1 Mark Questions

1. Pernicious anaemia is due to
   (a) blockage of vitamin-B_{12} absorption
   (b) blockage of vitamin-A absorption
   (c) deficiency of vitamin-C
   (d) deficiency of vitamin-B_2

2. Which of these can be an antigen but cannot induce immune response?
   (a) Haemocyanin
   (b) Influenza virus
   (c) Azobenzene arsonate
   (d) Corynebacteria

3. In mammals, the second messenger Nitric Oxide (NO) is produced from
   (a) ammonium nitrate (b) arginine
   (c) urea (d) nitrous acid

4. Generally, the rate-limiting step of major metabolic pathways is a reaction
   (a) in which the availability of the substrate is limited
   (b) catalyzed by an allosteric enzyme
   (c) catalyzed by an enzyme with very low K_m
   (d) whose products are not readily consumed by the subsequent step of the pathway

5. Human DNA (3×10^6 Kb) is replicated in 5 hrs at a rated of 1 Kb/min. The number of origins of replication utilized are
   (a) 1 (b) 3
   (c) 300 (d) 10,000

6. Phospholipases A1 and A2
   (a) play no role in phospholipids synthesis
   (b) hydrolyze phosphatidic acid to diglycerate
   (c) remove fatty acid from sn-1 and sn-2 of phospholipids
   (d) are involved in biosynthesis of phosphatidyl ethanolamine

7. Equal volumes of two buffers of pH-4 of identical ionic strengths are mixed. The resultant pH is
   (a) close to 4 (b) close to 5
   (c) close to 6 (d) exactly 5

2 Marks Questions

8. An insert (I) of 1 Kb is ligated to a plasmid (P) of 4 Kb in a molar ratio of 4 : 1 respectively in a final DNA concentration of 10 µg/mL. The amounts of insert (I) and plasmid (P) required in µg are
   (a) I = 8 and P = 2
   (b) I = 2 and P = 8
   (c) I = 5 and P = 5
   (d) I = 1 and P = 4

9. The formation of ATP from ADP and Pi is not a spontaneous reaction. A reason for this is
   (a) ATP readily ionizes
   (b) electrostatic repulsion in ATP is lower than that in ADP
   (c) ATP is better hydrated than the total hydration levels of ADP and Pi
   (d) resonance stabilization of P–O bonds in Pi is higher than that in ATP

10. A beam of light passes through 1 cm of a coloured solution. Eighty per cent of the incident light is transmitted. If the incident light passes through 2 cm of the same solution, the percentage of transmitted light is
    (a) 60 (b) 64
    (c) 70 (d) 40

11. Lactose uptake in *E. coli* is an example of
    (a) passive transport
    (b) primary active transport
    (c) secondary active transport
    (d) simple diffusion

12. During receptor-mediated endocytosis of LDL bound to its receptor
(a) both receptor and ligand are degraded
(b) the receptor is degraded and the ligand recycled
(c) both are recycled
(d) the ligand is degraded and the receptor is recycled

13. Choose the correct pairs from the following groups.

Group I	Group II
A. Isocitrate lyase	1. Conversion of amino acids into glucose
B. PEP carboxykinase	2. Biotin
C. Pyruvate dehydrogenase complex	3. Synthesis of glucose from acetate
D. Phosphofrucktokinase	4. Lipoic acid
E. Pyruvate carboxylase	5. An allosteric enzyme

Codes

	A	B	C	D	E
(a)	1	2	4	5	3
(b)	3	1	4	5	2
(c)	3	1	4	2	5
(d)	2	5	1	4	3

14. The advantage of haemoglobin having a high histidine content is
(a) histidine binds to oxygen
(b) histidine carries oxygen to the tissues
(c) histidine imparts buffering capacity to haemoglobin
(d) '*R*' group of histidine has low pKa

15. IgG has four chains. Purified monoclonal IgG was subjected to electrophoresis. The number of bands visible by
A. Reducing SDS-PAGE B. Isoelectric focusing
C. Native PAGE

	A	B	C		A	B	C
(a)	2	1	1	(b)	1	1	2
(c)	2	4	2	(d)	4	2	4

16. When *E. coli* is grown in glucose an lactose, the *lac* operon is not expressed. This is because glucose interferes with
(a) removal of repressor
(b) binding of activator
(c) removal of repressor and binding of activator
(d) removal of activator

17. What property of biomembranes is responsible or their self-sealing nature?
(a) Hydrophilicity of the phospholipid head group
(b) Presence of proteins in biomembranes
(c) Presence of cholesterol in biomembranes
(d) Hydrophobicity of the fatty acid side chains of phospholipids

18. A mixture of amino acids consisting of glycine, lysine, arginine, histidine, aspartic acid and glutamic acid was placed in the centre of a paper strip, moistened with buffer of pH 6 and electric current applied. The migration of amino acids was as follows :
(a) Glycine, lysine and histidine moved towards the anode, Aspartic acid and glutamic acid moved towards the cathode while arginine remained near the origin.
(b) Aspartic acid and glutamic acid remained near the origin and lysine, histidine and glycine moved towards the anode while arginine moved towards the cathode.
(c) Glycine remained near the origin. Lysine, arginine and histidine moved towards the cathode while aspartic acid and glutamic acid moved towards the anode.
(d) All amino acids remained near the origin.

19. Cells expressing Epidermal Growth Factor (EGF) receptors were treated (T) or untreated (U) with EGF. The cells were lysed and immunoprecipitated with EGF recetor-specific and antibodies. The immunoprecipitate was analyzed by Western blotting with antibodies specific to
I. phosphotyrosine II. phosphothreonine
III. tyrosine kinases IV. threonine kinases
Which of these antibodies would detect a band under T and U conditions?
(a) T–I and II; U–III (b) T–II and IV; U–IV
(c) T–I and II; U–I (d) T–I and III; U–II

20. Which of the following would be considered the longest feedback loop?
(a) Reproductive steroid hormones ..... aminergic neurons
(b) Reproductive steroid hormones ..... hypothalamic neurons
(c) Reproductive steroid hormones ..... pituitary gonadotrophs
(d) Gonadotropin releasing hormones ..... hypothalamic neurons

21. In myasthenia gravis, a neuromuscular disorder, the acetylcholine receptor becomes dysfunctional because
(a) the receptor is mutated
(b) antibodies to the receptor inhibit ligand binding
(c) of deficiency in acetylcholine transferase
(d) of excess of acetylcholine esterase