

[23]

S/L

SARDAR PATEL UNIVERSITY
M. Sc. (I Semester) Biochemistry Examination
Wednesday, 1st November 2017
Time: 10. 00 a. m. to 1.00 p. m.
Paper: PS01CBIC01 (Cell Biology & Genetics)

Total Marks: 70

- N.B.: (i) Answers of all the questions (including multiple-choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

- (i) Which of the following statements does not apply to the nuclear envelope?
(a) It is a double membrane.
(b) It has pores through which material enters and leaves.
(c) It is continuous with the endoplasmic reticulum.
(d) It has infoldings to form cristae.
- (ii) Some proteins are found in the plasma membrane. What part of the protein is within the membrane itself?
(a) hydrophilic region (b) hydrophobic region
(c) hydrophobic region (d) hydrophilic region
- (iii) Which of the following is not an accurate description of a chromosome?
(a) It is a colored body localized in the nucleus.
(b) It is a protein and nucleic acid complex.
(c) It is the cellular structure that contains the genetic material.
(d) In eukaryotes, it is composed of many DNA molecules attached end to end.
- (iv) A researcher made an interesting observation about a protein made by the rough ER and eventually used to build a cell's plasma membrane. The protein in the membrane was actually slightly different from the protein made in the ER. The protein was probably changed in the
(a) Golgi apparatus (b) mitochondrion
(c) nucleus (d) chloroplast
- (v) During which phase of the cell cycle are normal components of the cell are synthesized?
(a) M Phase (b) G1 Phase (c) S Phase (d) G2 phase
- (vi) During which of the following conditions cell cycle will be arrested?
(a) Presence of single break in DNA
(b) Presence of unphosphorylated, unstable p53
(c) Presence of active cyclin dependent kinases
(d) all of the above
- (vii) Cyclins are degraded by
(a) Proteases (b) Phosphatases (c) Cyclases (d) Cyclins are not degraded
- (viii) Blood group AB is a phenomenon of
(a) Co-dominance (b) Incomplete dominance
(c) Complete dominance (d) None of the above

(Contd....2)

Q2. Answer any SEVEN of the following questions in brief:

(7 X 2 = 14)

- (i) Why is the evolution of photosynthesis thought to have favoured the subsequent evolution of oxidative metabolism?
- (ii) 'Some of the eukaryotic organelles evolved through a symbiotic relationship' Explain.
- (iii) 'Analysis of the details of the cell structure requires the use of more powerful microscopic techniques'. Explain.
- (iv) Briefly describe the components of Endomembrane system of eukaryotic cells
- (v) Differentiate between euchromatin and heterochromatin
- (vi) Define apoptosis
- (vii) What is the function of p53 gene?
- (viii) State the two laws of Mendel
- (ix) Give example and explain the phenomenon of co-dominance

Answer the following questions in details:

(4 X 12 = 48)

Q3. (a) Giving an over view of structure of plasma membrane and briefly discuss the types of membrane proteins and their functions (6)

(b) Giving an illustrative account of structure of nucleus, briefly explain how a single nuclear pore complex can efficiently transport proteins that possess different kinds of nuclear localization signal. (6)

OR

(b) Give an illustrative account of the formation of primary and secondary lysosomes and discuss the role of secondary lysosomes in the cellular digestive processes (6)

Q4. (a) Write an explanatory note on the chloroplast structure and its functional relationship (6)

(b) Give a brief account of the structure of Golgi complex and discuss how it coordinates with other organelles in secretion and transport of materials to their proper destination(6)

OR

(b) Giving a brief over view of ribosomes, present their structure based on asymmetrical model. (6)

Q5. (a) Giving an overview of the composition and organization of cytoskeletal elements, discuss in brief their role in cell division, wall formation and transport. (6)

(b) What is meant by cell cycle checkpoint? What is its importance? How does a cell stop its progress at one of these check points? (6)

OR

(b) Explain in detail the activation of cyclin dependent kinase. Also explain its function. (6)

Q6. (a) Write the two Mendel's laws and deviations of these laws. (6)

(b) Give examples and explain the concept of multiple allelism. (6)

OR

(b) State the law of segregation. For a following dihybrid cross write the number of possible gametes:

