

(115)

SEAT No. \_\_\_\_\_

No. of Printed Pages : 2

Sc

## SARDAR PATEL UNIVERSITY

M.Sc. Integrated Biotechnology Examination, ~~II~~ Semester - II

Day &amp; Date : 13-November-2017, Monday

Time : 02:00 P.M. TO 05:00 P.M.

Subject : Physics - II

Subject Code : PS02CIGB01

Instructions :

[a] Figure to the right indicates full marks.

Total Marks : 70

[b] All questions are compulsory.

## Q-1 Choose the correct answers

[08]

- 1 Tesla is a unit of \_\_\_\_\_  
 [a] flux density [b] field strength [c] flux [d] inductance
- 2 A magnetic field exists around \_\_\_\_\_  
 [a] Iron [b] moving charges [c] copper [d] aluminum
- 3 The unit of relative permeability is \_\_\_\_\_  
 [a] henry [b] henry/mt [c] it is dimensionless [d] none of above
- 4 In n type semiconductor materials, the majority charge carriers are \_\_\_\_\_  
 [a] holes [b] photons [c] neutrons [d] electrons
- 5 The number of atoms per unit cell in FCC crystal structure is \_\_\_\_\_  
 [a] 1 [b] 6 [c] 2 [d] 4
- 6 Heat is measured in \_\_\_\_\_  
 [a] joule/calorie [b] calorie [c] joule [d] none of above
- 7 With increase in temperature heat will be \_\_\_\_\_  
 [a] decreases [b] increases [c] remains constant [d] none of above
- 8 The forward voltage drop across a silicon diode is \_\_\_\_\_  
 [a] 0.7 v [b] 0.3 v [c] 1.1 v [d] 1.0 v

Q-2 Attempt Any Seven out of the followings

[14]

1. State coulomb's law.
2. What is Hall effect?
3. Enlist the properties of diamagnetic substance.
4. Define lattice and basis of a crystal.
5. Draw the plane for given miller indices (100) and (111).
6. State the properties of sound absorbing materials.
7. Differentiate between n type and p type materials.
8. Define : stress and strain
9. State Hooke's law.

## Q-3 [a] Define ferromagnetic substance. Also state their properties.

[06]

[b] Derive the expression for coulomb charge.

[06]

OR

[b] Derive the expressions for hall effect and also hall mobility.

[06]

(P.T.O)

①

- Q-4 [a] Derive general expression for the velocity of sound in gaseous medium. [06]
- [b] Explain Young's and Bulk Modulus. [06]

OR

- [b] Discuss in detail about ultrasonic waves and its applications. [06]
- Q-5 [a] State and explain Stefan's law in detail. [06]
- [b] What is entropy and how does it change explain it. [06]

OR

- [b] Derive the expression for rectilinear flow of heat along a bar. [06]
- Q-6 [a] Discuss in detail about Extrinsic semiconductor material with lattice diagram. [06]
- [b] Write a short note on Light emitting diode (LED). [06]

OR

- [b] Calculate the atomic packing factor for BCC crystal structure. [06]



②

SEAT No. \_\_\_\_\_

No. of printed pages: 02

[89/A40/A4] SARDAR PATEL UNIVERSITY

M.Sc. (Integrated) Biotechnology, Second Semester Examination

Wednesday 15<sup>th</sup> November,

2017

2:00 p.m. to 5:00 p.m.

Biophysical chemistry: PS02CIGB02

Total Marks : 70

Note: (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

- Q.1 Choose the correct option for the following :** [08]
- (i) The reaction of an anion or cation with water accompanied by cleavage of O-H bond is called.....  
(a) Neutralization (b) Hydrolysis (c) Ionization (d) Acidification
- (ii) Substance which donates hydrogen ions is .....  
(a) acids (b) bases (c) neutral (d) aprotic
- (iii) A process in which heat is constant is called .....  
(a) isothermal (b) isobaric (c) adiabatic (d) isochoric
- (iv) Which out of the following is not an intensive property?  
(a) Pressure (b) Concentration (c) Density (d) Volume
- (v) Osmotic pressure can be measured by .....  
(a) Manometer (b) Osmometer (c) Stalagnometer (d) P<sup>H</sup> meter
- (vi) With rise in temperature, surface tension of liquid .....  
(a) increases (b) decreases (c) remain constant (d) none
- (vii) Which form of radioactivity is most penetrating ?  
(a) Alpha rays (b) Beta rays (c) Gamma rays (d) X-rays
- (viii) An alpha particle contains same nucleus as ..... atom.  
(a) Ar (b) O (c) Ne (d) He

- Q.2 Answer the following (Attempt any seven) :** [14]
- (i) What are lewis acid and lewis base ? Give two examples for each.
- (ii) Write dissociation process of acetic acid and define dissociation constant.
- (iii) Define: Specific viscosity.
- (iv) Explain: Isothermal process and adiabatic process.
- (v) Enlist various factors affecting the viscosity of the liquid.
- (vi) Define: Osmosis and diffusion.
- (vii) Explain: Internal energy and entropy.
- (viii) Calculate the disintegration constant of Co-60. Given:  $t_{1/2} = 5.2$  yrs.
- (ix) Write any two characteristics of alpha and beta particles.

