Question Paper Code:U1031

SRI DEVRAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

(A DEEMED TO BE UNIVERSITY)

M.B.B.S Phase-I Degree Examination APRIL 2021

Time:3 hours **Max Marks:100**

BIOCHEMISTRY- PAPER 1

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

LONG ESSAY ***2 X 10 = 20 Marks***

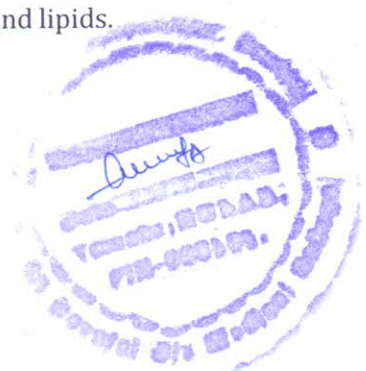
1. Describe how Vitamin D is synthesized in the body. Explain its biochemical functions and deficiency manifestations of Vitamin D. (4+4+2)
2. Explain primary and secondary structure of proteins. Describe the various methods for identification of primary structure of proteins. (3+3+4)

SHORT ESSAY ***10 X 5 = 50 Marks***

3. Classify Liver function tests. Explain the tests to assess detoxification function of liver. (2.5+2.5)
4. Describe the mechanism of phagocytosis and pinocytosis. Mention its biomedical importance (2+2+1)
5. Explain the tertiary and quaternary structural organisation of proteins with suitable examples. (2.5+2.5)
6. Define & Classify Lipids with suitable examples. Add a note on Phosphotidyl inositol. (1+3+1)
7. What are Ampholytes? Explain the term Isoelectric point and its significance.(1+2+2)
8. What are subcellular marker enzymes? Enumerate various marker enzymes for subcellular organelles. (1+4)
9. Classify complex lipids and explain their biomedical importance. (3+2)
10. What are the different types of RNAs? Describe the role of rRNAs in translation. (1+4)
11. A 55 year old Male alcoholic reached to the hospital with complaint of severe abdominal pain after lavish cocktail party. He also had severe vomiting and nausea. The following are the results of laboratory investigations Serum Amylase- 480 IU/dL (Reference Range 23-85 IU/L) a) What is the probable diagnosis? b) What is the reason for increased serum Amylase? c) Which is the other enzyme likely to be raised along with serum amylase? d) List any two other biochemical investigations done in chronic alcoholism. (1+1+1+ 2)
12. Name nucleoside and nucleotides of adenine and cytosine. Write their importance.

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

13. List any two synthetic analogues of purine bases and mention its clinical application.
14. What is Precision and Accuracy?
15. What is FIGLU excretion test? Mention its use.
16. What are essential amino acids? Name them.
17. What is Respiratory Quotient? Give RQ value for carbohydrates, proteins and lipids.
18. What are derived proteins? Give two examples.
19. What is lecithin? Write its biomedical importance.
20. What are Ionophores? Give two examples
21. Mention two purines of plant origin and give their clinical significance.
22. Mention the different types of RNA and write their functions.



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BIOCHEMISTRY- PAPER 2

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LONG ESSAY ***2 X 10 = 20 Marks***

1. Write the reference values for Fasting and Post Prandial blood glucose. Explain the hormonal regulation of blood sugar. (2+8)
2. Name the Aromatic amino acids. Describe the Steps involved in the metabolism of Amino acid causing Phenyl Ketonuria. Name any two tests for diagnosis of Phenyl ketonuria (1.5 + 6.5 +2)

SHORT ESSAY ***10 X 5 = 50 Marks***

3. What are oxygenases? Classify and give example for each. (1+4)
4. Define & describe transamination of Aminoacids with examples. Add a note on biomedical importance of transaminases.(1+3+1)
5. Write the Biological reference values of Sodium, Potassium and Chloride. How is Potassium Regulated in the biological system?(3+2)
6. Define Gluconeogenesis. Name the substrates for Gluconeogenesis. Justify why gluconeogenesis is not just the reversal of glycolysis. (1+1+3)
7. Describe the role of oncogenes and anti oncogenes in the development of cancer. Add a note on the growth factors. (2+2+1)
8. Define PCR. Explain the steps of PCR. (1+4)
9. What is the normal blood pH? Explain the respiratory mechanism by which acid-base balance is regulated in the body.
10. Describe the salient features & components of Fatty acid synthase complex (2+3)
11. Write the different DNA repair mechanisms. Add a note on diseases associated with DNA repair mechanism. (3+2)
12. Define genetic code. Describe the characteristics of genetic code. (1+4)