A tall pea plant bearing purple flowers is crossed with pure strain of similar phenotype. (for height of plant- dominant allele T; recessive allele t) (for color of flower - dominant allele P; recessive allele p) (6)

[18]

Sardar Patel University
M. Sc. Biochemistry, First Semester Examination

Friday, 03rd November 2017

10:00 am to 01:00 pm

PS01CBIC02: Bioinstrumentation

Maximum Marks: 70

1. Choose the correct answer

(1x8=8)

- i) Which one of the following lamps are used in bright field microscope?
a. Tungsten lamp
b. Halogen lamp
c. Light emitting diodes
d. All of the above
- ii) Piezoelectric tube is a component of _____
a. Fluorescence microscope
b. Scanning tunnelling microscope
c. Phase contrast microscope
d. Electron microscope
- iii) Which one the following techniques can be used for separation of charged molecules
a. Centrifugation
b. SDS PAGE
c. Agarose gel electrophores
d. Both B and C
- iv) Which one of the following technique is used to separate cell organelles based on their densities?
a. Rate zonal centrifugation
b. Continuous centrifugation
c. Isopycnic centrifugation
d. None of these
- v) Which of the following radiation source is used in IR spectroscopy?
a. Hollow cathode lamp
b. Deuterium lamp
c. Mercury lamp
d. Nernst glower
- vi) Which of the following techniques may be employed for determination of molecular mass of an analyte?
a. AAS
b. MALDI-TOF
c. IEF
d. IR
- vii) After emitting a radioactive particle, an isotope shows decrease in atomic number by 1 and no change in mass number. The radioactive process is known as
a. Negatron emission
b. Alpha particle emission
c. Positron emission
d. Decay by electron capture
- viii) A biosensor consists of all of the following components except
a. Biocatalyst
b. Quadrupole analyzer
c. Transducer
d. Electronic processor

2. Write short notes on any seven:

(7x2=14)

- a. Barrier filter
- b. Conjugate foci
- c. Reverse phase chromatography
- d. Thin layer chromatography
- e. Stoke's shift
- f. Photomultiplier tube
- g. Spin-spin interaction in NMR spectroscopy
- h. Basic principle of autoradiography
- i. Total consumption burner used in AAS

3. a. Differentiate scanning electron microscope and transmission electron microscope. (6)
b. Explain flow cytometry in detail. (6)

OR

- b. Write a brief note on phase contrast microscopy. (6)

4. a. Briefly explain Capillary electrophoresis. (6)

- b. Write a brief note on instrumentation of GC. (6)

OR

- b. Write a note on types of density gradients and their applications. (6)

5. a. Explain the working of any one lamp type used in UV spectroscopy. (6)

- b. Define chemical shift. How is it calculated? Why is it considered significant in NMR spectroscopy? (6)

OR

- b. Explain the sample preparation methods for IR spectroscopy. (6)

6. a. Explain the basic principle of solid scintillation counting with a note on the energy transfer process. What are its limitations? (6)

- b. Write notes on: i) Crystallization of samples for x ray diffraction analysis. (6)
ii) Applications of autoradiography

OR

- b. What are Biosensors? Explain the principle and uses of any one Biosensor in detail. (6)

+++++

[78]

SEAT No. _____

No. of Printed Pages : 2 5 c

SARDAR PATEL UNIVERSITY

M. Sc. (I Semester) Biochemistry (under CBCS) Examination

Tuesday, 7th November 2017

Time: 10.00 a.m. to 1.00 p.m.

Paper: PS01CBIC03 (Cellular Metabolism)

Total Marks: 70

- N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

- (i) The conversion of pyruvate to lactate by Lactate Dehydrogenase (LDH) is accompanied by the consumption of
(a) GTP
(b) ATP
(c) NADH
(d) NAD⁺
- (ii) During anaerobic conditions, the rate of glycolysis, is called
(a) Warburg effect
(b) Pasteur effect
(c) Hill reaction
(d) Compensation point
- (iii) Malonyl CoA, ACP and NADPH are involved in
(a) fatty acid oxidation
(b) Glycogenesis
(c) Pentose phosphate pathway
(d) fatty acid biosynthesis
- (iv) How many times β -oxidation is required to transform C20 fatty acid into acetyl-CoA?
(a) 7
(b) 8
(c) 9
(d) 10
- (v) Which of the following enzymes act in pentose phosphate pathway?
(a) 6-phospho gluconate dehydrogenase (c) Aldolase
(b) Glycogen phosphorylase (d) none
- (vi) Acetyl-CoA can be produced in cell from
(a) Pyruvate (c) Palmitoyl-CoA
(b) carbon skeleton of amino acids (d) All of the above
- (vii) Tyrosine is biosynthesized from _____
(a) Tryptophan (b) Alanine (c) Phenylalanine (d) None of above
- (viii) Glutamine is synthesized in the liver by the action of enzyme
(a) Transaminase (c) α -ketoglutarate dehydrogenase
(b) Glutamine synthetase (d) none of the above

