NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF MEDICINE

DIVISION OF BASIC MEDICAL SCIENCES

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY DEGREE PART I FINAL EXAMINATIONS

MBM 1202 : BIOCHEMISTRY PAPER II

DATE : JUNE 2013

TIME : 3 HOURS

Instructions to Candidates

Answer **all** questions

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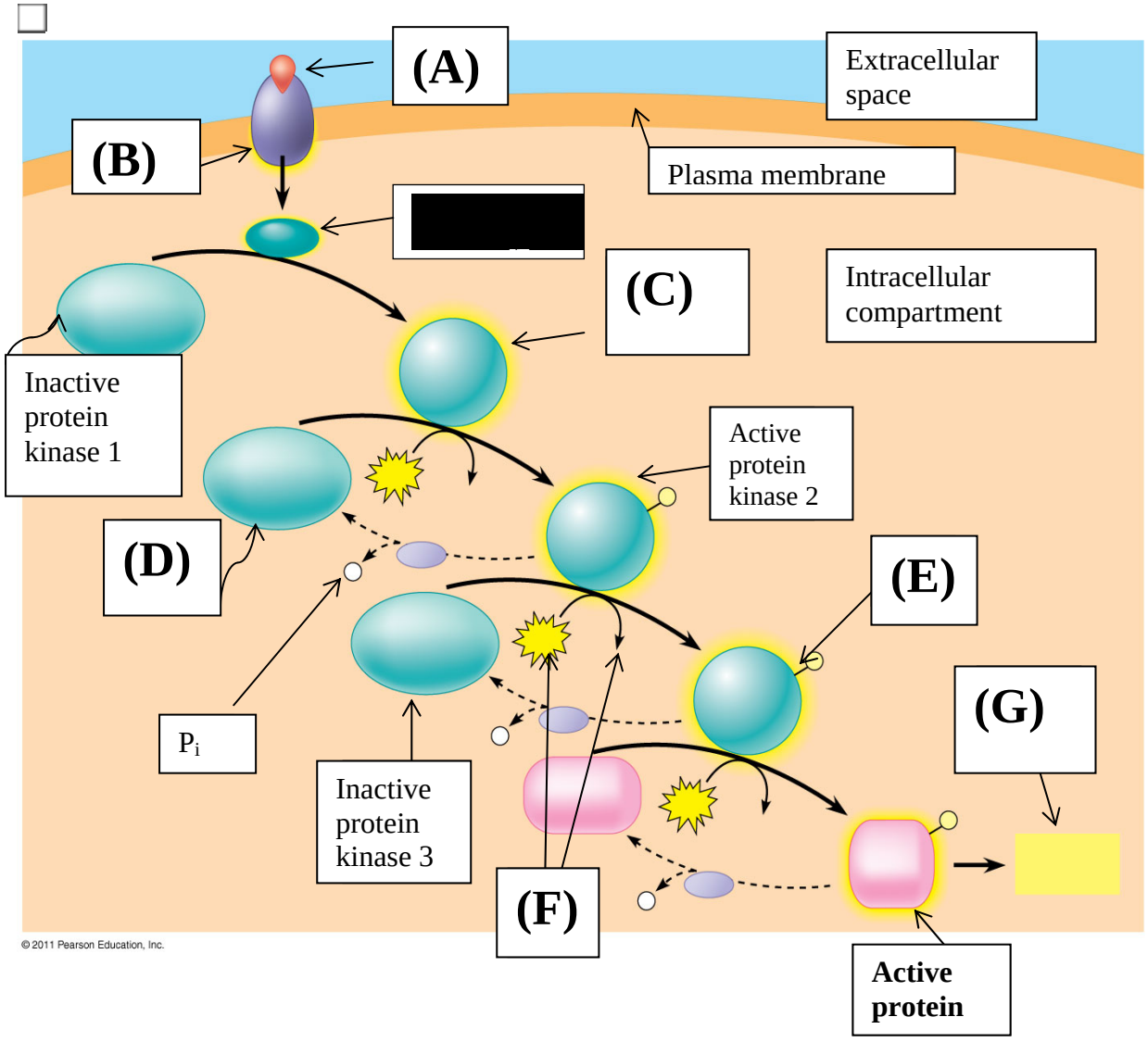
1. What are the causes of phenylketonuria and how is it managed? (7)
2. Acetyl CoA can be described as a “cross-road” molecule. Sketch its metabolic sources and its utilization. (4)
3. Map the distribution of amino acids in the well-fed state. (5)
4. Briefly, explain the biochemical bases of neonatal jaundice. (5)
5. Differentiate between the terms “metabolomics” and “metabonomics”. (4)
6. Differentiate between glucogenic and ketogenic amino acids. Are these interconvertible? (6)
7. Explain the strategies used to regulate the synthesis of the non-essential amino acids that are derived from glutamate. (5)
8. What is the biochemical basis of maple syrup urine disease and its sequelae? (5)
9. Write short notes explaining the roles of prostaglandin H_2 synthase in local hormone synthesis. (5)

10. Explain the formation and functions of the cyclooxygenase 1 (COX 1) and cyclooxygenase 2 (COX 2) (4½)

11. What is the effect of aging on the following hormones?
    i) Thyroid hormones (T_3 and T_4) (1)
    ii) Growth Hormone (GH) (1)
    iii) Melatonin (1)
    iv) Insulin (1)

12. List the group of hormones of the adrenal glands and their site of production. Give an example and function for each group. (6)

13. Below is an incomplete diagram of a generic scheme for a phosphorylation cascade. Name the components making up a standard phosphorylation cascade marked **(A)** to **(G).** (3½)



14. Describe how and why cells communicate. (8)

15. Indicate what is meant by the "quorum-sensing" gene in bacteria and how this may have applications in medicine. (3)

16. Clearly outline the protein kinase A-mediated dual control of glycogen degradation and synthesis. (4)

17. Briefly, explain the biochemical basis of pain and swelling in skeletal muscles following strenuous exercise. (4)

18. Briefly, explain the medical importance of the hormonal regulation of glycogen synthesis. (4)

19. Describe the medical significance of glucose-6-phosphate dehydrogenase in the hexose monophosphate shunt. (6)

20. Identify the medical significance of gluconeogenesis and, briefly, explain the regulation of the anabolic pathway. (6)

21. Gangliosides are formed from _____by stepwise addition of _____ like _____, _____, _____, and _____. X_____ present in _____ are involved in the transfer of sugars from nucleotides. (4)

22. Summarize the biological functions of the adenine nucleotides. (4)

END OF EXAMINATION