P.T.O.

**Q.3 Answer the following :**

[A] Define : Buffer solution and explain its function. [6]

[B] Define acid-base indicators. Explain the action of various indicators during titration process. [6]

**OR**

[B] Discuss in brief about Arrhenius theory of acids and bases. [6]

**Q.4 Answer the following:**

[A] Describe the different types of thermodynamic processes. Derive the relation :  $\Delta H = \Delta E + \Delta nRT$  [6]

[B] Describe the Gibbs halmholtz equation. [6]

**OR**

[B] Distinguish between reversible and irreversible process. [6]

**Q.5 Answer the following:**

[A] Define Viscosity. Enlist different type of viscometer used in viscometry and also discuss any one viscometry method. [6]

[B] Write a note on Osmotic behavior of cells. [6]

**OR**

[B] Define osmotic pressure. Enlist measurement methods of osmotic pressure. Discuss any two methods in detail. [6]

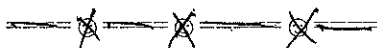
**Q.6 Answer the following:**

[A] Define radioactivity. Discuss radioactive decay using suitable example. [6]

[B] Discuss the importance of radioisotope in biology. [6]

**OR**

[B] Distinguish between: G.M. counter and liquid scintillation counter. [6]



SEAT No. \_\_\_\_\_

[88]

No. of printed pages: 02

Sardar Patel University  
M.Sc. (Integrated) Biotechnology  
External Theory Examination  
PS02CIGB03 – Computer Applications  
17<sup>th</sup> November, 2017 (Friday)  
Time: 02:00 p.m. to 05:00 p.m.

Total Marks: 70

[08]

**Q 1 Multiple Choice Questions.**

1. In pattern matching \_\_\_\_\_ allows to match a single character.
  - a) \_
  - b) %
  - c) &
  - d) None of these
2. Which one of the following is an association among several entities?
  - a) Domain
  - b) Entity
  - c) Relationship
  - d) None of these
3. The output of select Lpad(Lower('SARDAR'),10,'^') from dual; is \_\_\_\_\_.
  - a) ^^^^Sardar
  - b) ^^^^sardar
  - c) ^^^^SARDAR
  - d) None of these
4. To make the change permanent a \_\_\_\_\_ statement has to be given at the SQL statement.
  - a) commit
  - b) roll back
  - c) save point
  - d) view
5. Which of the following is not three schema architecture for a database?
  - a) Hierarchical
  - b) Physical
  - c) Network
  - d) Relational
6. Privileges once given can be denied to a user using \_\_\_\_\_ command.
  - a) Recall
  - b) Grant
  - c) Revoke
  - d) Drop
7. The sequence that differs because of a gene duplication event is called
  - a) paralogous
  - b) Orthologous
  - c) Analogous
  - d) None of these
8. \_\_\_\_\_ is an example of curated database.
  - a) Swiss Prot
  - b) PDB
  - c) GenBank
  - d) None of these

CP. T. D.

- Q 2 Short Questions (Attempt any seven). [14]**
1. Define: Attribute , Entity
  2. Define information and data.
  3. Explain DROP command with syntax, use and example.
  4. Explain Between() function with example.
  5. Draw the PL/SQL block.
  6. Write in brief about SQRT(), ROUND().
  7. Give the role of primer in molecular biology.
  8. What is gap and gap penalty?
  9. Give full form of EMBL, DDBJ, PIR and BLAST.
- Q 3 A.** What do you mean by DBMS. Explain advantages of DBMS. [06]
- Q 3 B.** Define data model and explain relational data model in detail. [06]
- OR**
- Q 3 B.** Explain normalization in detail alongwith example. [06]
- Q 4 A.** List all the Codd's rules and explain any five of them. [06]
- Q 4 B.** Explain Primary key constraint with proper syntax and example. [06]
- OR**
- Q 4 B.** Write and explain following function with syntax and example:  
1. ABS()      2. SUBSTR()      3. POWER() [06]
- Q 5 A.** List out types of join. Explain any one in detail with syntax and example. [06]
- Q 5 B.** What is explicit cursor? Explain Open and Fetch statement of explicit cursor with example. [06]
- OR**
- Q 5 B.** Explain stored procedure in detail alongwith syntax and example. [06]
- Q 6 A.** Write a detailed note on BLAST and FASTA. [06]
- Q 6 B.** What is bioinformatics? Explain any five applications of bioinformatics in detail. [06]
- OR**
- Q 6 B.** Discuss a detailed note on NCBI. [06]

