

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I (RS 1 Batch) University Examinations September/October- 2025

SUBJECT: BIOCHEMISTRY PAPER 2 (QP CODE: 1031)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100

Date: 26/09/2025

Time: 3 hrs

I. Long Essay question

1X12=12 Marks

1. A one-year-old male child born to consanguinous parents had developmental delay and hypopigmented scalp hair. Screening for plasma amino acid levels showed elevated levels of phenylalanine. (1+ 4+5+2)
 - a. What is the enzyme defect in this child?
 - b. Discuss the catabolism of the amino acid mentioned.
 - c. Discuss the formation of biologically important compounds from this amino acid.
 - d. List the biochemical investigations in phenylketonuria.

II. Short notes

3X6=18 Marks

2. Explain the steps in the recombination DNA technology with neatly labelled diagram. Mention the clinical applications. (4+2)
3. Explain the primary and secondary structural organization of proteins with examples. (3+3)
4. Explain the steps of lipid peroxidation. Describe the role of antioxidants in scavenging reactive oxygen species. (3+3)

III. Short notes (Applied aspects)

4X5=20 Marks

5. A 50-year-old man presented with severe back pain and weakness. He has significant weight loss in last 3 months. Bone marrow biopsy shows plasma cells in excess. X ray skull shows punched out lesions. Urine is positive for Bence Jones proteins.(1+2+2)
 - a. What is the probable diagnosis?
 - b. Discuss the serum protein electrophoresis findings in this case.
 - c. Draw the electrophoretic pattern of the above condition.
6. A 3-year-old girl presented with swelling, pain in joints of finger and toes. She also had fever and weakness. Patient had similar episodes in the past. Her mother also complained of developmental delay. Her Blood investigation reports are as follows- Hb:7.1g%, serum total bilirubin 4.2mg/dl, unconjugated 3.4 mg/dl, peripheral blood shows sickled RBCs.(3+2)
 - a. Explain the molecular defect in sickle cell disease and biochemical basis of sickling
 - b. Mention on the laboratory investigations in sickle cell disease.
7. 50 year old male who had been suffering from fever and lethargy for the past five days was brought to the hospital. On examination he had signs of dehydration like reduced skin turgor, dry mouth and sunken eye balls. His urine output was decreased. Following were the laboratory findings: Random Blood Glucose: 90 mg/dl, Serum Urea: 110 mg/dl, Serum Creatinine: 2.5 mg/dl. (1+2+2)
 - a. What is the probable diagnosis?
 - b. List the glomerular function tests
 - c. Define creatinine clearance. Mention it's normal value.

P.T.O

July
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Sumantara N.S
26/9/25

8. 3 year old boy was brought by his mother to paediatric OPD with complaints of delayed milestones, abnormal movements, biting of fingers and lips. On probing she recalls that her brother to have similar symptoms. His blood investigation revealed high uric acid level (8.8 mg/dl) .(1+1+2+1)
- Suggest the probable diagnosis
 - Name the pathway affected in this.
 - Write the reaction catalyzed by the deficient enzyme.
 - What is the biochemical basis of high uric acid in this case

IV. Short notes

4X5=20 Marks

- Describe the DNA repair mechanism with suitable examples.
- Define the tumour markers. Name the four tumour markers and mention their significance. (1+4)
- Write a labelled diagram of tRNA. Add a note on its functions. (2+3)
- Describe and discuss the role of physician in health care system.

V. Reasoning questions

5X3=15 Marks

- Treatment with vaccines but not immunoglobulins can provide active immunity.
 - Mitochondrial diseases follow a pattern of maternal inheritance.
- Why edema is a common feature in hypoalbuminemia.
 - A primer is not involved in the RNA synthesis.
- DNA replication is semiconservative
 - Secondary response to an antigen exposure is usually higher than primary response.
- Alkaline phosphatase enzyme activity is increased in Obstructive Jaundice
 - Exacerbation of symptoms on treatment with barbiturates in Acute intermittent porphyria
- Cold intolerance occurs in hypothyroidism.
 - Allopurinol is used in the treatment of gout.

VI. MCQs

15X1=15 Marks

18.

