[5903]-11

F.Y. B.Sc. (Biotechnology)
BBT - 101 : FUNDAMENTALS OF CHEMISTRY - I
(2019 Pattern) (CBCS) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   *Q1 is compulsory.*

   2)   *Solve any three questions from Q2 to Q5.*

   3)   *Questions 2 to 5 carries equal marks.*

Q1) **Solve any five of the following :**   **[5]**

   a) Calculate bord order of O_2.

   b) State Pauli's exclusion principle.

   c) Give electronic configuration of chlorine. (atomic number of Cl : 17)

   d) Define functional group isomerism with example.

   e) Give IUPAC name of

   f) Define enthalpy.

$$CH_3-\underset{\underset{OH}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-CH_3$$

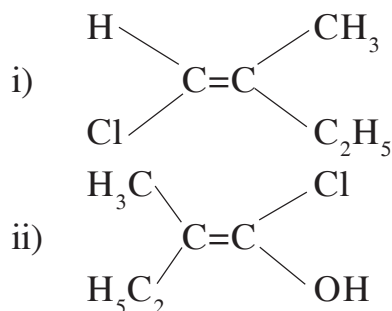*Q2)* a) What are alkyl halides? How are they classified? What is the reaction of   **[6]**

     i)   Aqueous KOH and

     ii) C_2H_5 ONa on ethyl bromide.

<div align="center">OR</div>

    Define hybridization. State its types. Explain Sp^3 hybridization in detail with suitable example.

   b) Assign E / Z   **[4]**

    i)

$$\underset{Cl}{\overset{H}{\diagdown}}C=C\underset{C_2H_5}{\overset{CH_3}{\diagup}}$$

    ii)

$$\underset{H_5C_2}{\overset{H_3C}{\diagdown}}C=C\underset{OH}{\overset{Cl}{\diagup}}$$

Q3) a) Define conformational isomerism. Draw conformation of ethane with energy profile diagram. **[6]**

OR

State and explain VSEPR Theory.

b) Differentiate between Isothermal and Adiabatic process. **[4]**

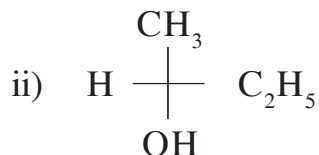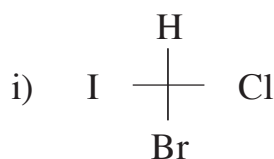*Q4)* a) What are nucleophilic substitution reactions? Explain SN^1 in detail with example. **[6]**

OR

Define oxidation and reduction. Calculate oxidation number for the following.

i) Cr in $Cr_2O_7^{2-}$ ii) Cl in ClO_4^-

iii) M_n in $M_nO_4^{2-}$ iv) Pt in $K_2PtCl_6^-$

b) Assign R / S for **[4]**

i)

$$I \overset{\overset{\textstyle H}{\displaystyle |}}{\underset{\underset{\textstyle Br}{\displaystyle |}}{\rule[0.5ex]{1.5em}{0.4pt}}} Cl$$

ii)

$$H \overset{\overset{\textstyle CH_3}{\displaystyle |}}{\underset{\underset{\textstyle OH}{\displaystyle |}}{\rule[0.5ex]{1.5em}{0.4pt}}} C_2H_5$$

Q5) **Write short notes on (Any Four) :** **[10]**

a) Enthalpy as state function

b) Dipole Dipole forces

c) Biological oxidation reduction reaction

d) Fridel Crafts Acylation reaction

e) Bohr's atomic model

f) Paramagnetism

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F.Y. B.Sc. (Biotechnology)
BBT-102 : FUNDAMENTALS OF PHYSICS
(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Question 1 is compulsory.*
2) *Solve any three questions from Q2 to Q5.*
3) *Questions 2 to 5 carry equal marks.*

Q1) **Solve any five of the following :**   **[5]**

    a) What is standard defination of 1 second.

    b) Define streamline flow.

    c) Define surface Tension & it's unit.

    d) State that coefficient of viscosity (η).

    e) Define shell's law.

    f) What is value of 1 amu (Atomic mass unit)?