— ✕ —

SC

SEAT No. \_\_\_\_\_

No. of pages -2

[7.5] **SARDAR PATEL UNIVERSITY**  
**M. Sc (Int.) Biotechnology: Semester II Examination**  
**Monday, 20<sup>th</sup> November, 2017**  
**Time: 2.00pm to 5.00pm**  
**Sub: PS02CIGB04: Microbiology-I**

**Total Marks: 70**

**Q-1 Give the answer by choosing appropriate option.**

**[8 X 1]**

- (1) Following is a mordant used in Gram's staining.  
 (a) Iodine (b) Alcohol (c) Saffranine (d) Any of these
- (2) Bacteria is surrounded by lateral flagella is known as..  
 (a) Lophotrichous (b) Peritrichous (c) Amphitrichous (d) None of these
- (3) Following is present in the cell wall of archeobacteria.  
 (a) Peptidoglycan (b) Teichoic acid (c) Pseudomurein (d) None of these
- (4) \_\_\_\_\_ developed aseptic culture technique and isolated bacteria in pure culture.  
 (a) John Needham (b) Joseph Lister (c) John Tyndall (d) None of these
- (5) \_\_\_\_\_ insisted that puerperal fever was contagious and caused by a germ.  
 (a) Oliver Wendell Holmes (b) Louis Pasteur (c) Robert Koch (d) None of these
- (6) \_\_\_\_\_ is a problem with Electron microscopy.  
 (a) Staining (b) Resolution (c) Artifact (d) All of these
- (7) \_\_\_\_\_ is used as a solidifying agent.  
 a) Peptone      b) Agar      c) Yeast extract      d) Beef extract
- (8) Which isolation method is not suitable for psychrophilic media?  
 (a) Streak plate (b) Pour plate (c) Spread plate (d) None of these

**Q-2 Answer the following questions in short. (Any seven)**

**[7 X 2]**

- (1) Write the Koch's postulates.
- (2) Write the contributions of Joseph Lister and Antony van Leeuwenhoek in microbiology.
- (3) Differentiate between capsule and slime layer.
- (4) What is endospore? Give examples of sporulating bacteria.
- (5) Explain decolourization procedure in Gram staining.
- (6) Define phototrophs and organotrophs.
- (7) Write applications of Scanning Electron Microscopy.
- (8) Write the steps to perform simple staining.
- (9) What is anaerobic chamber for the growth of anaerobic bacteria?

(P.T.O.)

- Q-3 (a) Explain the spontaneous generation theory with the contribution of scientists who supported it. [06]
- (b) Give the detailed description of the development in Germ theory of Diseases. [06]
- OR
- (b) Discuss the role of scientists in the development of molecular biology. [06]
- Q-4 (a) Explain the movements observed in bacteria based on Flagella and write its importance. [06]
- (b) Discuss sporulation and germination process development in the bacteria. [06]
- OR
- (b) Write a brief note on the structure, functions and examples of Gram negative bacteria. [06]
- Q-5 (a) Explain negative staining with its importance. [06]
- (b) Write a detailed note on fluorescence microscopy. [06]
- OR
- (b) Discuss principle, working and specimen preparation for TEM. [06]
- Q-6 (a) Explain the methods for the isolation of pure cultures. [06]
- (b) Write a detailed note on the types of media used for the growth of bacteria. [06]
- OR
- (b) Describe nutritional requirements of the microorganisms. [06]

