SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology (IGBT) 2nd Semester
Theory Exam – April 2017
PS02CIGB01 – Physics- II
10th April 2017 (Monday), 10:00 am to 1:00 pm

Maximum Marks: 70

Note: 1) All the Questions are compulsory.
2) Figures on the right indicate marks.

Q.1 Choose the correct option.   1x8= 8
(1) Tesla is the unit of ....
    (a) flux   (b) flux density   (c) field strength   (d) inductance
(2) The direction of magnetic line of forces is from...............
    (a) north pole to south pole   (b) south pole to north pole
    (c) one end of the magnet to another (d) none of these
(3) Which of the following is the dimensionless quantity..........
    (a) Shear stress   (b) strain
    (c) Poisson's ratio   (d) both b and c
(4) In which of following, speed of sound is least?
    (a) metal   (b) air   (c) liquid   (d) vacuum
(5) Unit of thermal conductivity is...............
    (a) W/K   (b) W/ (m. K)   (c) W/m^{2}K   (d) none of these
(6) Which mechanism of heat transfer is involved in heat flow from Sun to Earth?
    (a) conduction   (b) convection   (c) radiation (d) None of these
(7) The coordination number for FCC structure is....................
    (a) 8   (b) 4   (c) 6   (d) 12
(8) In p-type semiconductors, number of holes _____ number of electrons.
    (a) equal   (b) greater than   (c) less than   (d) cannot be defined

Q.2. Attempt any Seven of the following: 2x7= 14
        (1) State and explain Coulomb's law.
        (2) List the properties of magnetic line of force.
        (3) Write a note on Hooke's law.
        (4) Enlist the properties of sound absorbing materials.
        (5) Derive Laplace's formula for calculation the velocity of sound in air.
        (6) Briefly explain modes of transmission of heat.
        (7) State and explain zeroth law of thermodynamics.
        (8) Define unit cell and Basis of a crystal.
        (9) Draw the plane for given Miller Indices (1 1 1).

Q.3   (A) Describe the properties of Paramagnetic and diamagnetic substances.   [06]
       (B) Define electric potential. Derive the equation of electrostatic potential at any   [06]
           point.

                                  OR

       (B) (i)Two spheres charged with equal but opposite charges experience a force of [03]
               103 N when they are placed 10cm apart in a medium of relative
               permittivity 5.Determine the charge on each sphere.   [03]
           (ii) Write a note on Hysteresis.

Q.4 (A) Derive the relation between the constants K, α and β. [06]

(B) Explain magnetostriction method for the production of ultrasonic waves. [06]

OR

(B) (i) Discuss the effect of temperature on the speed of sound [03]
(ii) If the speed of sound in air at $0°C$ is 330 m/s, what will be its value when [03]
pressure is doubled and temperature is raised to $35°C$?

Q.5 (A) Define co-efficient of thermal conductivity. Derive the equation of thermal [06]
conductivity.

(B) Derive an expression for rectilinear flow of heat along a bar. [06]

OR

(B) (i) A sphere of radius 6.0cm at $1200°C$ is suspended in a vacuum in an enclose [03]
at $500°C$. Find the rate of loss of heat of the sphere assuming that it is a
blackbody. Take $\sigma = 5.67 \times 10^{-8}$ Wm^{-2}K^{-4}.

(ii) Explain the Lee's disc method for determination of thermal conductivity of
poor conductors. [03]

Q.6 (A) Write a note on Zener diode and Photovoltaic cell. [06]

(B) (i) Give a brief note on Intrinsic and Extrinsic semiconductors [03]
(ii) Calculate the atomic packing factor for FCC crystal structure. [03]

OR

(B) Explain the construction and working of PNP transistors. [06]

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SARDAR PATEL UNIVERSITY
External theory examination
Semester II
PS02CIGB03 – Computer Applications
15ᵗʰ April, 2017(Saturday)
Time: 10:00 a.m. to 1:00 p.m.

Q-1   Multiple choice questions.   [08]

1   Rows of the relation are referred as
   a) Attributes   b) Record
   c) Tuples   d) Relationship

2   _____ is an object that exists and distinguishable from other objects.
   a) Entity set   b) Attribute
   c) Entity   d) None of these

3   _____ SQL statement is use to modify datatype of any table column.
   a) change   b) alter
   c) update   d) create

4   In pattern matching _____ allows to match string of any length.
   e) ___   f) &
   g) %   h) None of these

5   When a column is defined as not null, that column becomes a _____ column.
   a) Unique   b) Primary key
   c) Mandatory   d) Not Compulsory

6   The data stored in a cursor is known as
   a) database   b) active data set
   c) current data set   d) None of these

7   _____ is the example of heuristic method.
   a) BLAST   b) FASTA
   c) Both a) and b)   d) None of these

8   _____ is an example of curated database.
   a)   Swiss Prot   b) EMBL
   c) GenBank   d) None of these

Q-2   Short questions (Attempt any seven).   [14]

1   List types of relationships.
2   Define attributes and domain.
3   Write any two datatypes available in Oracle.
4   Define RPAD( ) with example.
5   What is table level constraint?
6   What is privilege? List the object privileges.
7   Give full form of EMBL, PIR, SRS and NCBI.
8   What is central dogma?
9   Define alignment and write its types.