- A patient presents with signs of aspirin overdose. The drug is being broken down into non-toxic products. The mechanism by which it is detoxified in the body is
 - Dehydration of aspirin to form salicylamide
 - Hydrolysis of aspirin to form salicylic acid and acetic acid
 - Decarboxylation of aspirin into phenol and CO₂
 - Oxidation of aspirin into salicylic aldehyde
- Which is the primary organ for detoxification in the human body?
 - Kidney
 - Lungs
 - Skin
 - Liver
- 28-year-old woman receives a hepatitis B vaccine. Months later, she is tested for immunity and high levels of IgG antibodies are found in her blood. What is the main role of IgG in this situation?
 - It prevents allergic reactions by blocking histamine
 - It provides immediate, short-term defense at mucosal surfaces
 - It gives long-term protection by neutralizing the virus in the bloodstream
 - It stimulates red blood cell production to improve oxygen delivery

P.T.O

4. 12-year-old boy presents with itchy skin, sneezing, and watery eyes during spring. His doctor diagnoses seasonal allergic rhinitis. Allergy testing shows elevated IgE levels. What is the function of IgE in allergic reactions?
- It binds to mast cells and triggers histamine release
 - It activates B cells to make more antibodies
 - It promotes T cell memory
 - It neutralizes allergens directly in the bloodstream
5. A 56 year old male recently diagnosed with diabetes mellitus should undergo screening test for complications of diabetic nephropathy, the best test is?
- Protein
 - Serum creatinine
 - Microalbumin
 - Specific gravity of urine
6. A child with acute lymphoblastic leukemia is treated with a synthetic purine nucleotide analogue that interferes with DNA synthesis by incorporating into the DNA chain. He later develops myelosuppression. Which drug was most likely used?
- Cytarabine
 - 6-Mercaptopurine
 - Methotrexate
 - Cyclophosphamide
7. A patient with hyperuricemia is treated with allopurinol, a xanthine oxidase inhibitor. Which of the following contributes to its ability to reduce de novo purine synthesis?
- Direct inhibition of PRPP synthetase
 - Increased conversion of PRPP to uric acid
 - Increased feedback inhibition by IMP and GMP
 - Activation of HGPRT
8. A patient undergoing chemotherapy receives 5-fluorouracil (5-FU). The drug targets pyrimidine metabolism. What is the enzyme inhibited by its active metabolite?
- Dihydroorotate dehydrogenase
 - Thymidylate synthase
 - Ribonucleotide reductase
 - Orotate phosphoribosyltransferase
9. 32-year-old man presents to the clinic after testing positive for HIV. He is started on antiretroviral therapy that includes zidovudine, a nucleoside analogue. This drug targets the reverse transcriptase enzyme of the virus. Which of the following is true about this enzyme ?
- It integrates viral RNA into the host genome
 - It synthesizes viral RNA from DNA
 - It synthesizes viral proteins from RNA
 - It synthesizes viral DNA from RNA
10. A doctor suspects that a patient may have tuberculosis. He orders for PCR. What is the main advantage of PCR in this case?
- It amplifies the pathogen's DNA for detection
 - It detects antibodies
 - It stains the bacteria for microscopy
 - It tests for antibiotic sensitivity

P.T.O

11. 28-year-old woman is being tested for HIV infection. Her confirmatory test detects HIV proteins by separating them via electrophoresis and using labeled antibodies. Which technique is used?

- a. Southern blot
- b. Northern blot
- c. Western blot
- d. PCR

12. 9-year-old girl presents with breathlessness, weakness, poor appetite, frequent infections, and failure to thrive. On examination: pallor, icterus, massive hepatosplenomegaly, and growth retardation are noted. She has a history of multiple blood transfusions. Labs show low Hb, low MCV & MCH, elevated bilirubin and liver enzymes. Hemoglobin electrophoresis shows increased HbF. What is the most probable diagnosis?

- a. Iron Deficiency Anemia
- b. Sickle Cell Anemia
- c. Beta Thalassemia Major
- d. Autoimmune Hemolytic Anemia

13. 6-year-old child presents with tiredness, stomach pain, and poor attention in school. He lives in an old house with peeling paint. Blood tests show low hemoglobin and basophilic stippling on the blood smear. Lead poisoning is suspected based on the findings. Lead causes anemia by inhibiting which enzyme?