(7)

(Contd.....2)
(P.T.O)

Q2. Answer any SEVEN of the following questions briefly: (7 X 2 = 14 Marks)

- (i) As glucose-6-phosphate is used in many pathways besides glycolysis, which is the first committed step of glycolysis?
- (ii) Differentiate between the Hexokinase and Glucokinase.
- (iii) What are the intracellular sites of carbamoyl phosphate synthase 1 and 2 reaction?
- (iv) How pyruvate is converted into phosphoenol pyruvate (PEP) in gluconeogenesis?
- (v) What are essential fatty acids? Give examples.
- (vi) Differentiate between free energy change and standard free energy change.
- (vii) An amino acid that yields acetoacetyl-CoA during catabolism is glucogenic or ketogenic?
- (viii) In which cells glucose -6- phosphatase enzyme is found? What is its subcellular location?
- (ix) Why Ketone bodies are synthesized in prolonged starvation when blood glucose is very low & also in diabetes when blood glucose is very high?

Q3. (a) Explain the reactions of three steps of gluconeogenesis that are different from glycolysis. Justify that gluconeogenesis is energetically expensive but essential. (6)

(b) Explain coordinated regulation of glycolysis and TCA cycle. (6)

OR

(b) List the tissues where Pentose Phosphate pathway is found active and explain the reactions and importance of this pathway. (6)

Q 4. (a) Write a detailed note on the carriers involved in electron transport chain. (6)

(b) Explain the regulation of ETC. (6)

OR

(b) Give a detailed account on glycogen breakdown. (6)

Q 5. (a) What are ketone bodies? Write reactions of ketone bodies' formation. (6)

(b) Explain the oxidation of Palmitoyl-coA and calculate the energy production by β - oxidation. (6)

OR

(b) Explain enzymes and reactions involved in Fatty acid synthase complex. (6)

Q .6 (a) Give any two examples and explain transamination reactions. (6)

(b) Write a detailed note on regulation of purine biosynthesis. (6)

OR

(b) What is salvage pathway? Write the salvage pathway reactions for pyrimidine biosynthesis. (6)

#####

— X —
(2)

SEAT No. _____
[247]

SARDAR PATEL UNIVERSITY
M. Sc. (I Semester) Biochemistry Examination
Wednesday, 1st November 2017
Time: 10. 00 a. m. to 1.00 p. m.
Paper: PS01CBIC21 (Cell Biology & Genetics)

Total Marks: 70

N.B.: (i) Answers of all the questions (including multiple-choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

- (i) Which of the following statements does not apply to the nuclear envelope?**
 - (a) It is a double membrane.
 - (b) It has pores through which material enters and leaves.
 - (c) It is continuous with the endoplasmic reticulum.
 - (d) It has infoldings to form cristae.

- (ii) Some proteins are found in the plasma membrane. What part of the protein is within the membrane itself?**
 - (a) hydrophilic region
 - (b) hydroponic region
 - (c) hydrophobic region
 - (d) hydrocoel region

- (iii) Which of the following is not an accurate description of a chromosome?**
 - (a) It is a colored body localized in the nucleus.
 - (b) It is a protein and nucleic acid complex.
 - (c) It is the cellular structure that contains the genetic material.
 - (d) In eukaryotes, it is composed of many DNA molecules attached end to end.