P.T.O.

Q-3
A   Explain DBMS and its advantages in detail.   [06]

B   What is ER modeling? Explain in detail with diagram.   [06]
                                              OR
B   Discuss Relational data model in detail.   [06]

Q-4
A   Enlist and explain various basic data types used in Oracle.   [06]

B   Explain primary and unique key constraint with proper syntax and example.   [06]
                                              OR
B   Discuss update and alter statement with appropriate syntax and example.   [06]

Q-5
A   What is explicit cursor? Explain fetch and close statement of explicit cursor with   [06]
        example.
B   Write a detail note on VIEW.   [06]
                                              OR
B   Explain any three Aggregate functions available in oracle with appropriate   [06]
        syntax and example.

Q-6
A   What is BLAST? Explain different types of BLAST.   [06]

B   What is bioinformatics? Explain any four applications of bioinformatics in detail.   [06]
                                              OR
B   Discuss the nucleotide sequence database in detail.   [06]

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SARDAR PATEL UNIVERSITY
M. Sc (Int.) Biotechnology: Semester II Examination
Tuesday, 18ᵗʰ April, 2017
Time: 10.00am to 1.00pm
PS02CIGB04: Microbiology-I

Total Marks: 70

Q-1 Give the answer by choosing appropriate option.   [8 X 1]

(1) _____ refused spontaneous generation by fly experiment.
(a) Francesco Redi   (b) Louis Pasteur
(c) Lazaro Spallanzani   (d) None of these

(2) Following is not found in all bacterial cell.
(a) Cell membrane (b) Ribosome (c) Capsule (d) All of these

(3) _____ insisted that puerperal fever was contagious.
(a) Oliver Wendell Holmes   (b) Robert Koch
(c) Louis Pasteur   (d) All of these

(4) Following are composed of polyphosphates.
(a) PHB granules   (b) Metachromatic granules
(c) Glycogen granules   (d) All of these

(5) Following gives three dimensional qualities to the specimen images.
(a) Phase contrast microscopy (b) SEM (c) TEM (d) None of these

(6) Following is an example of decolourizer in staining.
(a) Alcohol (b) Acid alcohol (c) Oxidizer (d) All of these

(7) Following cryoprotective agent is added during storage of cells at low temperature.
(a) DMSO (b) Acid alcohol (c) Propanol (d) All of these

(8) _____ is a method of isolating pure culture.
(a) Four flame method   (b) Spread plate method
(c) Pour plate method   (d) All of these

Q-2 Answer the following questions in short (Any seven)   [7 X 2]

(1) Enlist types of flagella based on arrangement.
(2) List the contribution of Pasteur in microbiology.
(3) Write River's postulates.
(4) What is endospore? Give examples of sporulating bacteria.
(5) Write differences between SEM and TEM.
(6) Write principle of phase contrast microscopy.
(7) What is the role of mordant in staining? Give examples.
(8) Define colony and pure culture.
(9) What is N-agar? Write the composition of N-agar.

Q-3 **(a)** Briefly discuss the spontaneous generation controversy with the help of appropriate experiments. [06]

(b) Write short notes on following: 1. Germ theory of fermentation [06]
2. History of molecular biology

OR

(b) Discuss the history of different laboratory technique developments. [06]

Q-4 **(a)** Compare Gram positive and Gram negative bacterial cell wall in detail. [06]

(b) Differentiate between Flagella and Pilli. Explain flagella structure and its hydrodynamics. [06]

OR

(b) Explain : 1. Functions of cell membrane
2. Cytoplasmic inclusions and vacuoles [06]

Q-5 **(a)** What is differential staining? Discuss any one method of differential staining in detail. [06]

(b) Discuss principle, working and applications of TEM. [06]

OR

(b) Write a short note on fluorescence microscopy along with its applications. [06]

Q-6 **(a)** Write a short note on nutritional requirements for the growth of bacteria. [06]

(b) Describe the following:
1. Anaerobic jar for the cultivation of anaerobes [06]
2. Selective media

OR

(b) Discuss the techniques used for the preservation and maintenance of pure culture. [06]

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(2)

(18)

SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology – Second Semester Examination
Thursday, 20th April 2017
Time: 10:00 am to 01:00 pm

PS02CIGB05: CELL BIOLOGY

Note: *(i) Figures to the right indicate marks.*

(ii) Draw neat and labeled diagram, wherever necessary.