- a. ALA synthase
- b. ALA dehydratase
- c. Uroporphyrinogen III synthase
- d. Uroporphyrinogen I synthase

14. Serum lipase is considered more suitable than amylase in diagnosing acute pancreatitis? All of the following are correct reasons except:

- a. Lipase remains elevated longer than amylase
- b. Lipase is more specific to pancreatic tissue
- c. Lipase is not increased in salivary diseases
- d. Lipase is the earliest enzyme to rise in pancreatitis

15. A lab technician notices that the control value for glucose testing is outside the ± 2 SD range on the Levey-Jennings chart for today's run. What should the technician do first?

- a. Report patient results immediately
- b. Ignore it if yesterday's control was normal
- c. Investigate the cause and do not report patient results until resolved
- d. Recalibrate the analyzer after reporting results

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26/9/25

Sumantree N.S.
26/9/25

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I (RS1 Batch) University RESIT Examinations Nov/Dec- 2025

SUBJECT: BIOCHEMISTRY PAPER 2 (QP CODE: 1031)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100

Date: 27/11/2025

Time: 3 hrs

I. Long Essay question

1X12=12 Marks

1. A 40-year-old woman presents with progressively worsening yellow discoloration of the eyes and skin, dark urine, and pale, clay-colored stools. She also reports mild abdominal pain and itching and has a history of gallstones. Laboratory investigations reveal: serum total bilirubin:10mg/dl, conjugated bilirubin: 8mg/dl, Serum AST: 70 IU/L, Serum ALT: 50 IU/L, Serum ALP: 430 IU/L and diagnosis of obstructive jaundice is established. (4+2+6)
 - a) Define jaundice and enumerate the various types of jaundice.
 - b) Explain the biochemical basis for elevated conjugated bilirubin.
 - c) Describe the steps of bilirubin metabolism?

II. Short Notes

3X6=18 Marks

2. Describe the process of translation. Add a note on post translational modification of proteins. (4+2)
3. Describe the classification of proteins with suitable examples. Mention the functions of proteins.
4. Enumerate the steps and applications of recombinant DNA technology. (3+3)

III. Short notes with Applied aspects

4X5=20 Marks

5. A 30-year female came to medicine OPD with history of weight loss, palpitations and her laboratory investigations shows serum TSH: <0.5 μ IU/ml. (1+2+2)
 - a) What is the probable diagnosis?
 - b) Enumerate the causes for above condition.
 - c) Mention the other laboratory investigations you would like to suggest for the patient.
6. A 65-year-old female presents with chronic low back pain and recurrent fractures. With total protein value of 10g/dl. Pelvic X-ray reveals punched-out osteolytic lesions. Urine examination is positive for Bence Jones proteins. (1+1+1+2)
 - A. What is the probable diagnosis?
 - B. What is the biochemical basis in the above condition?
 - C. What are Bence jones proteins?
 - D. Describe the pattern of electrophoresis in the above condition?
7. Explain the structure and functions of immunoglobulins. (2+3)
8. Define tumour markers. Mention any 4 tumour markers with their use. (1+4)

P.T.O

IV. Short notes

4X5=20 Marks

9. Describe the structure of DNA. Write TWO difference between DNA and RNA. (3+2)
10. Define xenobiotics. Explain the phase two detoxification reactions with examples.
11. What are free radicals? Mention the types of antioxidants with examples.
12. Discuss physician's role and responsibilities to society and community.

V. Reasoning Questions

5X3=15 Marks

13. Why tyrosine becomes essential in phenylketonuria?
14. Allopurinol is used in the treatment of gout. Justify
15. RT PCR is useful in diagnosis of Covid 19. Justify
16. DNA follows Chargaff's rule. Justify
17. Why fetal hemoglobin shifts the oxygen dissociation curve to the left and what is its advantage?