Q2) a) Define Fundamental & derived quantities. List the seven important of fundamental quantities along with appropriate unit & symbols.   **[6]**

<div align="center">OR</div>

    Obtain the poiseuille's equation for flow of liquid through a capillary tube.

    b) Write any four application of surface tension in details.   **[4]**

Q3) a) Obtain expression for surface Tension in capillary action.   **[6]**

<div align="center">OR</div>

    State Doppler's effect. Derive an expression for apparent when source is moving towards & away from a stationary observer.

<div align="right">*P.T.O.*</div>

b) Two flat horizontal plates, each of area 100 cm² are separated by 1mm thick layer of glycerine. If the lower plate be fixed, calculate the force required to move the upper plate with a speed of 7 cm/sec (coefficient of viscosity η = 1 kg/m sec). **[4]**

Q4) a) Explain the difference between audiable, ultrasound & ultrasonic waves & state the frequency range between it. **[6]**

OR

Write the types of lenses & derive the expression for lens maker equation.

b) A slit of variable width is illuminated by red light of wavelength 6500 A°. At what width of the slit the first minimum of the minimum will fall at θ = 30°? **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Explain the principle of super position of waves

b) Write eqⁿ of continuity in short

c) Explain the quantity of standard of mass

d) What is wetting angle & wettability explain with example

e) Define wave with their types

f) Explain sound wave as pressure wave

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SEAT No. :

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F.Y. B.Sc. (Biotechnology)
BBt - 103 : BIOCHEMISTRY - I
(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :
1) *Q.1 is compulsory.*
2) *Attempt any three questions from Q.2 to Q.5.*
3) *Q.2 to Q.5 carry equal marks.*

Q1) Attempt any five of the following :   **[5]**
   a)   Ionic bond.
   b)   Enlist 'any two' Good's buffer.
   c)   Write any two properties of water, that make it suitable for life.
   d)   Draw structure of maltose.
   e)   16 : 0.
   f)   Name two epimers of glucose.

Q2) a)   Explain 'mutarotation' of glucose.   **[6]**
                    OR
   a)   Describe structure of chitin, give its significance.
   b)   Explain the phenomenon of 'Osmosis'.   **[4]**

Q3) a)   Classify fatty acids giving examples.   **[6]**
                    OR
   a)   Name the different type of phospholipids with their structure and significance.
   b)   Justify MDL concentration and its correlation with heart disorders.   **[4]**

Q4) a)   Describe with example heterogenous polysaccharides.   **[6]**
                    OR
   a)   Explain cholesterol decreases membrane fluidity.
   b)   Triacyl glycerols are packed with abundant energy, Justify.   **[4]**

P.T.O.

Q5) Write short notes on any four of the following : [10]

    a)   Sphingolipids.

    b)   Reducing sugar.

    c)   Urey-Miller Experiment.

    d)   Cellulose.

    e)   Lactose.

    f) $18 : 2^{\Delta 9,12}$.

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F.Y. B.Sc. (Biotechnology)
BBT - 104 : BIOPHYSICS
(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :
1) *Q.1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any Five of the following :   **[5]**
- a) Define Cohesion.
- b) Explain J.J Thomsons atomic model.
- c) Define half life of a radioactive isotope.
- d) What is cellular biophysics?
- e) Define Passive transport.
- f) Osmosis.

Q2) a) What are Nuclear Forces? Give their properties.   **[6]**
               OR
- a) Explain branches of Biophysics.   **[6]**
- b) What is quantum number? Enlist & explain them.   **[4]**

Q3) a) Explain vector atom model.   **[6]**
               OR
- a) Give the properties of α, β and γ rays.   **[6]**
- b) What is surface tension? Explain factor affecting surface tension.   **[4]**

Q4) a) What is dialysis? Explain its types.   **[6]**
               OR
- a) Explain GM counter in detail.   **[6]**
- b) Derive the relation between radius of Bohr's orbit and principle quantum number.   **[4]**

P.T.O.

Q5) Write short notes on any Four of the following : [10]

    a) Sandwich model.

    b) Facilitated diffusion.

    c) Shell model.

    d) Applications of Radioactive isotopes.

    e) Depolarization & repolarization.

    f) Colloids.