Total Marks - 70

Q-1   Fill in the blanks by choosing appropriate option.   [08]

(1)   Unit membrane model was proposed by _____.

a. J.D.Robertson   b.D.R.Huxley   c.Novikoff&Holtzmann   d.Hilleir&Hoffman

(2)   Which one of the following junction does not permit intercellular exchange of materials?

a.Gap junction   b.Desmosomes   c.Tight junction   d. None of these

(3)   Dark reaction takes place in _____.

a. Grana   b. Stroma   c. Matrix   d. Oxisome

(4)   Which one of the following is called 'power house of the cell'?

a. Mitochondria   b. Ribosome   c. Chloroplast   d. Lysosomes

(5)   Protein present in microtubules is _____.

a. Tubulin   b. Dentin   c. Vimentin   d. None of these

(6)   Nucleus without nuclear membrane is called _____.

a. Nucleolus   b. Nucleoplasm   c. Protoplasm   d. Nucleoid

(7)   Number of daughter cells produced as a result of mitosis is _____.

a. Two   b. Four   c. Eight   d. Sixteen

(8)   DNA replication takes place during _____ Phase.

a. G_1 phase   b. G_2 phase   c. G_0 phase   d. S phase

Q-2   Answer the following. (Any Seven)   [14]

(1)   Write the difference between prokaryotes and eukaryotes

(2)   Write about Chlamydiae and Rickettsiae.

(3)   Draw and label the Blue-green algae.

(4)   Give the functions of Lysosome.

(5)   Enlist the functions of microfilaments.

(6)   Give a note on cilia and flagella.

(7)   Write any four differences between mitosis and meiosis.

(8)   Write the significance of Meiosis.

(9)   Write a note on the types of Ribosome.

Q-3 (A) Explain the structure of Animal cell with neat and labeled diagram. [6]

(B) Write a note on the chemical composition of plasma membrane. [6]

OR

(B) Explain the structure of bacterial cell with suitable diagram. [6]

Q-4 (A) Explain the structure and functions of Mitochondria. [6]

(B) Give a note on the structure and functions of Endoplasmic reticulum. [6]

OR

(B) With diagram explain the structure and function of Chloroplast. [6]

Q-5 (A) Give an explanatory note on the ultra structure and functions of Nucleus. [6]

(B) Write briefly on intermediate filaments. Add a note on their function. [6]

OR

(B) Give a note on the structure and functions of microtubules. [6]

Q-6 (A) What is cell cycle? With diagram explain the various events of interphase. [6]

(B) With labeled diagram, explain the phases of meiosis. [6]

OR

(B) Write a note on mitosis with diagram. [6]

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(ૠ/અ) Sardar Patel University

M. Sc. Integrated Biotechnology (IGBT) - 2nd Semester
Theory examination, April, 2017
Saturday, 22nd April, 2017; Time: 10:00 a.m. to 1:00 p.m.
Subject: PS02CIGB06: Biostatistics

Total Marks: 70

Notes: - (1) Figures to the right indicate marks.
(2) Draw neat and labeled diagram, wherever necessary.

Q.1 **Choose the Correct Answers of the Following.** [08]

1. A circle in which sectors represents various quantities is called_____.
   (a) Histogram (b) Frequency Polygon (c) Component Bar chart (d) Pie Chart

2. Taking the relevant root of the product of all non-zero and positive values are called:
   (a) Arithmetic mean (b) Geometric mean (c) Harmonic mean (d) Combined mean

3. From a 52 cards, card is drawn at random. What is the probability that card being king?
   (a) 1/13   (b) 3/52   (c) 3/13   (d) 1/4

4. Which of the following is a continuous probability distribution?
   (a) Binomial   (b) Poisson   (c) Normal   (d) None of these

5. The probability of rejecting the null hypothesis when it is true is called:
   (a) Level of confidence (b) Level of significance (c) Power of the test (d) Difficult to tell

6. A failing student is passed by an examiner, it is an example of:
   (a) Type-I error (b) Type-II error (c) Both (a) & (b) (d) Difficult to tell

7. A perfect positive correlation is signified by:
   (a) 0   (b) -1   (c) +1   (d) -1 to +1

8. To check goodness of fit for the data, which of the following test is used?
   (a) Paired t-test (b) t-test for single mean (c) Chi-square (d) None of these