VI .18) MCQs

15X1=15 Marks

1. A 30-year-old male presents to the emergency department with severe right big toe pain after eating non vegetarian food. On examination, the right big toe was swollen, warm, red, and exquisitely tender. Uric acid level was found to be elevated and gout was diagnosed. Which of the following is the cause for the above condition?
 - a) Decreased enzyme activity of PRPP synthetase.
 - b) Deficiency of enzymes of salvage pathway.
 - c) Excess of glucose 6 phosphatase.
 - d) Decreased phosphoribosyl amido transferase activity.
2. Patient gives history of cough, fever since 1 month and difficulty in breathing since 4 days. Family history reveals that one of his brother had died earlier due to lung disease. Electrophoresis showed decreased alpha-1 fraction of globulin. What is the probable diagnosis?
 - a) Emphysema
 - b) Bronchial asthma
 - c) Tuberculosis
 - d) Pneumothorax
3. A middle-aged woman presents with recurrent episodes of severe abdominal pain that are often precipitated by prolonged fasting. During these episodes, her urine turns dark red upon standing. She is diagnosed with Acute Intermittent Porphyria. Which of the following enzymes is deficient in this condition?
 - a) PBG deaminase
 - b) UPG decarboxylase
 - c) CPG III oxidase
 - d) Heme synthase

P.T.O

4. A 10-year-old male brought to paediatric OPD due to learning difficulty, hyperactivity and tendency for self-mutilating behaviour. What is the probable diagnosis?
- Orotic aciduria
 - Lesch-nyhan syndrome
 - Gout
 - Phenyl ketonuria
5. A 12-month-old infant brought to emergency department complains of lethargy, poor feeding and parents mention that the baby's urine had a strange burnt sugar like odor. On initial metabolic investigations showed metabolic acidosis and low bicarbonate levels with increased blood level of leucine, isoleucine, and valine with corresponding excretion of ketoacids. What is the probable diagnosis?
- Phenylketonuria
 - Maple syrup urine disease
 - Tyrosinemia
 - Alkaptonuria
6. A 29-year-old man was admitted to the hospital with severe anemia and received a blood transfusion. Shortly afterward, he developed jaundice and hemoglobinuria (blood in urine). Laboratory evaluation revealed increased total and unconjugated bilirubin levels. What is the most probable diagnosis?
- Hepatic jaundice
 - Obstructive jaundice
 - Hemolytic jaundice
 - Thalassemia
7. A 15-year-old male brought by his mother to pediatric OPD due to swelling of the face and lower limbs. On further evaluation observed massive proteinuria and hypercholesterolemia. What is the probable diagnosis?
- Liver cirrhosis
 - Nephrotic syndrome
 - Diabetes Mellitus
 - Kwashiorkor
8. Conjugated hyperbilirubinemia with raised alkaline phosphatase levels are characteristic of
- Obstructive jaundice
 - Hemolytic jaundice
 - Viral hepatitis
 - Physiological jaundice
9. A 60-year male had history of passing blood in urine and loss of appetite with weight loss since few months and to diagnose prostatic carcinoma which of the following tumor marker is suggested?
- Beta hCG
 - Alpha feto protein
 - Prostate specific antigen
 - Beta2 micro globulins

P.T.O



10. Which of the feature is unique to eukaryotic mRNA processing?
- 5' capping
 - Poly adenylation
 - Removal of introns
 - All of the above
11. A elderly male admitted in the hospital for vomiting and on evaluation found to be hyperkalemia and what could be the likely cause for hyperkalemia.
- Hemolysis of the blood sample
 - Due to increased tourniquet tension
 - Error during collection, storage, and handling of blood sample
 - All the above
12. Which of the following statement characterizes p53?
- It is a proto oncogene
 - It is a tumour suppressor gene
 - It is a tumour marker
 - It is a onco suppressor gene product
13. A 32-year-old male came to physician with complaints of joint pain and also observed that urine turning black color after some time. Her serum uric acid level was normal. Urine shows positive for ferric chloride test. What is the probable diagnosis?
- Pentosuria
 - Cystinuria
 - Alkaptonuria
 - Maple syrup urine disease
14. An 18-year-old girl was admitted to emergency department with complaints of fever and recurrent pain in bones of arms and legs and diagnosed to be sickle cell anemia. What is the biochemical defect?
- Replacement of valine by glutamic acid at 6th position of beta globin chain.
 - Replacement of glutamic acid by valine at 6th position of beta globin chain.
 - Replacement of glycine by glutamic acid at 6th position of beta globin chain.
 - Replacement of glutamic acid by glycine at 6th position of beta globin chain.
15. A child with disputed paternity requires DNA testing for confirmation. Which of the following techniques is most commonly used to analyze the DNA?
- Southern Blotting
 - Western blotting
 - Northern blotting
 - FISH



SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I University RESIT Examinations (2023 Repeater Batch) Nov/Dec- 2025

SUBJECT: BIOCHEMISTRY PAPER 2 (QP CODE: 1006)

Your answer should be specific to the question asked

Draw neat, labelled diagrams wherever necessary

Maximum Marks: 100

Date: 27/11/2025

Time: 3 hrs.