- (iv) A researcher made an interesting observation about a protein made by the rough ER and eventually used to build a cell's plasma membrane. The protein in the membrane was actually slightly different from the protein made in the ER. The protein was probably changed in the**
 - (a) Golgi apparatus
 - (b) mitochondrion
 - (c) nucleus
 - (d) chloroplast

- (v) A proteinaceous, button like, structure at the outer surface of the centromere of each chromatid, to which spindle fibers attach are**
 - (a) microtubules
 - (b) MAP
 - (c) centre proteins
 - (d) Kinetochore

- (vi) During which of the following conditions cell cycle will be arrested?**
 - (a) Presence of single break in DNA
 - (b) Presence of unphosphorylated, unstable p53
 - (c) Presence of active cyclin dependent kinases
 - (d) all of the above

- (vii) High cyclin concentration is found during**
 - (a) M phase
 - (b) interphase
 - (c) G₀ phase
 - (d) Cyclins concentration remains same in all phases of cell cycle

- (viii) Blood group AB is a phenomenon of**
 - (a) Co-dominance
 - (b) Incomplete dominance
 - (c) Complete dominance
 - (d) None of the above

Q2. Answer any SEVEN of the following questions in brief:

(7 X 2 = 14)

- (i) Why is the evolution of photosynthesis thought to have favoured the subsequent evolution of oxidative metabolism?
- (ii) 'Some of the eukaryotic organelles evolved through a symbiotic relationship' Explain.
- (iii) 'Analysis of the details of the cell structure requires the use of more powerful microscopic techniques'. Explain.
- (iv) Briefly describe the components of Endomembrane system of eukaryotic cells.
- (v) Differentiate between euchromatin and heterochromatin.
- (vi) Contrast the events that occur during cytokinesis in typical plant and animal cells.
- (vii) What is the effect of fusing a cell in G1 with one in S and of fusing a G1 phase cell with M phase cell?
- (viii) State the two laws of Mendel.
- (ix) Give example and explain the phenomenon of co-dominance.

Answer the following questions in details:

(4 X 12 = 48)

- Q3. (a)** Giving an over view of structure of plasma membrane and briefly discuss the types of membrane proteins and their functions. (6)
- (b)** Giving an illustrative account of structure of nucleus, briefly explain how a single nuclear pore complex can efficiently transport proteins that possess different kinds of nuclear localization signal. (6)
- OR**
- (b)** Give an illustrative account of the formation of primary and secondary lysosomes and discuss the role of secondary lysosomes in the cellular digestive processes. (6)
- Q4. (a)** Write an explanatory note on the chloroplast structure and its functional relationship (6)
- (b)** Give a brief account of the structure of Golgi complex and discuss how it coordinates with other organelles in secretion and transport of materials to their proper destination. (6)
- OR**
- (b)** Giving a brief over view of ribosomes, present their structure based on asymmetrical model. (6)
- Q5. (a)** Describe the events that occur in a cell during prophase, prometaphase and metaphase of mitosis. (6)
- (b)** What is meant by cell cycle checkpoint? What is its importance? How does a cell stop its progress at one of these check points? (6)
- OR**
- (b)** Explain in brief the functions of Cyclins, CAK, wee1 & cdc 25. (6)
- Q6. (a)** Write the two Mendel's laws and deviations of these laws. (6)
- (b)** Give examples and explain the concept of multiple allelism. (6)
- OR**
- (b)** In humans the eye color is governed by a pair of gene-alleles. Brown eye is due to dominant allele (B) and blue to the recessive allele (b). What proportion of children will be blue-eyed and brown eyed in the following case? (6)
A brown-eyed man whose father was blue-eyed married a brown-eyed woman whose mother was also blue-eyed.

#@#@#@#@#@#@#@#@#@#@

2. Write short notes on any seven:

(7x2=14)

- a. Long pass filter
- b. Conjugate foci
- c. Reverse phase chromatography
- d. Agarose
- e. Beer's and Lambert's law
- f. Principle of Maldi-TOF
- g. Spin-spin interaction in NMR spectroscopy
- h. Basic principle of autoradiography
- i. Hollow cathode lamp used in AAS

3. a. Differentiate scanning electron microscope and transmission electron microscope. (6)
b. Explain flow cytometry in detail. (6)

OR

b. Write a brief note on specialized components of phase contrast microscopy. (6)

4. a. Briefly explain PAGE.

b. Write a brief note on instrumentation of GC. (6)

OR

b. Write a note on types of centrifuge rotors. (6)