Q.2 **Answer the following in short. (Attempt Any Seven)** [14]

1. What is Data? Give a classification of data.

2. Enlist the general rules for tabulation.

3. Calculate the arithmetic mean and mode of the following set of observations: 10, 11, 10, 11, 9, 8, 9, 10, 12, 10.

4. Define the terms (a) Compound Events (b) Exhaustive Events.

5. What is the probability of getting a total of more than 09 in a single throw with two dice?

6. Narrate the characteristics of Chi-square test.

7. Explain: Type I error and Type II error

8. Define: Correlation and enlist their types.

9. Narrate about Regression Lines.

Q.3 (A) The numbers of pods per plant of a pulse are given below. Calculate the Mean, Median [06] and Mode.

No. of pods	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Plants	6	12	22	48	56	32	18	6

Q.3 (B) In a study on patients, the following data was obtained. Find the Mean, Standard deviation and Coefficient of Variation of the data: [06]

Age (in years)	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Number of cases	01	00	01	10	17	38	09	03

OR

Q.3 (B) Calculate the arithmetic mean, geometric mean, harmonic mean of the following data [06] recorded on the number of pods per plant in lentil:

Number of pods = 80, 82, 84, 90, 85, 100, 105, 110, 90, 115

Q.4 (A) Write the statement of Addition theorem for compatible events. The probability that a [06] student passes a Biostatistics test is (2/3) and the probability that he passes both Biostatistics and Biomathematics test is (14/45). The probability that he passes at least on test is (4/5). What is the probability that the student passes the Biomathematics test?

Q.4 (B) A card is drawn at random from well shuffled pack of 52 cards. What is the probability [06] that (i) the card is spade (ii) the card is queen (iii) the card is spade or queen (iv) the card is not a club (v) the card is a face card (vi) the card drawn is either a heart or a diamond.

OR

Q.4 (B) Write the statement of Bayes' theorem. There are 4 boys and 2 girls in room A and 5 [06] boys and 3 girls in room B. A girl from one of the two rooms laughed loudly. What is the probability that the girl who laughed was from room B.

Q.5 (A) Ten objects are chosen at random from a large population and their weights are found to [06] be in gms 63, 63, 64, 65, 66, 69, 70, 70, 71. In the light of the above data, discuss the suggestion that the mean weight in the universe is 65 gms.
[Tabulated $t_{0.05}$ = 2.262 for d.f. 9]

Q.5 (B) The mean life of a sample of 10 electric bulbs was found to be 1456 hours with a [06] standard deviation of 423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with standard deviation 398 hours. Is there significant difference between the means of the two batches?
[Tabulated $t_{0.05}$ = 2.06 for d.f. 25]

2

OR

Q.5 (B) In an experiment on breeding of flowers of a species; a researcher obtained 107 Pink **[06]** flowers with a green stigma, 42 Pink flowers with red stigma, 38 Yellow flowers with a green stigma and 13 Yellow flowers with a red stigma. According to Mendel's laws the theory predicts that these types should be obtained in the ration of 9:3:3:1. Draw your conclusions based on the calculated 'χ^2' value.
[Tabulated 'χ^2' value 7.81 at 5% level of probability for 3 degree of freedom]

Q.6 (A) The height (x) and body weight (y) of ten males are given below. Calculate the **[06]** correlation coefficient (r) and value of 't' to find out the level of significance:

x	65	68	62	70	65	72	67	66	68	70
y	128	140	120	152	138	160	135	130	125	165

[Tabulated 't' value at 1% (3.36) levels of probability with d.f.=8]

Q.6 (B) Four different drugs have been developed for the cure of a certain disease. These drugs **[06]** are tried on patients of three different hospitals. The numbers of cases of recovery from the disease per 100 people are given below. Carry out two factor analysis of variance and interpret your results. [Tabulated F value for between drugs = 4.8, p=0.05 at d.f. =n_1=3; n_2= 6; F value for between hospitals = 5.1, p=0.05 at d.f. = n_1=2; n_2=6]

Drugs

Hospital	A	B	C	D
X	24	20	24	17
Y	20	25	30	09
Z	13	18	31	13

OR

Q.6 (B) The following data relate to the pod length (x) and the numbers of seeds per pod (y) are **[06]** given below. Calculate the regression coefficient (b) and test their level of significance.

x	4.5	4.0	5.2	4.6	5.2	5.2	4.3	4.0	4.5	5.5
y	5	5	6	6	6	7	4	4	5	6

[Tabulated 't' value at 1% (3.36) levels of probability with d.f.=8]

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