I. Long Essay

2 X 10 = 20 Marks

1. A 68 years old male, known chronic case of Type 2 DM with history of pedal oedema and periorbital puffiness during early hours of morning. His lab reports depicts blood urea levels of 192 mg/dL and creatinine 6.8 mg/dL. (1+2+7)
 - a) State the probable diagnosis.
 - b) Mention the reference range of serum creatinine and Blood urea.
 - c) Describe the steps of urea formation. Add a note on urea cycle disorders.
2. Define Transcription. Describe the process of Transcription in prokaryotes. Add a note on post transcriptional modifications.

II. Short Essay

8 X 5 = 40 Marks

3. A 13 years old boy on a trekking trip experienced episode of pain in hands & feet and left hypochondrial region. On admission to casualty, based on peripheral blood picture sickling crisis was diagnosed. (3+2)
 - a) Explain the molecular basis of this disease.
 - b) State the principle of electrophoresis.
4. What is Gout? Mention the causes of Gout. Add a note on significance of Allopurinol in the treatment of Gout.
5. Mention the types of RNA and their functions. Draw a neatly labelled diagram of t-RNA.
6. What are tumour markers? Enlist any FOUR tumour markers with their significance.
7. Enumerate the types of Immunoglobulins. Give a diagrammatic description of immunoglobulin structure.
8. Describe the procedure and applications of Polymerase chain reaction.
9. Describe the phases of detoxification process with examples.
10. Describe Van Den Bergh test with its clinical application.

III . Short Answers

10 X 3 = 30 Marks

11. Enlist any SIX derivatives of glycine.
12. Mention any THREE characteristics of Genetic code.
13. Mention any THREE Enzymes used for diagnosis of liver disorders.
14. What are Acute phase proteins? Give examples.
15. Give examples for transport protein, storage protein and structural protein.
16. State the working principle of colorimeter. (P.T.O)

17. Elucidate the alpha helix structure of proteins.
18. Describe purine salvage pathway.
19. What are essential amino acids? Give examples.
20. Mention the roles and responsibilities of a doctor in society and community.

IV. MCQ's

10 x 1 = 10 Marks

21.

- i. Acute phase reactant associated with emphysema
 - a. C-reactive protein
 - b. α_1 - antitrypsin
 - c. Haptoglobin
 - d. α_1 - acid glycoprotein

- ii. Isosthenuria is
 - a. Urine specific gravity >1.022
 - b. Fixed urine specific gravity of 1.010
 - c. Loss of tubular conservation of sodium
 - d. GFR <60 ml/min

- iii. Alpha fetoprotein is a tumor marker for
 - a. Choriocarcinoma
 - b. Renal cell carcinoma
 - c. Hepatocellular carcinoma
 - d. Lipoma

- iv. The optimum pH for the activity of alkaline phosphatase
 - a. 4
 - b. 1
 - c. 9
 - d. 7

- v. Secretory immunoglobulin is
 - a. Ig A
 - b. Ig E
 - c. Ig M
 - d. Ig D

22.

- i. Microalbuminuria is albumin excretion of
 - a. 2.5 -3 mg/day
 - b. 30-300 mg/day
 - c. More than 300 mg/day
 - d. Less than 150 mg/day

(P.T.O)

- ii. Regarding myoglobin all are true EXCEPT
- a. Hemoprotein
 - b. Reservoir of oxygen
 - c. Early marker of myocardial infarction
 - d. Multimeric protein
- iii. Western blotting technique detects
- a. DNA
 - b. hnRNA
 - c. Proteins
 - d. siRNA
- iv. Proteins may be denatured irreversible by
- a. Adding urea
 - b. Bringing to isoelectric pH
 - c. Heat coagulation
 - d. Reduction with mercaptoethanol
- v. Mutated oncosuppressor gene in familial breast cancer is
- a. RB
 - b. p53
 - c. BRCA
 - d. WT

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I University Examinations (2023 Repeater Batch) Sep/ Oct- 2025

SUBJECT: BIOCHEMISTRY PAPER 2 (QP CODE: 1006)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100

Date: 26/09/2025

Time: 3 hrs.

