



CSIR-UGC-NET/JRF LIFE SCIENCES

SAMPLE TEST : CELL BIOLOGY

Time : 60 Minutes

Date : 15-05-2018

M.M. : 48

INSTRUCTION:

1. There are Two Parts. Part-B contains 4 objective type questions, each question carry 2 marks and Part-C contains 10 objective type questions, each question carry 4 marks.
2. There is negative marking, @ 25% will be deducted for each wrong answer.
3. Attempt all the questions, use of calculator is not allowed.

PART-B

1. Raynodyne receptors are present in

(a) PM of a cell	(b) Mitochondrial outer membrane
(c) SER membrane	(d) Nuclear membrane
2. Which one is the right position of P⁵³ gene on human chromosome?

(a) 13 q 14	(b) 17 p 13
(c) 17 q 14	(d) 9 p 21
3. Segregation of sister-chromatid will occur in

(a) Meiosis-I and Mitosis	(b) Meiosis-II
(c) Mitosis	(d) Meiosis-II and Mitosis
4. NO gas is a vasodiating agent, which of the following about NO signaling is wrong?

(a) NO is synthesized from Arginine in smooth muscle cells
(b) NO is synthesized from Arginine in vascular endothelial cell
(c) Receptor of NO is intracellular
(d) To activate NO function for longer period phosphodiesterase inhibitors can be used

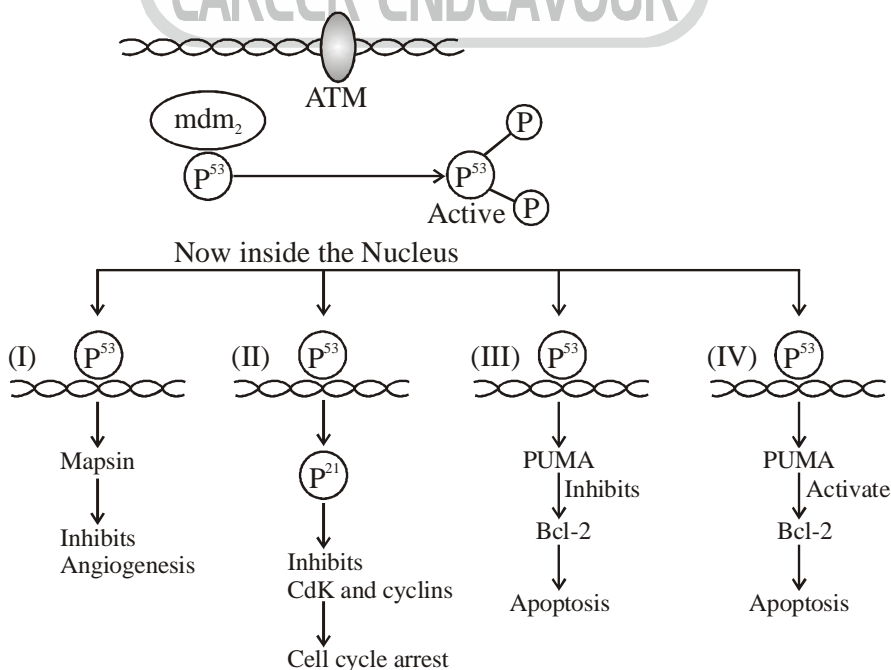
PART-C

5. The second messenger cAMP, synthesized by adenylyl cyclase transduces wide variety of physiological signals in various cell types in mammalian cells. Most of the diverse effects of cAMP are mediated through activation of protein kinase A, also called cAMP dependent protein kinase. Which of the following statements regarding PKA is NOT correct?

(a) Inactive PKA is a tetramer consisting of two regulatory subunits and two catalytic subunits
(b) Each R subunit binds the active site in acatalytic domain and inhibits the activity of catalytic subunits
(c) Each R subunit has two distinct cAMP binding sites and binding of cAMP occurs in cooperative fashion
(d) Binding of cAMP to R subunit causes a conformational change resulting in binding to side other than catalytic side causing strengthening of binding to C-subunit activating its kinase activity