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

13. Define gene therapy and write its application.
14. Mention the sources and factors affecting abosorption of Iron.
15. Mention the sites of ATP synthesis in oxidative phosphorylation.
16. What is McArdle's disease? Mention the enzyme defect and clinical feature.
17. What is the Biological reference range of serum calcium levels? Write any four biochemical functions of Calcium.
18. What is Alkaptonuria? Mention the enzyme defect.
19. List any 3 functions of zinc. Mention the deficiency manifestation of Zinc.
20. List three biologically important compounds derived from Glycine & mention their functions.
21. Mention any three functions of copper.
22. How Inosine monophosphate is synthesized?

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Time:2.30 hours **Max Marks:80**

BIOCHEMISTRY- PAPER 1

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

LONG ESSAY ***2 X 10 = 20 Marks***

1. Define Enzymes. Classify enzymes. Give two examples for each class and the reaction catalyzed by them. (1+5+4)
2. Name anitoxidant vitamins. Describe the sources,RDA,biochemical functions and deficiency manifestations of any one of them. (1+1+1+4+3)

SHORT ESSAY ***6 X 5 = 30 Marks***

3. Describe the reactions catalyzed by Pyruvate Dehydrogenase complex. Write the significance of this complex. (3+2)
4. Write any six biochemical functions and mention the deficiency manifestations of ascorbic acid. (3+2)
5. Define BMR. Mention the normal levels BMR. Explain briefly the measurement of BMR(1+1+3)
6. Describe procedure and interpretation of oral GTT (2+3)
7. What are disaccharides? Classify them with examples. Add a note on reducing disaccharides. (1+2+2)
8. Write the Biological reference range of Blood Urea. Write the steps of detoxification of Ammonia (1+4)

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

9. How do you classify amino acids based on the metabolic fate? Give examples.(2+1)
10. Define Stereoisomers. Give two examples
11. Write the composition and function of a) Chondroitin sulphate acid b) Dermatan Sulphate
12. Justify why Folic acid and cobalamin are mostly prescribed together for megaloblastic anaemia.
13. Mention the role of carbohydrates present in plasma membrane.
14. Write three difference between active & passive transport with suitable examples.
15. List 3 biological functions of Pyridoxal Phosphate.
16. Define dipeptide, tripeptide and pentapeptide. Give examples for each.
17. Name any two amino acids which are not involved in protein synthesis and mention any one function of them
18. Define communication. List four barriers to communication. (1+2)

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BIOCHEMISTRY- PAPER 2

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LONG ESSAY ***2 X 10 = 20 Marks***

1. Define pH. Write the normal blood pH? List the various mechanisms in our body to regulate blood pH. Explain any one (1+1+3+5)
2. Define lipoproteins. Classify lipoproteins. Explain the mechanism of reverse cholesterol transport by HDL.(1+3+6)

SHORT ESSAY ***6 X 5 = 30 Marks***

3. Define Genetic Code. Write its salient features (1+4)
4. Write the biological reference of Blood Calcium. How is it regulated? (1+4)
5. What are steroids? Give the structure of cholesterol. Name the biologically important compounds derived from cholesterol. (1+2+2)
6. List the inhibitors of DNA Replication. Add a note on its mechanism of action. (2.5+2.5)
7. Describe the structure of Fatty acid synthase multi enzyme complex. Write its significance (4+1)
8. Describe the Watson-Crick Model of DNA with a neat labeled diagram.