I. Long Essay

2 X 10 = 20 Marks

1. Enumerate the steps of protein biosynthesis in detail and post translation modifications. (7+3)
2. A 1 year old child was brought to paediatric OPD for not achieving milestone. Also complaints for mousy body odour and seizures. Urine analysis reveals increased Phenyl pyruvate. (1+5+3+1)
 - a) What is the inborn error associated and enzyme involved?
 - b) Explain the breakdown of amino acid involved.
 - c) Explain the important products formed the amino acids.
 - d) What are the tests to diagnose this condition?

II. Short Essay

8 X 5 = 40 Marks

3. What is blood urea normal value? Enumerate steps of urea cycle. (1+4)
4. A 45 year male presented with severe pain. Redness and swelling of 1st metatarsophalangeal joint in the night after a bout of alcohol. O/E - right toe was swollen and reddish. On investigation Serum uric acid is 10.2 mg/dl. (1+1+3)
 - a) What is the diagnosis?
 - b) What is the normal serum uric acid level?
 - c) How is uric acid formed?
5. Enumerate the functions of albumin and its importance. What is normal value of serum albumin? (4+1)
6. What is recombinant DNA technology? Write the applications of the recombinant DNA technology? (1+4)
7. Explain the phases two reactions of detoxification with examples.
8. Enumerate the steps of Heme synthesis with its regulation.
9. What are FOUR important compounds formed from glycine. Write about the formation of creatine. (3+2)
10. Explain in detail the structural organization of proteins with examples.

III. Short Answers

10 X 3 = 30 Marks

11. Biological important peptides - any three - write its importance.
12. Classify the Liver function tests.
13. Name THREE tumor markers and its significance.
14. What is Maple syrup urine disease. What is enzyme deficiency?
15. List any THREE functions of Immunoglobulins
16. Western Blot technique.
17. List any THREE Non enzymatic antioxidants.
18. Distinguish between DNA and RNA.
19. What are the tests done to diagnosis thyroid disorder.
20. List any THREE products obtained from glycine.

IV. MCQ's

10 X 1 = 10 Marks

21.

- i. Anti codons are present on
 - a. m-RNA
 - b. t-RNA
 - c. Non-coding strands of DNA
 - d. None of these

July 26/9/25

*Sumantree N.S.
26/9/25*

P.T.O

- ii. Grey topped vacutainer ----- as a preservative
- EDTA
 - Fluoride
 - Heparin
 - Citrate
- iii. Separation of protein is best by
- HPLC
 - Thin layer Chromatography
 - Electrophoresis
 - ELISA
- iv. Which disease is caused by oncosuppressor mutation
- Retinoblastoma
 - Multiple myeloma
 - Huntington's chorea
 - Bronchogenic carcinoma
- v. All the following are hydroxyl group containing amino acids found in proteins EXCEPT
- Thyroxine
 - Threonine
 - Serine
 - Methionine

22.

- i. Meister cycle involves all amino acid except
- Glycine
 - Glutamate
 - Cysteine
 - Lysine
- ii. Heat stable enzyme is
- Restriction endonuclease
 - Reverse transcriptase
 - Thermus thermophilus*
 - RNA polymerase
- iii. FIGLU is formed from metabolism of
- Aspartate
 - Arginine
 - Glutamate
 - Histidine
- iv. The rate limiting enzyme in heme biosynthesis is
- ALA synthase
 - ALA dehydratase
 - Ferrochelataase
 - Heme oxygenase
- v. RT- PCR is used when the starting material is
- DNA
 - Protein
 - RNA
 - Plasmid

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SAPTHAGIRI NPS UNIVERSITY
MBBS PHASE I University Examination October 2024
BIOCHEMISTRY PAPER - II (QP CODE: 1006)

Your answer should be specific to the question asked
Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 Date: 03/10/2024