5. a. Write the desirable properties of radiation sources. Explain the working of the deuterium lamp. (6)

b. Define chemical shift. How is it calculated? Why is it considered significant in NMR spectroscopy? (6)

OR

b. Explain the basic principle, vibrational modes and applications of IR spectroscopy. (6)

6. a. Explain the basic principle of liquid scintillation counting with a note on the energy transfer process. What are its limitations? (6)

b. Write notes on: i) Crystallization of samples for x ray diffraction analysis. (6)
ii) Applications of autoradiography

OR

b. What are Biosensors? Explain the principle and uses of any one Biosensor in detail. (6)

+++++

SARDAR PATEL UNIVERSITY

M. Sc. (I Semester) Biochemistry (under CBCS) Examination

Tuesday, 7th November 2017

Time: 10.00 a.m. to 1.00 p.m.

Paper: PS01CBIC23 (Cellular Metabolism)

Total Marks: 70

- N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

- Pyruvate dehydrogenase is a multienzyme complex that catalyzes a series of reactions. Which of the following is not carried out by pyruvate dehydrogenase complex?
 - combining the acetyl group with a cofactor
 - producing an acetyl group from pyruvate
 - the production of ATP
 - a decarboxylation reaction
- How many molecules of CO₂ are produced for each molecule of glucose that passes through glycolysis and krebs cycle?
 - 2
 - 6
 - 3
 - 7
- The proper sequence of stages in glycolysis is
 - Glucose priming, cleavage and rearrangement, oxidation, ATP generation
 - Cleavage and rearrangement, glucose priming, ATP generation, oxidation
 - Glucose priming, oxidation, oxidation, cleavage and rearrangement, ATP generation
 - Glucose priming, cleavage and rearrangement, ATP generation
- The rate of fatty acid oxidation can be increased by increasing _____ in the diet.
 - PUFA
 - Carnitine
 - MUFA
 - Creatinine
- Which of the following is a positive modulator of Carbamoyl phosphate synthase I reaction?
 - Bicarbonate ion
 - Glutamine
 - N-acetyl Glutamine
 - None of the above
- Which of the following inhibits 'glutamine -PRPP amidotransferase', an enzyme involved in biosynthesis of AMP and GMP?
 - Only AMP
 - Only GMP
 - only IMP
 - All of the above
- How much energy is released upon hydrolysis of terminal phosphate from ATP molecule?
 - 30.5 KJ/mol
 - 7.3 KJ/mol
 - 13.5 KJ/mol
 - 25 KJ/mol
- Which of the following is an activator of acetyl-CoA carboxylase?
 - Citrate
 - Palmitoyl-CoA
 - AMP
 - None of the above

Q2. Answer any SEVEN of the following questions briefly: (7 X 2 = 14 Marks)

1. Give reason - even a six carbon fatty acid, the same number of carbons as glucose, generates more energy than glucose.
2. Why $\text{NADH} + \text{H}^+$ produces more ATP than FADH_2 ?
3. Which reaction is catalyzed by ribose phosphate pyrophosphokinase?
4. Write a reaction that converts malate to pyruvate. Also name the enzyme responsible.
5. Give any two examples of anaploretic reactions of TCA cycle.
6. What are essential and nonessential fatty acids? Give examples.
7. What could be the fate of Glucose -6-phosphate in a liver cell?
8. What is the effect of Insulin and Glucagon on Acetyl CoA Carboxylase?
9. Write the reaction catalyzed by Aspartate amino transferase. Which is the coenzyme required?

Q3. (a) Explain in detail the reactions involved in production of Acetyl-CoA by PDH complex. (6)

(b) Describe the regulation of glycolysis. (6)

OR

(b) Explain the regulation of electron transport chain (ETC). (6)

Q 4. (a) Write the reactions involved in oxidation of saturated fatty acids. What is the fate of the product of this pathway in aerobic conditions? (6)

(b) Explain the regulation of Fatty acid synthesis. (6)

OR

(b) Write the reactions involved in ketone bodies production. Also explain the physiological conditions during which production of ketone bodies is favored. (6)

Q 5. (a) Write the reactions involved in release of ammonia by Glutamate and Glutamine in liver. (6)

(b) Explain reactions involved in Urea cycle. (6)