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F.Y. B.Sc (Biotechnology)

BBt - 105 : Animal Sciences - I

(2019 Pattern) (Semester - I) (CBCS)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1)   *Q1 is compulsory.*

2)   *Solve any three questions from Q2 to Q5.*

3)   *Q2 to Q5 carries equal marks.*

Q1) **Solve any Five of the following :**   **[5]**

   a)   Enlist the names of canal system of phylum porifera.

   b)   Define metamorphosis.

   c)   Write any two characters of protochardata.

   d)   Write two important characters of connective tissue.

   e)   Define aestivation in frog.

   f)   Enlist two examples of phylum Mollusca.

Q2) a)   Give two examples of Class Aves and write the salient features of it. **[6]**

                                   OR

   With neat labelled diagram describe the ultrastructure and functions of striated muscle.

   b)   <u>C. elegans</u> as a good animal model system. Justify.   **[4]**

Q3) a)   Describe male reproductive system of frog.   **[6]**

                                   OR

   Describe the life cycle of drosophila.

   b)   Explain anyone of the sense organ in frog.   **[4]**

Q4) a) Describe water vascular system in Echinodermata. (Asteroida) **[6]**

OR

Write the characters of class cephalochordata with examples.

b) Write differences between non-chordates and chordates with examples.

[4]

Q5) **Write short notes on any four of the following :** **[10]**

a) Polymorphosim in Hydra.

b) Byproducts of honeybee.

c) Different types of pseudopodia (any two)

d) Sexual diamorphism in Drosophila.

e) Worker bee.

f) Hyaline cartilage

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F.Y. B.Sc (Biotechnology)
BBt : 106 Plant Sciences - I
(2019 Pattern) (Semester - I) (CBCS)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) *Q1 is compulsory.*
2) *Solve any three questions from Q2 to Q5.*
3) *Q2 to Q5 carry equal marks.*

Q1) **Solve any Five of the following :** **[5]**
   a) State any four unique characteristics of plants.
   b) Define phyllotaxy.
   c) Explain the term epipetalous stamens with suitable example.
   d) What is the role of lateral meristem.
   e) Explain storage root modification with examples.
   f) What are pneumatophores.

Q2) a) Give general account of Bryophytes with suitable examples. **[6]**

OR

   a) What are the objectives and principles of plant classification. Describe classification of plants on the basis of habit and habitat with suitable examples. **[6]**
   b) Compare dicots & monocots. **[4]**

Q3) a) Explain three basic types of primary tissue systems in plants. **[6]**

OR

   a) With a neat labelled diagram describe the internal structure of young dicot stem. **[6]**
   b) Describe aerial modifications of stem with suitable examples. **[4]**

P.T.O.

Q4) a) What is inflorescence? Explain the subtypes of racemose inflorescence with diagrams and examples. **[6]**

<div align="center">OR</div>

a) Describe the types of cohesion of stamens. **[6]**

b) Compare xylem and phloem. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) T.S. of dicot leaf.

b) Types of vascular bundles based on arrangement in plant body.

c) Compare algae and fungi.

d) Structure of plant cell wall.

e) Types of flower based on position of ovary.

f) Write short note on leaf modifications.

<div align="center">❆ ❆ ❆</div>

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F.Y. B.Sc.

BIOTECHNOLOGY

BBt - 107 : Microbiology - I

(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1)   Question 1 is compulsory.

2)   Solve any three questions from Q.2 to Q.5.

3)   Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following: **[5]**

a)   Write two examples of Gram negative bacteria.

b)   Write two features of eukaryotic cell.

c)   Enlist any four distinguishing characters of algae.

d)   What is numerical aperture?

e)   What is mordant?

f)   Give principle of monochrome staining.

Q2) a)   Explain in brief general characteristics and importance of prokaryotes.**[6]**

OR

Discuss differences between prokaryotes and eukaryotes.

b)   With neat labelled diagram explain structure of prokaryotic cell membrane.

[4]

Q3) a)   Explain in brief structure and importance of nucleoid in prokaryotic cell.**[6]**

OR

What is germ theory of disease? Write Koch's postulates.

b)   Write principle and method of Gram's staining.   **[4]**

Q4) a) Describe in detail structure and life cycle of bacteriophages. **[6]**

OR

With neat labelled diagram explain structure of bacterial endospore and add a note on process of sporulation.

b) Explain working and functions of compound microscope. **[4]**

Q5) Write short notes on any four of the following: **[10]**

a) Archaebacteria.

b) General characters fungi.

c) Structure of flagella.

d) Different types of objective lenses.

e) Negative staining

f) Viriods and prions.