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

9. Mention the different types of RNA. Add a note on its function (1.5+1.5)
10. What are porphyrias? Give two examples with their enzyme defect (1+2)
11. Name the thyroid hormones. Add a note on the Clinical features and Biochemical abnormalities in Hypothyroidism (1.5 +1.5)
12. List the functions of Liver. Write the principle of Vanden Bergh test (2+1)
13. Write the Biological reference values of serum Sodium, Potassium and Chloride. (1+1+1)
14. What is the function of lipoprtein lipase? Give two examples of lipoprotein lipase
15. Define uncouplers. Give two examples. (1+2)
16. Write the causes and clinical features of Fluoride toxicity? (1.5+1.5)
17. What are second messengers? Give any two examples.
18. What are tumor markers? Give two examples

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Time:30 minutes **Max Marks:20**

BIOCHEMISTRY- PAPER 1

Multiple Choice Questions ***1 X 20 = 20 Marks***

1. Digestion of starch is incomplete in mouth because
   a) salivary pH is not ideal for enzyme action
   b) inadequate time for enzyme action
   c) inadequate exposure of substrate to enzyme
   d) no polysaccharidase is present in saliva

2. Gamma-aminobutyric acid is derived from
   a) tyrosine
   b) tryptophan
   c) glutamic acid
   d) serine

3. Number of ATP molecules utilized in aerobic glycolysis are
   a) 2
   b) 4
   c) 6
   d) 8

4. Active form of vitamin D is
   a) 7 dehydrocholecalciferol
   b) 25-OH cholecalceferol
   c) ergosterol
   d) calcitriol

5. The Hypoglycemic effect of insulin is brought about by
   a) increasing uptake of glucose in extra hepatic tissue
   b) increasing the synthesis of glycogen
   c) decreasing gluconeogenesis
   d) all of the above

6. Homogentisic acid is excreted in urine in
    a) phenylketonuria
    b) maple syrup urine disease
    c) tyrosinosis
    d) alkaptonuria

7. Anti-vitamin of folic acid is
    a) aminopterin
    b) dicoumarol
    c) pyrithiamine
    d) isoniazid

8. The vitamin required for formation of Hydroxyproline found in collagen is
    a) vitamin C
    b) vitamin A
    c) vitamin D
    d) vitamin E

9. Rennin acts on casein of milk in infants in presence of
    a) Mg^{2+}
    b) Zn^{2+}
    c) Co^{2+}
    d) Ca^{2+}

10. Example for Ketogenic amino acid is
    a) leucine
    b) isoleucine
    c) tyrosine
    d) tryptophan

11. A thirty years male patient a known alcoholic presented to the hospital with complaints of sudden onset of severe abdominal pain,nausea and vomiting after a cock tail party. He was diagnosed with acute pancreatitis. The enzyme elevated in acute pancreatitis is
    a) aldolase
    b) AST
    c) ALT
    d) amylase

12. A 35 years old farmer in a village whose staple diet for several years was maize and jowar. He later developed chronic diarrhea, dermatitis on exposure to the sunlight and associated symptoms such as delirium and loss of memory. The symptoms are due to deficiency of
    a) thiamine
    b) niacin
    c) pantothenic acid
    d) pyridoxine

13. The monosaccharide units are linked by α-1-4 glycosidic linkage in
    a) maltose
    b) sucrose
    c) cellulose
    d) cellobiose

14. Imidazole ring is present in
    a) arginine
    b) threonine
    c) histidine
    d) valine

15. Lysine is not required for the synthesis of
    a) collagen
    b) cadaverine
    c) carnitine
    d) carnosine

16. In a racemic mixture
    a) D & L forms are equal
    b) D is more than L
    c) L is more than D
    d) only D form is present

17. Anti Tubercular drug Isoniazid leads to the deficiency of
    a) thiamine
    b) vitamin B12
    c) riboflavin
    d) pyridoxine

18. The polysaccharide used in assessing the glomerular filtration rate is
    a) glycogen
    b) agar
    c) inulin
    d) hyaluronic acid

19. A 10 year old girl was found to have normal blood sugar levels but urine test was positive for reducing sugars. When urine was specifically tested for glucose it was negative. However, Urine Bials test was positive. She was diagnosed with Essential pentosuria which is due to the deficiency of
    a) fructokinase
    b) xylitol dehydrogenase
    c) phospho fructokinase
    d) galactose 1 phosphate