OR

(b) Explain catabolic pathway for glutamate, glutamine and proline. (6)

Q 6. (a) Write the reactions involved in catabolism of purine nucleotides. (6)

(b) Explain the regulation of biosynthesis of adenine and guanine nucleotides. (6)

OR

(b) Explain the role of TCA cycle in integration of metabolism. (6)

→ X →

(2)

(86)

SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

M.Sc. (I-SEMESTER) Examination (Old Course)

Saturday, 11th November, 2017

M.Sc. Biochemistry

PS01EBIC01: BIostatistics

TIME: 10:00 AM to 01:00 PM

TOTAL MARK: 70

Q.1 Choose the correct answer of the following question in your answer sheet [08]

1. Measure of dispersion is also known as
 - a. First order average
 - b. Second order average
 - c. Zero order average
 - d. Third order average
2. If two variables oppose each other then the correlation will be
 - a. Positive Correlation
 - b. Perfect Correlation
 - c. Zero Correlation
 - d. Negative Correlation
3. If $b_{yx} = 1.6$ and $b_{xy} = 0.4$, then correlation coefficient (r) will be:
 - a. 0.4
 - b. 0.8
 - c. 0.64
 - d. -0.8
4. Probability of failure in binomial distribution is denoted by
 - a. $p = q + 1$
 - b. $q = 1 + p$
 - c. $p = q - 1$
 - d. $q = 1 - p$
5. Which of the following test is non parametric test?
 - a. Z-test
 - b. F-test
 - c. Chi-square test
 - d. t-test
6. When H_0 is true but it is rejected by the test, then it is known as
 - a. Type -I error
 - b. Correct Decision
 - c. Type -II error
 - d. None of Above
7. Which of the following is correct in a positively skewed distribution?
 - a. Mean = Median = Mode
 - b. Mean > Median > Mode
 - c. Mean < Median < Mode
 - d. Mean + Median + Mode
8. Which of the following is an absolute measure of dispersion?
 - a. Coefficient of variation
 - b. Standard deviation
 - c. Coefficient of dispersion
 - d. Coefficient of skewness

Q.2 Answer any SEVEN of following question briefly.

[14]

1. Explain various parts of table with diagram.
2. What is line of regression? Give any two properties of regression coefficient.
3. Define the following terms: a. Mutually exclusive events
b. Continuous random variable
4. Give an account on : Ogive curve
5. The mean of 8, 11, 6, 14, x and 13 is 16. Find the value of the observation x.
6. In an experiment on immunization of cattle from tuberculosis, the following results were obtained. Examine the effect of vaccine in controlling incidence of diseases by chi-square test. ($\chi^2_{1,0.05} = 3.84$)

	Affected	Unaffected
Inoculated	12	28
Not inoculated	13	7

7. Find out the probability of getting at least one head in two throws of an unbiased coin.
8. Define central tendency. Give the empirical relation between mean, mode and median in skew distribution.
9. What is correlation coefficient? Write down the properties of correlation coefficient.

C.P.T.O.)

①

1

- Q.3 a. Two groups of children were examined for protein calories malnutrition. Which group of the children has more malnutrition? (Using coefficient of variation) 6

% of malnutrition (in calories)	0-10	10-20	20-30	30-40	40-50
Group – A (n)	24	12	4	6	4
Group –B (n)	18	15	8	6	3

- b. Define Biostatistics. Explain the various method of sampling used in biostatistics. 6

OR

- b. Compute the median and Q_2 value of mg of chlorophyll/100 g (X) of plant leaves obtained from 140 plant samples. 6

X	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
F	7	15	18	25	30	20	16	7	2

- Q.4 a. Give the classical definition of probability. Describe the theory and properties of binomial distribution. 6

- b. There are 64 beds in a garden and 5 seeds of particular variety are shown in each bed. The probability that seed will germinated is $3/4$. Find out the numbers of beds in which (i) all seeds have germinated (ii) at least 3 seed have germinated. 6

OR

- b. The probability of infection cured by a particular antibiotics drug within 5 days is 0.75. Suppose four patients are treated by this antibiotics drug. Compute the probability that (i) No any patient cured (ii) exactly two patients are cured (iii) at least two patients are cured. 6

