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SARDAR PATEL UNIVERSITY
M.Sc. Microbiology IVth Semester Examination
Saturday, April 02, 2016
02:30 PM to 05:30 PM
PS04CMIC01 R-DNA Technology

Max. Marks: 70

Note: 1. Attempt all questions
2. Figures on the right in brackets indicate marks

Q1 Choose the most appropriate answer. **(01 x 8)**

(i) Palindromic sequences in DNA
- (a) form blunt ends when cut by restriction enzymes
- (b) reflects the same sequence on either strand
- (c) are not same sequence on either strand
- (d) all of the above

(ii) Chromosome walking is the technique
- (a) by which DNA fragments are separated by applying an electric current to the gel
- (b) by which DNA fragment in the sample can be amplified
- (c) by which one genome clone is used to isolate overlapping clones that extend from one or both ends of original clone
- (d) used to determine the location of complex disease genes in association with SNPs

(iii) _____ is the most suitable tracking dye in agarose gel electrophoresis
- (a) Bromophenol blue
- (b) Ethidium bromide
- (c) Silver stain
- (d) Coomassie blue

(iv) Conventional agarose gel electrophoresis is not suitable for separation of nucleic acid molecules
- (a) smaller than 20 kb
- (b) larger than 20 kb
- (c) smaller than 10 kb
- (d) larger than 10 kb

(v) The isoschizomers with different methylation sensitivity are known as
- (a) isocaudomers
- (b) neoschizomers
- (c) heteroschizomers
- (d) heterohypekomers

(vi) Polynucleotide kinase can be used for
- (a) 3'-end labeling of DNA fragments
- (b) radiolabeling of 5'-termini
- (c) phosphorylation of linkers prior to ligation
- (d) both 'b' & 'c'

(vii) The maximum cloning capacity of a cosmid vector with a ~5 kb size can be
- (a) 15 kb
- (b) 25 kb
- (c) 35 kb
- (d) 45 kb

(viii) Which of the following can be used as a selectable marker gene in yeast cloning vectors?
- (a) β-lactamase
- (b) chloramphenicol acetyl transferase
- (c) orotidine 5'-phosphate decarboxylase
- (d) all of the above

Cont.

Q2 Attempt any **SEVEN** of the following. **(02 x7)**

(a) Write a note on: End labeling.
(b) Explain transformation using silicon carbide whiskers / fibers.
(c) Explain abundancy probing to analyze a cDNA library.
(d) Explain electroporation.
(e) Write a brief note on: Bacmid.
(f) Enlist the features of ideal PCR primers.
(g) Why are Type II restriction endonucleases preferred over others in recombinant DNA technology work.
(h) Write in brief on: Nested PCR.
(i) 'The *LYS* 2 yeast gene permits both positive and negative selection of recombinant'. Explain in brief.

Q3 (A) Write a note on colony blot hybridization and compare it with plaque lift hybridization. **(06)**

(B) Give a descriptive account of PFGE and its variants. **(06)**

OR

(B) Write a note on non-isotopic labeling and their detection methodologies. **(06)**

Q4 (A) Give an elaborative account of pyrosequencing of nucleic acid. **(06)**

(B) Describe various strategies used for oligo-nucleotide directed targeted mutagenesis. **(06)**

OR

(B) Describe following techniques used in r-DNA technology. **(06)**
(i) Denaturing gradient gel electrophoresis (DGGE)
(ii) Subtractive hybridization and differential cloning

Q5 (A) Write on salient features and applications of phosphatase, kinase and ligase enzymes in genetic engineering. **(06)**

(B) What are phagemids? With the help of a diagram, describe salient features and cloning scheme of any one phagemid vector. **(06)**

OR

(B) Write a note on: Fosmids. **(06)**

Q6 (A) Write a note on expression of heterologous gene in *E. coli*. **(06)**

(B) Write a note on: RFLP. **(06)**

OR

(B) Write a note on: Reporter genes. **(06)**

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SARDAR PATEL UNIVERSITY
M. Sc. (IV Semester) Microbiology (under CBCS) Examination
Monday, 11h April 2016
Time: 2.30 p.m. to 5.30 p.m.
Paper: PS04EMIC07 (Human Physiology)

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 blood cells release granules that intensify the inflammatory response and promote hypersensitivity (allergic) reactions?

(a) Eosinophil (c) Monocyte
(b) Basophil (d) Lymphocyte

(ii) The enteroendocrine G cell in the gastric glands of the stomach secretes:

(a) Gastrin (c) Mucous
(b) Pepsinogen and gastric lipase (d) Hcl and intrinsic factor

(iii) This is secreted by the corpus luteum after ovulation.

(a) Progesterone (c) Relaxin
(b) LH (d) FSH

(iv) A pulpy mixture of food and gastric juices, produced in stomach from which it passes in to the small intestine is

(a) Chyme (c) Bolus
(b) Amylase (d) Peristalses

(v) An excitatory neurotransmitter _____ the postsynaptic membrane.

(a) Depolarizes (c) Repolarizes
(b) Hyperpolarizes (d) does not affect the polarity of

(vi) Na+/K+-ATPases are considered to be electrogenic pumps because

(a) They contribute to the negativity of the resting membrane potential
(b) Because the sodium ions are negatively charged
(c) Because they exhibit low permeability
(d) Both a and b

(vii) Too little of RBCs cause anaemia whereas too many of RBCs cause _____.

(a) Anaemia (b) polycythemia (c) Haematocrit (d) haemolglobinaemia

(viii) The resting potential indicates that the inside of the neuron is _____ compared to the outside

(a) Under ionic pressure (c) Positive
(b) Negatve (d) Inactive

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

1. Differentiate between phagocytosis by neutrophils and phagocytosis by macrophages.
2. What is the importance of emigration, chemotaxis, andphagocytosis in fighting bacterial invaders?
3. Which two enzymes contribute to the chemical digestion in the mouth? Explain the action of those enzymes on the ingested food.
4. Which hormone inhibits gastric secretion, suppresses the appetite and stimulates contraction of gall bladder?
5. Explain the role of LH and FSH in spermatogenesis.
6. Describe the anatomical features of Kidney.
7. What is Micturition reflex?
8. Explain the structural diversity of neurons.
9. What are peristalsis movements?

Q3. (a) Explain the formation and destruction of red blood cells, and recycling of hemoglobin components with the help of a diagram. **(6)**

(b) What is erythropoiesis? Explain the negative feedback regulation of erythropoiesis. **(6)**

<u>OR</u>

(b) Discuss the actions of the factors in the common coagulation pathway and the effect this enzymatic cascade has on the speed of activation of clot formation. **(6)**

Q.4 (a) Describe the structure and function of four basic tissue layers of the GI tract that are commonly found from stomach to the anus. **(6)**

(b) What is the function of liver, pancreas and gall baldder in the process of digestion of food . Explain in detail. **(6)**

<u>OR</u>

(b) Explain the digestion and absorption of protein in the intestinal gut. **(6)**

Q.5 (a) Give a detailed description of reabsorption and secretion in distal convoluted tubules. **(6)**

(b) Describe how the osmotic gradient builds up in the renal medulla and list the steps involved in the production of concentrated urine. **(6)**

<u>OR</u>

(b) Write a short note on: Glomerular filtration membrane. **(6)**

Q.6 (a) What is resting membrane potential? Explain the role of various ion channels and biochemcial factors leading to membrane potential. **(6)**

(b) Portray the hormonal changes during the menstrual cycle, and explain how these changes in hormonal milieu are part of reproductive preparation in females. **(6)**

<u>OR</u>

(b) Explain the factors that affect the speed of propagation of impulses. **(6)**