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F.Y. BSc. (Biotechnology)

BBt 108 : BIOMATHEMATICS AND BIOSTATISTICS - I

(2019 CBCS Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Solve each section on separate answer paper.*
2) *Use of non-programmable scientific calculator is allowed.*
3) *Q.1 and Q.5 are compulsory.*
4) *Solve any two questions out of Q.2, Q.3 and Q.4 in Biomathematics section.*
5) *Solve any two questions out of Q.6, Q.7 and Q.8 in Biostatistics section.*

SECTION - I
(Biomathematics)

Q1) a) Define : Symmetric Matrix. **[1]**

b) Write the expression $5^2 = 25$ in logarithmic form. **[1]**

c) Compute the dot product of vectors $\bar{u} = \bar{i} + \bar{j} + \bar{k}$ and $\bar{v} = 2\bar{i} - \bar{j} + \bar{k}$. **[1]**

Q2) a) If $3^{x-y} = 27$ and $3^{x+y} = 243$, then find the values of x and y. **[3]**

b) Determine whether the vectors $v_1 = (1, 0, 1)$ $v_2 = (-1, 0, 1)$ and $v_3 = (0, 1, 4)$ are linearly dependent. **[4]**

Q3) a) If $\log 2 + \log (x+3) - \log (3x-5) = \log 3$, then find the value of x. **[3]**

b) How many integers from 1 to 1000 are divisible either by 2 or 3 or 5? **[4]**

Q4) a) The lengths of the diagonals of a rhombus are 56cm and 33cm find the area of the Rhombus. **[2]**

b) How many ways are there to arrange the 11 letters in the word 'MATHEMATICS'? **[2]**

c) If $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix}$, then find the matrix x such that $2x + 3A - B = 0$ where '0' is zero matrix of order 2. **[3]**

P.T.O.

SECTION - II

(Biostatics)

Q5) State whether each of the following statements is true or false : **[1each]**

a) Mean of the data 2, 4, 6, 8, 10, is 2

b) Cov(x,4) = 0

Q6) Define the following terms : (any four) **[2each]**

a) Median

b) Central tendency

c) Standard deviation.

d) Mean deviation

e) Positive correlation.

Q7) Attempt the following.

a) Compute quartile deviation for the following data: 20, 25, 19, 22, 26, 17,30. **[5]**

b) For certain data $\sum(x_i - \bar{x})(y_i - \bar{y}) = 28$ and $\sum(x_i - \bar{x})^2 = 20$, compute regression coefficient of y on x. Also comment on the result.**[3]**

Q8) Attempt the following.

a) Explain the representation of data using ogive curves. **[5]**

b) Explain need of statistics in biology. **[3]**

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SEAT No. :

[5903] - 21

F.Y. B.Sc.

BIOTECHNOLOGY

BBt - 201 : Fundamentals of Chemistry - II

(2019 Pattern) (CBCS) (Semester - II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

    1)   *Q.1 is compulsory.*

    2)   *Solve any three questions from Q.2 to Q.5.*

    3)   *Q.2 to Q.5 carries equal marks.*

Q1) Solve **any five** of the following : **[5]**

    a)   Define Buffer.

    b)   What is EMF?

    c)   State Ostwalds law of dilution.

    d)   What is reversible cell?

    e)   Define Normality.

    f)   State Rate law.

Q2) a)   Derive Handerson Balch Equation for Acidic Buffer. **[6]**

<div align="center">OR</div>

       Explain Pseudomolecular Reaction with suitable example.

    b)   What is the use of salt bridge? How it is prepared? **[4]**

Q3) a) What is rate of reaction? Obtain the rate equation for a first order reaction. **[6]**

OR

What are Colligative properties? Explain Elevation of boiling point is a Colligative property.

b) A second order reaction where a = b is completed in 500 sec, how long it will take for the reaction to go to 60% completion. **[4]**

Q4) a) What is Standard Cell? Explain Weston Standard Cell. **[6]**

OR

Define equivalence point. Explain neutralization curve of Strong Acid and Weak Base.

b) Calculate the pH of the following : **[4]**

   i) 10^{-8} (M).

   ii) $\dfrac{M}{200} Ca(OH)_2$.

   iii) 1.0×10^{-2} (M) $Ca(OH)_2$

   iv) 0.1 M $CH_3 COOH$.

