Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I (CBME) Degree Examination - 24-Jun-2021

Time: Three Hours **Max. Marks: 100 Marks**

BIOCHEMISTRY – PAPER II (RS-4)
Q.P. CODE: 1025
(QP contains three pages)

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

LONG ESSAYS **2 x 10 = 20 Marks**

1. A 6 year old child was brought to the OPD with complaints of Mental retardation, delayed developmental milestones, hyperactive and seizures. The child had light coloured hair, skin and unpleasant mousy body odour. Serum Phenylalanine was 35mg/dl (Normal 1-2mg/dl). Ferric chloride test showed transient blue green colour in urine.
   a. Suggest the probable diagnosis?
   b. Mention the enzyme defect and write the reaction catalysed by their enzyme
   c. Write the biochemical basis for the following clinical findings:
      i. Neurological manifestations
      ii. Light colouredhair and skin
      iii. Mousy body odour
   d. Describe the steps for synthesis of any two biological important compounds derived from tyrosine. (1+2+3+4)

2. Explain in detail the reactions of Heme synthesis? Name the regulatory enzyme of this pathway. How is it regulated? (6+1+3)

SHORT ESSAYS **8 x 5 = 40 Marks**

3. Classify amino acids based on their nutritional significance giving examples. What are non protein amino acids? Give one example. (3+1+1)

4. Mention any four anticancer drugs and write their mechanism of action. (1+4)

5. A 40 year old male came with the complaints of difficulty in breathing, shortness of breath and tightness of chest. History revealed that he is a chronic smoker for the past 15years.Chest X-ray and CT scan showed changes suggestive of emphysema.
   a. Deficiency of which plasma protein causes this condition?
   b. Explain the biochemical basis of emphysema in smokers?
   c. Name any two serine proteases? (1+2+2)

6. Explain the tests done to assess the renal tubular functions? What is urine osmolality? Write its reference range? (3+1+1)

7. Name the RNA which carries amino acids to the site of protein biosynthesis. With illustration explain the structure. (1+4)

8. A four year old child was brought to the hospital with the following complaints developmental failure, aggressive behavior, joint pain, compulsive urge to bite his lips and fingers. Mother revealed a family history of similar illness among family members.
   a. Suggest the probable diagnosis.
   b. Name an appropriate biochemical parameter to diagnose this condition and state its reference range in males and females
   c. Name the enzyme deficiency and the reaction catalysed by the enzyme (1+2+2)

9. Explain Lac operon concept with a diagrammatic representation.

10. Classify antioxidants giving two examples for each class.

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SHORT ANSWERS **10 x 3 = 30 Marks**

11. Telomerases are involved in aging process. Justify and give its clinical significance. (1+2)

12. What is Southern blot technique? Write two applications of this technique. (1+2)

13. Mention any three salient features of DNA replication. (3)

14. What is detoxification? Give two examples of conjugation phase reactions? (1+2)

15. What are DNA probes? Write their applications. (1+2)

16. What are oncosuppressor genes? Name any two with their mechanism of action. (1+2)

17. Give reason for the following:
    a. Restriction enzymes are termed as molecular scissors
    b. Changing color of the bruise
    c. Hemolytic jaundice is also called a acholuric jaundice (1+1+1)

18. Illustrate the sources of carbon and nitrogen atoms in Purine ring. (3)

19. Write the biochemical findings in the serum and urine in obstructive jaundice. (3)

20. Give reason for the following:
    a. Pellagra like symptoms are seen in Hartnups disease
    b. Glycine does not exhibit optical activity
    c. Proline is an α- helix breaker (1+1+1)

Multiple Choice Questions **10 x 1 = 10 Marks**

21 i) The protein part present in nucleoprotein is
    a. Globin
    b. Opsin
    c. Histones
    d. Apoferritin

21 ii) The enzyme defect in Acute intermittent porphyria
    a. PBG- deaminase
    b. UPG-cosynthase
    c. Ferrochelatase
    d. UPG-decarboxylase

21 iii) The following compounds are biosynthesized by Glycine EXCEPT
    a. Creatinine
    b. Heme
    c. Melatonin
    d. Purine nucleotide

21 iv) 5'-Nucleotidase is more specific for
    a. Myocardial Infarction
    b. Prostate cancer
    c. Obstructive liver disease
    d. Wilson's disease

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21 v) Appearance Black colour urine is seen in
a. Porphyria
b. Alkaptonuria
c. Jaundice
d. Urinary tract infection

22 i) Which of the following has not been treated by gene therapy?
a. Hemophilia
b. Severe combined immunodeficiency
c. Cystic fibrosis
d. Glucose – 6- phosphatase deficiency

22 ii) Helicase enzyme in DNA replication -
a. Unwinds the DNA
b. releases the supercoils
c. breaks the strands
d. seals the strands

22 iii) Western blot technique is used for the
a. Detection of specific DNA segment
b. Detection of specific gene expression
c. Identification of a specific protein
d. Location of a gene on a specific chromosome

22 iv) Urine preservatives are used for all the following purposes EXCEPT
a. Reduce bacterial action
b. Minimize chemical decomposition
c. Increase pH
d. Decrease atmospheric oxidation of unstable compounds

22 v) Serum Alpha Fetoprotein level is increased in
a. Multiple Myeloma
b. Choriocarcinoma
c. Hepatoma
d. Lung cancer

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