Time: 3 hrs

I Long Essay

2 X 10 = 20 Marks

1. A 15 year old boy was brought to the hospital for self – mutilating behaviour and delayed development. His uric acid level was 15mg/dL. A provisional diagnosis of Lesch Nyhan Syndrome was made. (1+2+5+2)
 - a) Write the biological reference interval of serum uric acid.
 - b) Name the enzyme defect and the pathway affected in the above disorder.
 - c) Describe the pathway affected in the above disorder and the tissues dependent on this pathway.
 - d) Write the role of allopurinol in the treatment of hyperuricemia.
2. Define transcription. Explain the steps of initiation, elongation & termination of transcription (1+4+3+2).

II Short Essay

8 X 5 = 40 Marks

3. Enumerate the biologically important compounds formed from glycine.
4. Explain the steps involved in PCR and its applications.
5. Define Genetic Code. Explain its salient features.
6. A 15 year old tribal boy was admitted with complaints of fatigue, recurrent fever and pain in arms and legs. His peripheral blood smear shows sickled erythrocytes and a hemoglobin concentration of 6gm%. (1+2+2)
 - a) Name the molecular defect in this disorder.
 - b) Explain the mechanism of sickling.
 - c) What is the cause of anemia in this condition.
7. Define Xenobiotics. Describe phase 2 detoxification reactions.
8. Draw the structure of Immunoglobulin and label it. List the types of Immunoglobulins and its functions.
9. What are tumor markers. List any 4 tumor markers and write their diagnostic significance.
10. Classify renal function tests. Explain the tests to assess glomerular functions of the kidney.

III Short Answers

10 X 3 = 30Marks

11. Define pre analytical errors and give two examples.
12. Define free radical and explain the sources of free radicals in the body.
13. Define Thalassemia. List the types of thalassemia.
14. Enumerate post translational modifications.
15. List three functions of albumin.
16. What are the roles of a physician as a communicator.
17. List three biologically important peptides.
18. Compare and contrast between nucleosides and nucleotides.
19. What is western blotting technique. Write its applications?
20. Define jaundice and write the reference range of total bilirubin and direct bilirubin.

(IV) MCQ's

1 x 10 = 10

21 (i) Albinism is due to deficiency of the enzyme

- a) Phenyl alanine hydroxylase
- b) Tyrosinase
- c) Cystathionase
- d) Para hydroxy phenyl pyruvate oxidase

21 (ii) The amino acid that cannot undergo transamination

- a) Glycine
- b) Lysine
- c) Alanine
- d) Glutamine

21 (iii) The transport of ammonia occurs in the form of

- a) Ammonium ions
- b) Alanine
- c) Glutamine
- d) Glycine

21 (iv) The Following are Catecholamines except

- a) Dopamine
- b) Alanine
- c) Epinephrine
- d) Norepinephrine

21 (v) The methyl donor in methyl transfer reactions is

- a) Methyl cobalamin
- b) Methyl malonyl CoA
- c) S-adenosyl methionine
- d) S-adenosyl homocysteine

22 (i) Van den Bergh reaction is directly positive for

- a) Conjugated bilirubin
- b) Bile salts
- c) Unconjugated bilirubin
- d) Bile acids

22 (ii) The chief product of catabolism of purine in human beings is

- a) Urea
- b) Uric acid
- c) Hypoxanthine
- d) Folic acid

22 (iii) Wobble hypothesis is explained by one of the following characteristics of the genetic code

- a) Universality
- b) Non overlapping
- c) Specificity
- d) Degenerate

22(iv) Which enzyme protects DNA from aging?

- a) DNA polymerase
- b) Topoisomerase
- c) Deoxyribonuclease
- d) Telomerase

22 (v) The most common form of conjugation under detoxification involve

- a) Glucuronic acid
- b) Cystine
- b) Glycine
- d) Glutamine

SAPTHAGIRI NPS UNIVERSITY
MBBS PHASE I university examinations July /August 2024
BIOCHEMISTRY PAPER II (QP CODE: 1006)

Your answer should be specific to the question asked
Draw neat labelled diagrams wherever necessary

Maximum Marks: 100

Date: 14/08/2024

Time: 3 hrs

I. Long Essay

2 X 10 = 20 Marks

1. A 45-year-old obese man with history of alcoholism came to orthopedic OPD with complaints of acute pain in the distal metatarsophalangeal joints. On investigation his serum uric acid level was 12.8 mg /dl. (1+1+6+2)
 - a) What is the probable diagnosis
 - b) What is the normal range of serum uric acid levels
 - c) Explain the steps in the formation of uric acid
 - d) Add a note on treatment of this disorder
2. Describe how Heme is degraded into bile pigments? Define jaundice. Give a brief account of different types of jaundice (5+1+4).