6. What will be the last or final outcome of this pathway.
 Ras gene mutated \longrightarrow GTPase property of the Ras lost \longrightarrow Continuous Ras-MAP kinase pathway \longrightarrow CdK and cyclins continuously increase \longrightarrow ?
 (a) Cell cycle stops at G_1 phase (b) Cell cycle continues
 (c) No effect on cell cycle (d) Cell cycle will halt at M phase
7. There are certain statements regarding the characteristics of a cell. Read the statements carefully and find out the best suitable statements.
 (P) Aqueous compartment surrounded by the plasma membrane can consider as a cell
 (Q) Cell is the example of open system
 (R) Both plasma membrane and cell wall are the real boundary of a cell
 (S) The eukaryotic cell has low surface area to volume ratio as compared to prokaryotic cell
 (T) Microfilament, microtubules and intermediate filaments are absent in prokaryotic cell
 (a) All (b) P, Q, T
 (c) P, Q, S, T (d) P, Q, R, S
8. G-protein coupled receptor (GPCR) consist of three protein subunits - α , β and γ . In unstimulated state, α -subunit is GDP bound and GPCR is inactive. When GPCR gets activated, it acts like guanine nucleotide exchange (GEF) factor and induces α -subunit to release its bound GDP allowing GTP to bind in its place. In order to regulate G-protein activity by regulating GDP/GTP concentration, α -subunit acts as
 (a) GDP kinase (b) cGMP phosphodiesterase
 (c) GTPase (d) cAMP phosphodiesterase
9. From the given table, out of 1, 2, 3, 4 which is correctly matched
- | Trait | Benign Tumor | Malignant Tumor |
|---------------------------------|--------------|-----------------|
| I. Nuclear to cytoplasmic ratio | Low | High |
| II. Tumor boundary | Well defined | Poorly defined |
| III. Nuclear shape | Regular | Pleomorphic |
| IV. Nuclear size | Large | Small |
- (a) Only I and IV (b) II, III and IV
 (c) All I, II, III, IV (d) I, II and III
10. P^{53} is a tumor suppressor gene, when it is active in the cell then which of the following graph best explain its function.



- (a) All (b) Only II
(c) Only II and IV (d) I, II and III
11. The second messenger cAMP synthesized by adenylyl cyclase transduces wide variety of physiological signals in various cell types in mammalian cells. Most of the diverse effects of cAMP are mediated through activation of protein kinase A, also called cAMP dependent protein kinase. Which of the following statements regarding PKA is NOT correct?
- (a) Inactive PKA is a tetramer consisting of two regulatory subunits and two catalytic sub-units
(b) Each R sub-units binds the active site in a catalytic domain and inhibits the activity of catalytic sub-units
(c) Each R sub-units has two distinct cAMP binding sites and binding of cAMP occurs in cooperative fashion.
(d) Binding of cAMP to R sub-unit causes a conformational change resulting in binding to side other than catalytic side causing strengthening of binding to C-sub-unit activating its kinase activity
12. Match the following
- | Group-I | Group-II |
|----------------------------|--|
| (I) Flippase | (P) Catalyze the movement of any phospholipid across the lipid bilayer down its concentration gradient |
| (II) Floppase | (Q) Catalyse the translocation of phospholipid from extracellular to intracellular leaflet |
| (III) Lipase | (R) Catalyse the translocation of phospholipid from cytosolic to extracellular leaflet |
| (IV) Scramblase | (S) Degradation of phospholipid from lipid bilayer including an inner and outer leaflet |
| (a) I-Q, II-P, III-R, IV-S | (b) I-Q, II-R, III-S, IV-P |
| (c) I-P, II-R, III-S, IV-Q | (d) I-R, II-Q, III-P, IV-S |
13. There are certain statements regarding the characteristics of a cell. Read the statements carefully and find out the best suitable statements.
- (P) Aqueous compartment surrounded by the plasma membrane can be considered as a cell
(Q) Cell is the example of open system
(R) Both plasma membrane and cell wall are the real boundary of a cell
(S) The Eukaryotic cell has low surface area to volume ratio as compared to Prokaryotic cell
(T) Microfilament, microtubules and intermediate filaments are absent in Prokaryotic cell
- (a) All (b) P, Q, T
(c) P, Q, S, T (d) P, Q, R, S
14. Match the Column-I with Column-II
- | Column-I (Structure) | Column-II (Function) |
|-----------------------------|--|
| I. Plasma membrane | P. Break down of excess fatty acid |
| II. Peroxisome | Q. Regulation of substance leaving or entering a cell |
| III. Golgi apparatus | R. Processing, packaging, labelling and delivery of proteins |
| IV. SER | S. Synthesis of lipids and steroids |
| (a) I-S, II-R, III-P, IV-Q | (b) I-P, II-Q, III-S, IV-R |
| (c) I-Q, II-S, III-P, IV-R | (d) I-Q, II-P, III-R, IV-S |





CAREER ENDEAVOUR

Best Institute for IIT-JAM, NET & GATE

CSIR-UGC-NET/JRF LIFE SCIENCES
SAMPLE TEST : CELL BIOLOGY

Time : 60 Minutes

Date : 15-05-2018
M.M. : 48

[ANSWERS]

PART-B

1. (c) 2. (b) 3. (d) 4. (a)

PART-C

5. (d) 6. (b) 7. (c) 8. (c) 9. (d) 10. (d)
11. (d) 12. (b) 13. (c) 14. (d)

