[25] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

**M.Sc (IV Semester) Biochemistry Examination (CBCS)**

**Monday, 18th March, 2019**

**10:00 am to 1:00 pm**

**PS04CBIC21 – Animal Biotechnology**

**TOTAL MARKS: 70**

Q.1 Write the most correct answer for the following multiple choice questions. **(08 Marks)**

1. What is the effect of excess accumulation of metabolite products (lactate and ammonium) on cells?
   (a) They act as growth promoters
   (b) They act as growth inhibitors
   (c) Have no effect on cells
   (d) Lactate helps in the growth while ammonium inhibits the growth
2. Which of the following parameters are accessed for evaluating the quality of cell culture?
   (a) Morphology (b) growth rate (c) plating efficiency (d) all of the above
3. The cytosol-facing domains of most of the cell adhesion molecule (CAM) proteins are usually
   (a) connected to elements of the cytoskeleton
   (b) changing in cytoplasm, not connected
   (c) connected to inner side of plasma membrane
   (d) CAMs do not have any cytosol-facing domains
4. In animal cell culture, particularly mammalian cell culture, transformation means
   (a) uptake of new genetic material
   (b) phenotypic modifications of cells in culture
   (c) both (a) and (b)
   (d) release of genetic information
5. Which of the following is not a predominant amino acid of collagen?
   (a) Glycine (b) Proline (c) Hydroxyproline (d) Methionine
6. Gap junctions are predominant in
   (a) Urinary bladder (b) Cardiac muscles (c) Adipose tissue (d) Muscle tissue
7. The factor responsible for reducing the O2 toxicity for cultured cells is
   (a) Selenium (b) Glutamine (c) Biotin (d) Transferrin
8. Which of the following enzymes for disaggregation of tissue may result into poor platting efficiency?
   (a) Collagenase (b) Trypsin (c) Pronase (d) Dispase

Q.2 Answer the following questions (any seven). (14)

1. Why Biosafety level-2 or higher is necessary for cell-culture laboratory?
2. State the factors that necessitate the need for replacement of medium?
3. Describe amniocytes and briefly mention about amniocentesis.
4. How mycoplasma contamination in a cell culture are detected?
5. Explain the role of physiological and non-physiological factors in inducing differentiation in cultured cells.
6. Name the growth factors/hormones required in the media for the culture of Mammary, Epithelia, Fibroblast, Neuronal cells, Osteocytes.
7. How is the suspension culture different from a monolayer culture? Explain with example.
8. How can angiogenesis and Invasiveness be checked in malignantly transformed cell lines?

(P.T.O)

Q.3 (a) Discuss how biology of the cultured cells differ from the same type of cells grown in vivo. (6)

(b) Explain the various cell adhesion molecules that influences animal cell in culture. (6)

OR

(b) i) Explain the usefulness of CO2 incubator in cell culture laboratory (3)

ii) Differentiate between upright microscope and inverted microscope. (3)

Q.4 (a) Write a detailed note on different ingredients of chemically defined media for cultured cells and write their significance. (6)

(b) Discuss the chromosome and DNA analysis techniques used for the characterization of cell lines. (6)

OR

(b) Describe the complete protocol for the development of primary culture using appropriate disaggregation technique from human biopsy material. (6)

Q.5 (a) Describe different techniques involved in the animal cell separation. (6)

(b) Write the characteristics of transformed cells; and explain immortalization of cell line by viral genes and telomerase induced immortalization of cell line. (6)

OR

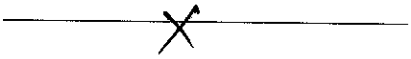
(b) Explain in detail monolayer cloning and add a note on the various techniques used in isolation of clones. (6)

Q.6 (a) Write a note on embryonic and adult stem cells. (6)

(b) Write a short note on embryo technology with special reference to embryo sexing and embryo splitting. (6)

OR

(b) Write a short note on therapeutic applications stem cells. (6)



(2)

[27] SEAT No._____ No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**

**M.Sc. IVth semester Biochemistry Examination (CBCS)**

**Wednesday, 20th March, 2019, 10.00 a.m. to 1.00 p.m.**

**Subject:** PS 04 CBIC 22 Nutritional and Clinical Biochemistry

Max marks: 70

Q.1 Write the most correct options of the following multiple choice questions. (08)

