



M.TECH DEGREE EXAMINATIONS: JAN 2015

(Regulation 2014)

First Semester

BIOTECHNOLOGY

P14BTT101: Physiology and Biochemistry

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Bile salts contains the following ions except : [K₁]
 - a) Na⁺
 - b) Cl⁻
 - c) Mg²⁺
 - d) Ca²⁺

2. Consider the following statements - [K₂]
 1. Prothrombin activator is formed as a result of rupture of blood vessel.
 2. Thrombin acts on fibrinogen to remove six low molecular weight peptides from it
 3. Traumatized tissue releases a complex of several factors called tissue factors.
 4. Activation of Factor IX is carried out by Factor X

Which of the following statements are correct?

 - a) 1 & 3
 - b) 2 & 3
 - c) 3 & 4
 - d) 1 & 4

3. Which of the following statements is in a correct sequence to produce posterior pituitary hormones? [K₄]
 - 1) Supraoptic/paraventricular nuclei → nerve tracts → pituitary stalk → nerve endings → posterior pituitary
 - 2) Nerve tract → supraoptic/ paraventricular nuclei → nerve endings → pituitary stalk → posterior pituitary
 - 3) Supraoptic/paraventricular nuclei → nerve endings → pituitary stalk → nerve tract → pituitary stalk
 - 4) Supraoptic/paraventricular nuclei → nerve tracts → nerve endings → pituitary stalk → posterior pituitary

15. Recall the pathophysiology of thyroid and parathyroid. [K₁]
16. Illustrate the regulation of posterior pituitary hormones by hypothalamus. [K₃]
17. Interpret the significance of high energy phosphates in bioenergetics. [K₃]
18. Define the term reducing equivalent. Name the electron carriers in respiratory chain acting as reducing equivalents. [K₁]
19. Correlate the role of liver in well-fed states. [K₄]
20. List the types of diabetes and their pathophysiology. [K₁]

PART C (10 x 5 = 50 Marks)

21. Relate the role of cytochrome P450 system in biotransformation process [K₁]
22. Illustrate the mechanism of action of loop and thiazide diuretics [K₃]
23. Brain is impermeable to many ions and molecules, however it requires them for their proper functioning. Give reasons. [K₄]
24. Demonstrate the mechanism of action of neurotransmitters. [K₃]
25. Describe the chemistry and functions of adrenal cortical hormones. [K₂]
26. Assess the regulation of secretion of pancreatic hormones. [K₅]
27. Recall the role of thiamine pyrophosphate as a coenzyme [K₁]
28. Discuss the chemiosmotic hypothesis of oxidative phosphorylation. [K₂]
29. Correlate the coordinated regulation of glycolysis and glycogenesis [K₄]
30. Determine the regulation of fatty acid degradation. [K₄]

PART D (2 x 10 = 20 Marks)

31. Emulsification of fats by bile salts is essential for digestion of fats. [K₄]
Substantiate your answer with an explanation on digestion of triglycerides.
32. Liver plays a major role in processing and distribution of nutrients. Justify the statement [K₃]