\*\*\*\*\*X\*\*\*\*\*



**(62 & A-34) Sardar Patel University****M. Sc. (Integrated) Biotechnology (IGBT) - 2<sup>nd</sup> Semester****Theory examination, November, 2017****Wednesday, 22<sup>nd</sup> November, 2017; Time: 02:00 p.m. to 05:00 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. The average of absolute deviations from the central value of a data set is called  
(a) Mean (b) Mean deviation (c) Standard deviation (d) None of these
2. Which of the following can be described as a variable?  
(a) Blood glucose level (b) Heart rate (c) Body weight (d) All of these
3. What is the probability of getting a sum 9 from two throws of a dice?  
(a) 1/9 (b) 1/6 (c) 1/12 (d) 1/8
4. Which of the following is a continuous probability distribution?  
(a) Binomial (b) Poisson (c) Normal (d) None of these
5. A statement that is accepted if the sample data provide sufficient evidence that the null hypothesis is false is called:  
(a) Simple hypothesis (b) Composite hypothesis  
(c) Alternative hypothesis (d) Statistical hypothesis
6. If the critical region is located equally in both sides of the sampling distribution of test-statistic, the test is called:  
(a) One tailed (b) Two tailed (c) Right tailed (d) Left tailed
7. When the ratio of variations in the related variables is constant, it is called:  
(a) Linear correlation (b) Nonlinear correlation (c) Positive correlation (d) Negative correlation
8. In the regression equation  $Y = a + bX$ , b is called:  
(a) Slope (b) Regression coefficient (c) Intercept (d) Both (a) and (b)

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

1. Give merits and demerits of median.
2. Write merits and demerits of Geometric Mean.
3. Define the terms: 1. Population 2. Sample
4. Write properties of Binomial distribution.
5. Define the terms: 1. Null event 2. Exhaustive events
6. What is Chi-square test? Enlist the application of Chi-square test.
7. What is a level of significant?
8. Write properties of regression coefficient.
9. Narrate the significance of correlation coefficient test.

Q.3 (A) The marks obtained by 35 students of IGBT class are: [06]  
 628, 665, 560, 328, 421, 525, 326, 480, 470, 405, 421, 664, 668, 620, 300, 305, 520,  
 420, 370, 326, 440, 328, 480, 565, 650, 480, 360, 325, 450, 360, 426, 440, 306, 488,  
 370.

Form a cumulative frequency table with class interval of 50. Calculate Mean, Median and Mode.

Q.3 (B) What is Central tendency? Name some of them which you have studied. Mention need of [06]  
 Measure of Central tendency for Biotechnology experiments.

OR

Q.3 (B) Given below is the data on the height of plants grown under normal light. Calculate the [06]  
 Arithmetic mean and Standard deviation.

Height	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of plants	42	44	58	35	26	15

Q.4 (A) (i) In a class there are 3 boys and 2 girls. 3 students are selected at random from the [03]  
 class. Find the probability that 2 boys and 1 girl or 1 boy and 2 girls are selected.

(ii) A card is drawn at random from a well shuffled pack of cards. Find the probability of [03]  
 getting a two of heart or a diamond.

Q.4 (B) Write in detail the conditions under which Poisson distribution is used and [06]  
 characteristics of Poisson distribution.

OR

Q.4 (B) There are two bags. One bag contains 4 white and 2 black balls. Second bag contains 5 [06]  
 white and 4 black balls. Two balls are transferred from first bag to second bag. Then one  
 ball is taken from the second bag. Find the probability that it is a white ball.

Q.5 (A) A random blood sample for the test of fasting sugar of 10 boys give the following data in [06]  
 mg/dl :

70, 120, 110, 101, 88, 83, 95, 107, 100, 98

Do these data support the assumption of population mean of 100 mg/dl?

[value of 't' for 9 degrees of freedom is 2.262]

Q.5 (B) A tobacco company claims that there is no relationship between smoking and lung [06]  
 ailments. To investigate the claims random sample of 300 males in the age group of 40  
 to 50 is given medical test. The observed sample results are tabulated below:

	Lung ailment	No lung ailment	total
Smokers	75	105	150
Non-smokers	25	95	120
Total	100	200	300

On the basis of chi-square test for goodness of fit, can it be concluded that smoking and lung ailments are independent?

[At 5% level of significance the value of ' $\chi^2$ ' value 3.841 for one degree of freedom]

OR

Q.5 (B) The average number of articles produced by two machines per day is 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 1% of significance? [06]

[ Tabulated  $t_{0.01, 48} = 2.58$ ]

Q.6 (A) Explain the different types of correlation. Discuss different methods of studying correlation. [06]

Q.6 (B) The following data relate to the pod length and the number of seeds per pod are given below. Calculate the correlation coefficient (r), and test their level of significance. [06]

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

Pods length (cms)	4.5	04	5.2	4.6	5.2	5.2	4.3	04	4.5	5.5
No. of seeds/pod	05	05	06	06	06	07	04	04	05	06

OR

Q.6 (B) From the data given below, find out whether the means of the three samples differ significantly or not with applying ANOVA. [06]

Sample 1	Sample 2	Sample 3
20	19	13
10	13	12
17	17	10
17	12	15
16	09	05

[Tabulated F value = 3.9 at 5% level of significance]

~~X~~