- Q.5 a. The following are the values of production of bluk drug paracetamol in tons by two companies A & B. Calculate the correlation coefficient and comments on your results. 6

Company A	10	11	14	14	20	22	16	12
Company B	12	14	15	16	21	26	21	15

- b. Find out the line of regression of Y on X of the following data obtained from 10 diabetic patients. Determine the blood pressure of patients whose age is 50 years. 6

Age (in Year)	66	38	56	42	72	36	63	47	55	45
Blood pressure (mm Hg)	145	124	147	125	160	118	149	128	150	124

OR

- b. Explain the types of correlation and describe the scatter diagram in detail. 6

- Q.6 a. The six patients of pernicious anemia were administrated 30mg of vitamin B_{12} intramuscularly during the period of remission. The results are obtained. Do the indicate any improvement in hemoglobin level? ($t_{5,0.05} = 2.57$) 6

No.	1	2	3	4	5	6
Before therapy (% Hb)	12.2	11.3	14.7	11.4	11.5	12.7
After 3 months of therapy	13.0	13.4	16.0	13.6	14.0	13.8

- b. What are two tailed and one tailed test? Explain the various types of t- tests used for small sample size. 6

OR

- b. Give an account on : Randomized Block Deign 6

— x —
②

(87)

SEAT No. _____

No. of Printed Pages : 2

Sardar Patel University
M. Sc. (1st Semester) External Examination
PS01EBIC21: Biochemistry of Horticultural commodities
11th November 2017, Saturday

Time: 10:00 a.m. to 01:00 p.m.

Max Marks: 70

- N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Select the appropriate answer for the following multiple choice questions: (8 x 1 = 8)

- (i) _____ includes the production and marketing of pome fruits.
(a) Horticulture (c) Olericulture
(b) Pomology (d) Floriculture
- (ii) Potatoes, beets, carrots, radishes are some of the examples of
(a) Cole crops (c) Cucurbits
(b) Root crops (d) Legumes
- (iii) The common name of *Abelmoschus esculentus*
(a) Tomato (c) Lima bean
(b) Okra (d) Potato
- (iv) In tomatoes and pink grapefruit a specific carotinoid called _____ gives them their red color
(a) anthocyanin (c) zeathanin
(b) lycopene (d) violaxanthine
- (v) Respiration rate and shelf life are
(a) inversely related (c) in direct proportion
(b) not related with each other (d) fully related with each other
- (vi) High TSS and low acidity (TSS 13 % acidity 0.5 - 0.6 %) of Pineapple is an indication of
(a) Its growth phase (c) Its development phase
(b) Its maturity phase (d) Its senescent phase
- (vii) _____ applications to rosette plants induce stem elongation by increasing cell division.
(a) Gibberellin (c) Auxin
(b) Cytokinin (d) Ethylene
- (viii) In all plants, ethylene biosynthesis occurs through a common pathway that uses _____ as the precursor.
(a) Glutamine (c) Glutathione
(b) Methionine (d) Malic acid

(Contd. 2)

(P.T.O.)

①

Q2. Answer any SEVEN of the following questions in brief: (7 x 2 = 14)

- (i) Justify "Horticulture is an applied science and an art form".
- (ii) Write at least two vernacular as well as scientific names for each of fruits and vegetables and flowers.
- (iii) Enumerate the Environmental Factors that influence Deterioration in the quality of horticultural commodities
- (iv) Define phytochemistry and present the nutritional value of any four phytochemicals present in the fruits and vegetables
- (v) Explaining the term senescence, enlist the patterns of senescence in general.
- (vi) Define "climacteric fruits" and explain how they differ from "non-climacteric fruits".
- (vii) Explain in brief the physiological role of phenolic compounds during early stages of development of a fruit
- (viii) Differentiate between physiological maturity and commercial maturity
- (ix) Explain in brief, "Post harvest technology is an inter disciplinary Science and Technique and it needs Inter-disciplinary and multi-dimensional approach"

Q3. (a) Discuss the biochemistry of maturation and ripening of fruits and vegetables (6)
(b) Describe process of senescence in flowers. (6)

OR

(b) Discuss the morpho-physio and biochemical characteristics of perishable products and their deterioration aspects. (6)