Q5) Write short notes on (**Any Four**) : **[10]**

   a) Lewis Acid and Base concept.

   b) Calomel Electrode.

   c) Lowering of vapour pressure.

   d) Characteristics of 1st order reaction.

   e) Medicinal and Biological concept of water.

   f) Galvanic cell.

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F.Y. B.Sc.

BIOTECHNOLOGY

BBT - 202 : Biochemistry - II

(2019 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :

  1) *Question 1 is compulsory.*

  2) *Solve any three questions from Q.2 to Q.5.*

  3) *Questions 2 to 5 carry equal marks.*

Q1) Solve **Any Five** of the following :   **[5]**

  a)   Zwitter Ion.

  b)   Peptide bond.

  c)   Specific Activity.

  d)   Nucleoprotein.

  e)   Active site.

  f)   Nucleoside.

Q2) a)   Explain six classes of enzyme according to the type of reaction catalyzed by them.   **[6]**

OR

Explain the structure of DNA with the help of well labelled diagram. Add a note on functions of Nucleic Acids.

  b)   Briefly explain role of Thiamine pyro phosphate as coenzyme.   **[4]**

Q3) a) Explain different forces stabilizing structure of DNA. **[6]**

OR

Explain α -Helix and β pleated sheet structure of proteins.

b) Briefly explain biochemical role of Riboflavin and Niacin. **[4]**

Q4) a) Give structure of following amino acids. **[6]**

     i)   Aspartic Acid.

     ii)   Glycine.

     iii)   Proline.

     iv)   Cysteine.

     v)   Lysine.

     vi)   Valine.

OR

Explain the effect of temperature, pH and substrate concentration on enzyme activity.

b) Discuss in brief denaturation of Nucleic acids. **[4]**

Q5) Write short notes on **<u>Any Four</u>** of the following : **[10]**

     a)   Structure of Adenine and Thymine.

     b)   Ionisation of Amino Acid Side Chain.

     c)   Induced Fit Model.

     d)   Z DNA.

     e)   Phosphodiester Bond.

     f)   Competetive inhibition.

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F.Y. B.Sc.

BIOTECHNOLOGY

BBT-203: Bioinstrumentation

(2019 Pattern) (CBCS) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :

  1) Q.1 is compulsory.

  2) Solve any three questions from Q.2 to Q.5.

  3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following :   **[5]**

  a) Enlist the applications of spectrophotometer.

  b) Define Absorption.

  c) Enlist the applications of Atomic Absorption Spectrometer.

  d) What is stationary phase?

  e) Define sedimentation rate.

  f) Enlist the thermometric properties of thermometer.

Q2) a) Explain the principle of centrifuge Add a note on different types of centrifuges.   **[6]**

<div align="center">OR</div>

   Explain the construction & working of colorimeter mention it's applications.

  b) Explain the principle of Mass spectroscopy.   **[4]**

Q3) a) Explain the principle & working of phase contrast microscope. **[6]**

OR

Explain the principle of double beam spectrophotometer. Add a note on applications of spectrophotometer to biomolecules.

b) Explain the principle of TLC & mention it's applications. **[4]**

Q4) a) Explain the principle & working of dark field microscope in detail. **[6]**

OR

Explain the principle & construction of thermocouple thermometer.

b) Explain the principle of fluorescence microscope & mention its applications. **[4]**

Q5) Write short notes on any Four of the following : **[10]**

a) Write a note on principle of pH meter.

b) Write a note on Analytical techniques.

c) Explain principle of colorimeter.

d) Explain energy levels of rigid diatomic molecules.

e) Give an account on applications of centrifuge.

f) Explain the construction of stereozoom microscope.

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F.Y. B.Sc.

BIOTECHNOLOGY

BBT-204: Animal Science - II

(2019 Pattern) (CBCS) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :

   1)   *Q.1 is compulsory.*

   2)   *Solve any three questions from Q.2 to Q.5.*

   3)   *Questions 2 to 5 carries equal marks.*

Q1) Solve any five of the following :   **[5]**

   a)   Name any two digestive glands.

   b)   Define synapse.

   c)   Enlist two hormones secreted by pituitary.

   d)   Write two differences between striated and non-striated muscle.

   e)   Define sarcomere.

   f)   Mention the scientific name of honey bee.