II. Short Essay

8 X 5 = 40 Marks

3. Explain the steps of Polymerase Chain Reaction (PCR). Mention four applications of PCR
4. What is Lipid peroxidation. Explain the role of antioxidants in scavenging reactive oxygen species
5. A known case of Diabetes and Hypertension on irregular treatment presented with swelling of both lower limbs and puffiness of face. He was diagnosed with chronic kidney disease (CKD)
 - a) Mention two biochemical parameters altered in CKD
 - b) Explain the test to assess glomerular functions of the kidney
6. A 4-year-old child was brought to the Paediatric OPD with complaints of fair skin, white hair and ocular manifestations suggesting the case to be Albinism.
 - a) What is the enzyme defect in Albinism
 - b) Write the pathway of synthesis of melanin
 - c) List two other biological important compounds formed from tyrosine
7. Explain the primary & secondary structures organization of proteins with examples
8. List five plasma proteins and mention their functions
9. What are tumor markers? Give examples with their diagnostic importance.
10. Mention two inhibitors of protein biosynthesis. Add a note on post-translational modifications.

III. Short Answers

10 X 3 = 30 Marks

11. Mention three advantages of automation in clinical biochemistry laboratory
12. Name two immunoglobulins and write their functions
13. What are xenobiotics. Write any two detoxification reactions
14. Define transamination. Explain with two examples
15. Enumerate the tests to assess thyroid function test, write the laboratory findings in case of hyperthyroidism.
16. What is the defective enzyme in maple syrup urine disease. What are its characteristic features?
17. Mention any three roles of Physician in healthcare system
18. What is Restriction Fragment Length Polymorphism (RFLP). Mention two clinical applications of RFLP
19. Write three features of genetic code
20. Compare and contrast between nucleosides and nucleotides

IV. MCQ's

1 X 10 = 10 Marks

- 21 (i) The antibody that mediates the hypersensitivity reaction and anaphylaxis is
- a) Ig G
 - b) Ig M
 - c) Ig A
 - d) Ig E
- 21 (ii) Amino acid which doesn't allow the formation of alpha helix is
- a) Proline
 - b) Glutamate
 - c) Tyrosine
 - d) Histidine
- 21 (iii) Elevated homocysteine levels are associated with a risk of
- a) Bronchiectasis
 - b) Nephrotic syndrome
 - c) Coronary artery disease
 - d) Diabetes mellitus
- 21 (iv) All manifestations are seen in Lesch – Nyhan syndrome, except
- a) Self-mutilation
 - b) Immunodeficiency
 - c) Hyperuricemia
 - d) X- linked inheritance
- 21 (v) Which enzyme protects DNA from aging
- a) DNA polymerase
 - b) Topoisomerase
 - c) Deoxyribonuclease
 - d) Telomerase
- 22 (i) Steroid hormones are produced from
- a) Purine
 - b) Pyrimidine
 - c) Cholesterol
 - d) Stercobilinogen
- 22 (ii) Southern blotting technique is used for detection of
- a) DNA
 - b) Protein
 - c) RNA
 - d) Lipoprotein
- 22 (iii) All are vectors for gene therapy, except
- a) Proteasomes
 - b) Liposomes
 - c) Adenoviruses
 - d) Retroviruses
- 22 (iv) Alpha fetoprotein level in serum is increased in
- a) Hepatoma
 - b) Cancer of lungs
 - c) Nephritis
 - d) Prostatic cancer
- 22 (v) Normal levels of Albumin in blood is
- a) 2.5 – 3.5 g/dl
 - b) 1.5 – 3.5 mg/dl
 - c) 3.5 – 5.0 g/dl
 - d) 2.5 – 3.5 mg/dl

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14/8/24