Q4. (a) Define maturity and its types. List various types of maturity indices and discuss on them. (6)
(b) Discuss the metabolic changes of harvested fruits and vegetables and their control mechanisms (6)

OR

(b) Write a brief note on (i) elements of harvesting and (ii) programmed cell death (6)

Q5. (a) List the compounds responsible for aroma in fruits and flowers. Discuss about any one metabolic pathway involved in aroma production in fruits or flowers. (6)
(b) Discuss the biosynthesis of anthocyanins during fruit ripening (6)

OR

(b) Discuss functions of Gibberellins in fruit set and development. (6)

Q6. (a) Present an overview of composition and nutritional qualities of fruits and vegetables in relation to their pigments, mineral and flavour compounds. (6)
(b) Define postharvest handling and describe various types of post harvest losses. (6)

OR

(b) Giving the advantages of edible coatings in postharvest preservation of perishable fruits and vegetables, discuss the types of edible coating compositions. (6)

@#@#@#@#@

(88)

SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M.Sc. (I-SEMESTER) Examination (CBCS)
Saturday, 11th November, 2017
M.Sc. Biochemistry

PS01EBIC22: BIOMOLECULES AND BIOENERGETICS

TIME: 10:00 AM to 01:00 PM

TOTAL MARK: 70

Q.1 Choose the correct answer of the following question in your answer sheet [08]

- Type -I reaction centre (Fe-S centre) is found as photosynthetic machinery in
 - E-Coil*
 - Purple bacteria
 - Green sulfur bacteria
 - Halophilic bacteria
- The naturally occurring form of amino acid in protein is
 - L- amino acids only
 - Both L & D amino acids
 - D- amino acids only
 - None of above
- The following eicosanoid is produce by platelets and act in the formation of blood clots
 - Prostaglandins
 - Leukotrienes
 - Thromboxanes,
 - Arachidonic acid
- Which amino acid can form disulphide bonds?
 - Glycine
 - Glutamate
 - Proline
 - Cysteine
- Which of the following molecule gives maximum energy upon oxidation?
 - Glucose
 - Alanine
 - Palmitoyl-coA
 - Maltose
- Ribose a pentose sugar found in
 - NAD
 - RNA
 - FAD
 - all of these
- What is the isoelectric point for phenylalanine given the pK_a for the COOH group is 1.83 and the NH_3^+ group is 9.13?
 - 2.43
 - 10.96
 - 5.48
 - 7.30
- All the following are monosaccharides except
 - Glucose
 - Maltose
 - Fructose
 - Galactose

Q.2 Answer any SEVEN of following question briefly.

[14]

- Define the following terms : a. Mutarotation b. Reducing sugar
- Justify the following statement "Carbohydrate is informational molecules."
- Mention in brief: How buffer resist change in pH?
- Justify the following statement "Peptide bond has partial double bond character."
- What are essential fatty acids? Give examples.
- Write down the biological importance of waxes.
- Write down the regulatory points of oxidative phosphorylation.
- Do living organisms obey second law of thermodynamics?
- List the electron carriers of electron transport chain in order.

(P.T.O.)

①

- Q.3 a. Describe the process of oxidative phosphorylation by type I & II reaction centre in photosynthetic green sulfur and purple bacteria. 6
b. What is standard free-energy? Explain the free energy change during phosphoryl group transfer with appropriate example. 6

OR

- b. What is chemiosmotic model? Describe the structure of ATP synthase complex with its function. 6
- Q.4 a. List out strategy for protein sequencing. Explain the various methods employed in determination of protein sequence. 6
b. Describe the structure and importance of various structural lipids present in plasma membrane. 6

OR

- b. What is Eicosanoids? Describe the biological importance of main three classes of eicosanoids. 6
- Q.5 a. Derive Henderson and Hasselbach equation. Can we find the exact ratio of weak acid and its conjugate base for preparation of buffer using HH equation? 6
b. Define pI value of amino acid. Explain the titration curve of glycine and histidine amino acid. 6

OR

- b. Explain the structure and function of transfer RNA. 6
- Q.6 a. Explain the role of lectin-ligand interactions in the biological processes. 6
b. Describe the structural role of heteropolysaccharides in living organism. 6

OR

- b. Draw structure of proteoglycans. Explain various type of protein interaction with heparin sulfate. 6

← X →
(2)