1. The following is the gross energy value of piece of cheese, if a piece of cheese having 40g of carbohydrate, 10g of protein and 20g of fat.
   (a) 380Kcal (c) 480Kcal
   (b) 380 calories (d) 480 calories
2. _____ is a numerical system of measuring the degree of rise in blood sugar in response to various carbohydrates taken in diet.
   (a) Glycemic Index (c) IGT
   (b) Threshold value (d) Carbohydrate index
3. Mc Ardle's syndrome cause muscle cramps and muscles fatigue with increased muscle glycogen. Which of the following enzyme is deficient?
   (a) Muscles Hexokinase (c) Muscles Phosphorylase
   (b) Glucose -6- phosphatase (d) Branching enzyme
4. Which of the following biochemical complication develop before Insulin Resistance condition
   (a) Desensitization of pancreatic β-cell receptor (c) Overproduction of Insulin
   (b) Abnormal lipid profile (d) all of the above
5. Which of the following lipoproteins has highest amount of proteins?
   (a) VLDL (c) LDL
   (b) IDL (d) these all have same protein level
6. If liver cell has high amount of cholesterol,
   (a) LDL will enter hepatocytes through apo B 100 (c) LDL will activate cholesterol anabolism
   (b) LDL will enter hepatocytes through apo B 45 (d) LDL will not be taken by hepatocytes
7. Which of the following effect occurs due to activation of polyol pathway flux in hyperglycaemia?
   (a) increased $Na^+K^+$ ATPase activity (c) inactivation of protein kinase C
   (b) increase in cytosolic NADPH (d) none of the above
8. What will be the PER value, if intake of 28 grams of protein for 4 weeks by an experimental animal results in the gain of its body weight by 132 g?
   (a) 0.2 (b) 4.7 (c) 160 (d) none, protein never increase the weight



(P.T.O)

Q.2 Answer **any seven** of the following questions in brief: (14)

1. Narrate the procedure of Glucose Tolerance Test.
2. What is the action of insulin on lipase, Acetyl CoA carboxylase, Hexokinase and Glycogen synthase?
3. What are the major microvascular diseases occurring in chronic diabetic patients?
4. What is specific dynamic action of food? Why proteins have higher SDA?
5. Give the nutritional classification of protein.
6. Write any five major effects of insulin.
7. What is impaired glucose tolerance (IGT), how is it different from NGT?
8. Why HDL is considered as good cholesterol?
9. What is BMI? Write WHO classification of body weight based on BMI.

Q3 (a) What is insulin resistance? Discuss the clinical symptoms, classification and management of diabetes mellitus in detail. (06)

(b) What is the energy value of food? How can we determine it? (06)

**OR**

(b) List various acute and chronic diabetic complications. Briefly describe the various possible mechanisms responsible for development of chronic diabetic complication. (06)

Q4 (a) Write nutritional classification of proteins and explain how PER is determined. (06)

(b) Explain the following terms 1. Chemical Score of Proteins
2. Biological Value (BV)
3. Digestibility Coefficient (DC) (06)

**OR**

(b) What is Protein calorie malnutrition? Discuss the sign, symptoms, biochemical change and treatment of Kwashiorkor. (06)

Q5 (a) Define Obesity. Write down the biochemical mechanism of leptin hormone in regulation of body mass and development of obesity. (06)

(b) What are apolipoproteins? Describe the metabolic fate of chylomicrons and VLDL. (06)

**OR**

(b) What are PUFA and MUFA? Give the clinical significance of various essential fatty acids. (06)

Q6 (a) What are anti-nutrients? Write a note on naturally occurring anti-nutrients in food. (06)

(b) What is the importance of maintaining electrolytes balance? Explain the role of $Na^+K^+$ ATPase in maintaining electrolyte balance. (06)

**OR**

(b) Explain the metabolic adaptation in prolonged starvation. (06)

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[29] SEAT No._____

No. of pages: 2

# SARDAR PATEL UNIVERSITY
## M. Sc. (IV Semester) Examination
## Saturday, 23rd March, 2019
## 10:00 a.m. to 01:00 p.m.
## Biochemistry
## PS04EBIC23 – Microbial Physiology

Total marks: 70

Q.1 Select the right/most appropriate answer for the following: (08 marks)

A. Penicillin interfere with bacterial cell-wall synthesis by inhibiting
   a. Alanine racemase
   b. DD-transpeptidase
   c. UMP kinase
   d. Pyrophosphatase

B. _____ is the unique component of the core region of lipopolysaccharide of most gram-negative organisms.
   a. D-glucosamine
   b. Teichoic acids
   c. 2-keto-3-deoxyoctulosoninc acid
   d. β-hydroxy myristic acid

C. Which of the following flagellar protein is involved in conducting protons across the cytoplasmic membrane?
   a. Fli G
   b. Fli M
   c. Fli N
   d. Mot A/Mot B

D. Which of the following enzyme protect aerobic organisms from toxicity of ROS?
   a. Superoxide dismutase
   b. Catalase
   c. NADH oxidase
   d. Both a and b

E. Which of the following shows swarming motility?
   a. *Caulobacter*
   b. *Spirochetes*
   c. *E. coli*
   d. None of the above

F. Which of the following is true for Methylotrophs?
   a. Autotrophs
   b. Photoautotrophs
   c. Heterotrophs
   d. Lithotrophs

G. Enterobactin is which types of siderophores?
   a. Catecholate
   b. Hydroxamates
   c. Carboxylate
   d. None of the above

H. Which of the following quorum sensing circuit is found in *Staphylococcus aureus?*
   a. Com
   b. Agr
   c. CSF
   d. Cqs

(P.T.O)

Q.2 Answer/attempt **any seven** from the following: (14 marks)

a) What is two-partner protein secretion system?
b) Write in brief on ABC transporter.
c) What is the function and composition of spore coat?
d) Write in brief about significance of siderophore production.
e) Define: Symbiosis and Commensalism.
f) Differentiate between Bacteriocin and Antibiotic.
g) What are the characteristics of microbial reserve compounds?
h) Enlist the microorganisms used in MFC.
i) Write a brief note on phosphate assimilation in *E. coli*.