Q2) a)   Describe physiology of digestion in mouth and stomach.   **[6]**

<div align="center">OR</div>

      With the help of diagram explain the transport of O_2 and CO_2 between alveoli and tissue.

   b)   Describe mechanism of muscle contraction.   **[4]**

Q3) a) Describe spermatogenesis with diagram. **[6]**

OR

Explain the structure and functions of thyroid gland.

b) Write a note on various types of hives used in apiculture. **[4]**

Q4) a) Explain asexual phase in the life cycle of plasmodium. **[6]**

OR

Define sericulture and explain the life cycle of silkworm.

b) Name the hosts of helminthes parasite Taenia.sp. Write about the pathogenecity. **[4]**

Q5) Write short notes on any four of the following : **[10]**

a) Digestion of carbohydrates.

b) Stucture of Neuron.

c) Symbiotic relationship with example.

d) Fish by products.

e) Respiratory pigments.

f) Silkworm diseases.

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F.Y. B.Sc. (Biotechnology)
BBt - 205 : PLANT SCIENCES - II
(CBCS) (2019 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :
   1)   Question No. 1 is compulsory.
   2)   Solve any three questions from Q.2 to Q.5.
   3)   Question 2 to 5 carry equal marks.

Q1) Solve any <u>Five</u> of the following: **[5]**

   a)   Define Osmosis.

   b)   What is ascent of sap.

   c)   Define photophosphorylation.

   d)   Comment on photoperiodism.

   e)   Draw neat labelled diagram of chloroplast.

   f)   Write two examples of fiber yielding plants.

Q2) a)   Describe light reactions of photosynthesis. Add a note on photosynthetic pigments.   **[6]**

<div align="center">OR</div>

What is diffusion? Explain the cohesion - tension theory for ascent of sap in plants.   **[6]**

   b)   Write short note on kreb's cycle.   **[4]**

Q3) a)   Describe mechanisms of Nitrogen fixation.   **[6]**

<div align="center">OR</div>

State five classes of plant hormones. Explain their role in growth of plants **[6]**

   b)   Write a note on phloem loading and unloading.   **[4]**

Q4) a) Describe the factors influencing photosynthesis. Add a note on CAM pathway. **[6]**

<center>OR</center>

With a neat labelled diagram explain ETC involved in respiration. **[6]**

b) Write differences between photosynthesis and respiration. **[4]**

Q5) Write short notes on any <u>Four</u> of the following: **[10]**

a) Active and passive transport.

b) Imbibition.

c) C_4 pathway of photosynthesis.

d) Economic importance of cereals & pulses with suitable examples.

e) Vernalisation.

f) Glycolysis.

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F.Y. B.Sc. (Biotechnology)
BBT - 206 : MICROBIOLOGY - II
(2019 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates :

   1)   Question No. 1 is compulsory.

   2)   Solve any three questions from Q.2 to Q.5.

   3)   Question 2 to 5 carry equal marks.

Q1) Solve any <u>Five</u> of the following: **[5]**

   a)   State importance of sterilization process in microbiology.

   b)   Write mode of action of heavy metal on bacteria.

   c)   Write any two applications of pure culture.

   d)   Which method of sterilization you will use to sterile following material:

   i)   Syringes & needles.

   ii)   Inoculation cabinet.

   iii)   Serum.

   iv)   Petriplates & Pipettes.

   e)   What is MIC?

   f)   What is biosafety level 2 laboratory?

Q2) a)   With neat labelled diagram describe different phases of bacterial growth curve.   **[6]**

<div align="center">OR</div>

   Explain construction, working principle and uses of autoclave.   **[6]**

   b)   Classify bacteria on the basis of temperature and pH requirement.   **[4]**

Q3) a) Enlist various methods of preservation of microorganism. Explain process of lyophilization in detail. **[6]**

<div align="center">OR</div>

With neat labelled diagram describe animal - microbe interaction. **[6]**

b) Write mode of action and uses of halogens and detergents. **[4]**

Q4) a) Discuss factors affecting bacterial growth and classify bacteria on the basis of nutritional requirement. **[6]**

<div align="center">OR</div>

Describe any one method to obtain pure culture of microorganism. Add importance of serial dilution in it. **[6]**

b) Justify Blood agar is a differential media. **[4]**

Q5) Write short notes on any Four of the following: **[10]**

a) Enrichment media.

b) Growth factors.

c) Pasteurization.

d) Ideal disinfectant.

e) Biosafety.

f) U.V. light sterilization.

