Give one example each.
- b) Write a note on "denaturation" of proteins. (4+2)
17. a) Write any four differences between RNA and DNA.
- b) State Chargoff's rule of base equivalence. (4+2)
18. a) Define Hormones. How are they classified based on the composition ? Give one example each.
- b) What are liposomes ? Mention their biological role. (4+2)
19. a) Explain the types of specificity exhibited by enzymes giving suitable examples.
- b) Briefly explain Koshland's Induced Fit theory. (4+2)
20. a) Describe the sequence of electron carriers diagrammatically during mitochondrial electron transport chain and locate the sites of ATP synthesis.
- b) Name any two energy rich compounds other than ATP. (4+2)
21. a) How are fatty acids activated before the β -oxidation cycle ? Discuss the role of carnitine during the above pathway.
- b) What is Gluconeogenesis ? (4+2)



22. a) Write the chemical equations for the conversion of
i) Oxaloacetate to citrate during TCA cycle.
ii) Glucose to Glucose-6-phosphate during Glycolysis.
b) What is the fate of pyruvate under aerobic condition ? (4+2)
23. a) Discuss the steps involved in DNA replication and mention the enzymes.
b) What is Translation ? (4+2)
24. a) Give the classification of proteins based on the composition along with one example each.
b) What are amino sugars ? Give one example. (4+2)
25. a) Explain non-competitive inhibition with an example.
b) What are endergonic reactions ? Give an example.
c) What is transcription ? (2+2+2)
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61623

Sixth Semester B.Sc. Degree Examination, September/October 2022
(CBCS)
CHEMISTRY
Paper – VII : Inorganic Chemistry

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) The question paper has **two** Parts. Answer **both** the Parts.
2) Draw diagrams and equations **wherever** necessary.

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks.

(8×2=16)

- Write the IUPAC name of the following complex compounds.
i) $[\text{CrCl}_2(\text{H}_2\text{O})_4]\text{Cl} \cdot 2\text{H}_2\text{O}$ ii) $\text{K}[\text{Co}(\text{C}_2\text{O}_4)_2(\text{NH}_3)_2]$
- What are ligands ? Give an example for ambidentate ligand.
- State eighteen electron rule.
- Write two limitations of Werner's theory of co-ordination compounds.
- How is Ferrocene synthesised ? Give equations.
- How is dynamite prepared ? Give equation.
- Give an example each for
i) Liquid oxidiser ii) Liquid fuel.
- What are the roles of gypsum and water in the manufacture of cement ?
- Write a note on oilpaints.
- Explain the role of vitamin B_{12} in biological system.
- Write two applications of nano materials.
- Write two applications of superconductors.

PART – B

Answer **any nine** of the following questions. **Each** question carries **six** marks. (9×6=54)

- a) Based on valence bond theory, explain geometry and magnetic property of $[\text{CoF}_6]^{-3}$ complex.
b) Calculate the EAN of platinum in $\text{K}_2[\text{PtCl}_4]$ complex. (At. No of platinum is 78). (4+2)

P.T.O.



14. a) What is optical isomerism ? Explain the optical isomerism in $[\text{Co}(\text{en})_3]^{+3}$ complex.
b) Write the name and the formula of the co-ordination compound used in treatment of cancer. (4+2)
15. a) Based on the crystal field theory, explain the magnetic property of $[\text{Fe}(\text{CN})_6]^{-4}$ complex.
b) Write the structure of $\text{Mn}_2(\text{CO})_{10}$. (4+2)
16. a) Give the classification of ligands based on hapticity. Give an example for each.
b) What are high spin and low spin complexes ? (4+2)
17. a) Explain with an example.
i) Ionisation isomerism ii) Linkage isomerism.
b) What is spectrochemical series ? (4+2)
18. a) Describe the manufacture of soda glass.
b) Mention the role of Feldspar in the manufacture of ceramics. (4+2)
19. a) Explain how the PCE value of a refractory is determined.
b) Write the composition of LPG. (4+2)
20. a) Write any four advantages of gaseous fuels.
b) What are homogeneous solid propellants ? Give an example. (4+2)
21. a) How is portland cement manufactured by wet process ?
b) Explain the roles of following in varnishes
i) Acetone ii) Linseed oil. (4+2)
22. a) Describe the manufacture of silicon carbide.
b) Write one use each of
i) Poly carbonate glass.
ii) Metallic glass. (4+2)
23. a) What are essential and trace elements ? Give an example for each.
b) Name a metallophorphirin and mention the metal ion present in it. (4+2)
24. a) How is poly acetylene converted to conducting polymer by doping method ?
b) Briefly explain Type-I superconductor. (4+2)
25. a) Explain the preparation and isolation of C_{60} fullerene.
b) Explain plasma synthesis of nanomaterials. (4+2)



61654

VI Semester B.Sc. Examination, September/October 2022
(CBCS)
LIFE SCIENCE
Paper – VIII : Genetics and Evolution

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **all** questions.
2) Draw diagrams **wherever** necessary.

- I. Explain **any two** of the following : (10×2=20)
- 1) Explain molecular basis of genetic information.
 - 2) Define linkage. Give an account of chromosomal mapping.
 - 3) Give an account of Darwinism and Neo-Darwinism.
 - 4) With a suitable example, explain natural selection and artificial selection.
- II. Write explanatory notes on **any five** of the following : (5×6=30)
- 5) Explain multiple alleles.
 - 6) Explain gene mapping.
 - 7) Give an account of chromosomal abberation.
 - 8) Explain somatic cell genetics.
 - 9) Explain phylogeny of horse.
 - 10) Give an account of types of fossils.
 - 11) Describe macroevolution.
- III. Write a short note on **any five** of the following : (5×4=20)
- 12) Principles of inheritance.
 - 13) Epistasis
 - 14) Sex determination
 - 15) Aneuploidy
 - 16) Write major extinctions
 - 17) Role of extinction in evolution
 - 18) Speciation.



61647

VI Semester B.Sc. Examination, September/October 2022
(CBCS Scheme)
BIOTECHNOLOGY – VII
Plant Biotechnology

Time : 3 Hours

Max. Marks : 70

Instruction : Draw neat labelled diagrams **wherever** necessary.

SECTION – A

I. Write short notes on the following : (5×2=10)

- 1) Totipotency
- 2) Heterokaryon
- 3) Microprojectile
- 4) Haploid
- 5) Trade secret.

SECTION – B

II. Write **any four** of the following : (4×5=20)

- 6) What are growth regulators ? Add a note on Auxin.
- 7) Discuss the importance of Plant Tissue Culture in Forestry.
- 8) Describe the production of Vaccines in Banana.
- 9) Define Somoclonal Variation. Add a note on its significance.
- 10) Briefly explain the types of organogenesis and its application.

P.T.O.



SECTION – C

III. Answer **any three** of the following :

(3×10=30)

- 11) What is protoplast ? Add a note on its regeneration and Viability test.
- 12) Explain the technique and the factors influencing clonal propagation.
- 13) Give an account on Agrobacterium mediated gene transfer.
- 14) Define Somatic embryogenesis. Comment on the stages and factor affecting Somatic embryogenesis.
- 15) Write short note on :
 - a) Phytoalexins
 - b) PGR

SECTION – D

IV. Write the following in **one** word or **a** sentence **each** :

(10×1=10)

- 16) Tapetum
 - 17) Vir genes
 - 18) Encapsulation
 - 19) IAA
 - 20) Dedifferentiation
 - 21) Pomato
 - 22) Adventitious buds
 - 23) Tween 20
 - 24) Apical dominance
 - 25) Expand FDA.
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