Q.3 A. Explain the molecular mechanism of chemotaxis in detail. (06 marks)
B. Explain Peptidoglycan biosynthesis. (06 marks)

**OR**

B. Describe the general mechanism of insertion of integral membrane proteins and export of periplamic proteins. (06 marks)

Q.4 A. Describe the physiological events leading to *E. coli* cell division. (06 marks)
B. Discuss in detail on EnvZ/OmpR two-component system. (06 marks)

**OR**

B. Explain the yeast cell cycle regulation in detail. (06 marks)

Q.5 A. Discuss in detail on protein synthesis inhibiting antibiotics. (06 marks)
B. Discuss the steps of biofilm formation and its control strategy. (06 marks)

**OR**

B. Write a note on biochemistry of bioluminescence. (06 marks)

Q.6 A. Describe in detail on A-B toxin with suitable example. (06 marks)
B. Discuss quorum sensing mechanism in Gram-negative bacteria with one suitable example. (06 marks)

**OR**

B. Write a note on Microbial hydrogen production. (06 marks)

[72] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M.Sc.(IV Semester) Biochemistry External Examinations
26th March, 2019 (Tuesday)
10.00 a.m. To 1.00 p.m.
Paper: PS04EBIC24 - Plant Biotechnology

**I. Choose the most appropriate answer:** **(8 marks)**

(i) The process in which new meristems arise from callus under *in vitro* conditions is known as:
(a) Differentiation (b) Redifferentiation
(c) Dedifferentiation (d) None of these

(ii) Mature zygotic embryos require high concentration of sucrose whereas young embryos require low concentration of sucrose in nutrient medium due to their
(a) Heterotrophic in nature
(b) Autotrophic in nature
(c) Hetrotrophic and autotrophic in nature
(d) Autotrophic and heterotrophic in nature

(iii) Anther cultures are used to produce
a) Homozygous plants b) Heterozygous plants
c) Double Haploids plants d) Both a and b

(iv) Among different culture systems used to generate *in vitro* plants which culture system shows the maximum frequency of somaclonal variation:
(a) Zygotic embryo cultures (b) Organ cultures
(c) Protoplast cultures (d) Meristem tip cultures

(v) Which of the following plasmids induces hairy roots in plants?
a) Ti plasmid b) Ri plasmid
c) pUC plasmid d) pBR 322 plasmid

(vi) Golden rice consists of _____ which is absent in normal rice
a) Phenols b) vitamins c) Beta carotene d) flavanoids

(vii) The GFP protein can be used as a tag as well as a reporter since
a) It is a non analyte c) it is non toxic
b) It does not require a substrate d) all of these properties

(viii) Marker Assisted Selection is advantageous over conventional breeding in terms of
a) Less time b) absence of unwanted gene transfer
c) Cost effectiveness d) All of these

**II. Answer briefly on any seven** **(14 marks)**

(i) Criteria for selection of explant/s for culture initiation

(ii) Distinguish between Somatic embryo and zygotic embryo

(P.T.O.)

(iii) Types of In vitro morphogenesis

(iv) Why cultured anthers will permit pollen to develop into pollen embryos where as cultured isolated pollen grains may not form embryos? Give reasons.

(v) Why *in vitro* developed plantlets have high mortality when transferred to soil than *in vivo* developed seedlings. Give reasons.

(vi) Define induced defense mechanism

(vii) Type II restriction enzymes

(viii) Co integrative vectors

(ix) PR proteins

Q1. (A) Identify the various tissue culture systems based on in vitro growth and development. Give briefly the applications of each culture system. **(6)**

(B) Differentiate between Macropropagation and Micropropagation. Write notes on micropropagation. **(6)**

**OR**

(B) Write notes on somatic embryogenesis and it's in vitro applications **(6)**

2. (A) Write notes on androgenesis and factors affecting the anther cultures **(6)**

(B) Write notes on meristem tip cultures and its use in production of disease free plants **(6)**

**OR**

(B) Write notes on *In vitro* production of secondary metabolites **(6)**

3. (A) Write the procedure for isolation and fusion of Protoplasts. **(6)**

(B) List the different methods for gene transfer in plants. Explain any one method in detail. **(6)**

**OR**

(B) Write briefly on the principle and applications of Marker Assisted Selection **(6)**

4. (A) Write a note on morphological, structural and chemical barriers in plants against pathogens. **(6)**

(B) Define Intellectual Property Rights (IPR). Explain the significance of patents in plant Biotechnology. **(6)**

**OR**

(B) Describe the role of Resistance ( R) genes in plant defense in detail **(6)**

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