<div align="center">◆◆◆</div>

[5903]-27

F.Y. B.Sc. (Biotechnology)

BBt-207 : Biomathematics and Biostatistics - II

(2019 Pattern) (CBCS) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

1)   Solve each section on separate answer paper.

2)   Use of non programmable scientific calculator is allowed.

3)   Q.1 and Q.5 are compulsory.

4)   Solve any two questions out of Q.2, Q.3 and Q.4 in Biomathematics section.

5)   Solve any two questions out of Q.6, Q.7 and Q.8 in Biostatistics section.

SECTION - I

Biomathematics - II

Q1) a)   Find the order and degree of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = x$.

[1]

b)   Solve the integration $\int \frac{\cos x}{\sin x}\, dx$.

[1]

c)   Compute the partial derivative of the function $x^2y + \sin(x+y)$ with respect to 'x'.

[1]

Q2) a)   Solve the following system of linear equations by Gaussian elimination method.

[5]

$$x + y + z = 1$$
$$x + y - 2z = 4$$
$$2x + y + z = 2$$

b)   Find the stationary point of the following function

$$f(x, y) = x^2 - xy + y^2 - 2x + y$$

[2]

P.T.O.

Q3) a) Solve the differential equation $\dfrac{dy}{dx} = \dfrac{x+y}{x-y}$. **[5]**

b) Find the area under the curve $y = x^2 + 2$ from $x = 1$ to $x = 2$. **[2]**

Q4) Find eigenvalues and eigenvectors of matrix $A = \begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$. **[7]**

SECTION - II

Biostatistics - II

Q5) State whether each of the following is true or false : **[1 each]**

a) Rejecting Ho when Ho is true is called as type II error.

b) For binomial distribution mean < variance.

Q6) Attempt the following :

a) Define the following terms : **[2 each]**

   i) Random experiment

   ii) Level of significance

b) State any one application of normal distribution is bioscience. **[4]**
   If $X \rightarrow N(10, 16)$. Find $P(10 < X < |4)_9$ $P(|X - 10| < 4)$.

Q7) Attempt the following : **[8]**

The weight (in kg.) of 10 bags of salt taken from machine are found as follows :

15.9, 15.8, 16.2, 16.0, 16.4, 15.6, 15.8, 15.4, 16.1

Does the sample support the clainn of the company that average weigh of salt bag is 16kg. Use 1% level of significance.

(State the assumptions if any).

Q8) Write a note on one way ANOVA and two way ANOVA. **[8]**

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[5903]-28

F.Y. B.Sc. (Biotechnology)
BBt-208 : Computer In Biology
(2019 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1) Question 1 is compulsory.

2) Solve any three questions from Q.2 to Q.5.

3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following :   **[5]**

a) Give any two examples of output device.

b) Define firewall.

c) Write full form of following terms.

    i) DVD

    ii) RAID

d) What is Hashing?

e) Enlist the types of operating system (Any 2)

f) State True/false :

    i) ROM is a non-volatile memory.

    ii) Inkjet printer is a input device

Q2) Answer the following :   **[10]**

a) Explain the generations of computers in detail.   **[6]**

b) Write a short note on the following :   **[4]**

    i) Hierarchical Data Model.

    ii) Working on Search Engine.

Q3) Answer the following : **[10]**

    a)   What is Bioinformatics? Explain its history in brief. **[6]**

    b)   Write in brief following terms : **[4]**

        i)   Medline

        ii)   Pubmed

Q4) Answer the following : **[10]**

    a)   What is virus? State various type of viruses and explain in brief. **[6]**

    b)   Differentiate between supercomputer and mainframe computer. **[4]**

Q5) Write short note on any four of the following : **[10]**

    a)   MS-Excel

    b)   Workstations

    c)   Network database management system

    d)   Storage Devices

    e)   Biological databases

    f)   Trojans

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