20. Epinephrine is derived from
    a) tyrosine
    b) tryptophan
    c) glutamic acid
    d) serine

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BIOCHEMISTRY- PAPER 2

Multiple Choice Questions ***1 X 20 = 20 Marks***

1. Vasopressin
   a) enhances reabsorption of water from kidney
   b) decreases reabsorption of water
   c) increases excretion of calcium
   d) decreases excretion of calcium

2. The molecule which is not synthesised by liver is
   a) immunoglobulins
   b) albumin
   c) cholesterol
   d) lipoproteins

3. Morphine Poisoning causes
   a) metabolic acidosis
   b) respiratory acidosis
   c) metabolic alkalosis
   d) respiratory alkalosis

4. A 45 year old male collapsed on the road side and was brought to an emergency department. Blood chemistry revealed the following;
   pH: 7.51, PCO_2: 35mmHg, PO_2: 62 mmHg, HCO_3: 27 mEq/L.
   The most appropriate acid- base imbalance in the above said condition is
   a) metabolic acidosis
   b) metabolic alkalosis with respiratory acidosis
   c) respiratory alkalosis with metabolic compensation
   d) metabolic alkalosis with respiratory alkalosis

5. A 43 year male presented to the physician complaining of chest pain and shortness of breath on exertion. He reported that his father had died due to heart attack at the age of 45 years and his elder brother also had a heart attack at 46 years, he was treated and is on medications. The physical examination and vitals were within the reference range. Physician ordered an electrocardiogram, exercise stress test and blood work up for lipid profile. The patient's lipid profile showed serum total cholesterol of 350mg/dL. The physician prescribed him statins. Statins inhibit the enzyme
   a) HMG CoA lyase
   b) HMG CoA reductase
   c) HMG CoA synthase
   d) Thiolase

6. A malnourished mother delivered a preterm infant, who developed difficulty in breathing. The baby was diagnosed by the neonatologist with Respiratory distress syndrome, which is caused by deficiency of
    a) Sphingomyelin
    b) Plasmalogen
    c) Cardiolipin
    d) Dipalmitoyl lecithin

7. A 40 year old female was brought to the hospital in a comatose state. On examination she was dehydrated and with characteristic breathing pattern and a sweet smell on her breath. Lab investigations revealed the presence of Ketone bodies in urine. Biochemical test used to detect ketone bodies in urine is
    a) Benedicts test
    b) Hay's test
    c) Rothera's test
    d) Fouchet's test

8. A 14 year old African boy was admitted to a medical college with complaints of fever and severe body pains. On examination, Hepatosplenomegaly was detected. Lab investigations revealed haemoglobin levels were low(6.0g/dL). Microscopic examination of blood smear revealed sickle shaped RBC. Haemoglobin Electrophoresis showed a distinct HbS band with slower movement than that of adult haemoglobin(HbA1). Probable diagnosis was sickle cell anaemia. The following changes is considered to be the underlying biochemical lesion causing sickle cell disease
    a) glutamate is replaced by valine at the ninth position of α -chain
    b) valine is replaced by glutamate at the ninth position of α -chain
    c) glutamate is replaced by valine at the sixth position of β -chain
    d) valine is replaced by glutamate at the sixth position of β -chain

9. Hypothyroidism is characterized by
    a) Decreased T_3 levels
    b) Decreased TSH levels
    c) Weight loss
    d) Increased basal metabolic rate

10. Nucleosome is
    a) synonym of nucleolus
    b) DNA-RNA complex present in nucleus
    c) mRNA attached with SnRNA
    d) DNA wrapped around Histones

11. A 55 years aged truck driver was admitted to the hospital with complains of tiredness, weakness, nausea, yellowish discolouration of skin and drastic weight loss. Lab results revealed positive for HIV test. Blotting Technique used in the laboratory for testing HIV is:
    a) Dot blot
    b) Northern blot
    c) Southern blot
    d) Western blot

12. A 6 year old boy was presented to the hospital with complaining of failure to develop, hypotonia, aggressive behaviour, joint pains and self mutilating behavior. On examination there was testicular atrophy and hematuria. Biochemical investigations revealed increased concentration of serum uric acid (10.00 mg/dL).
The most probable diagnosis is
    a) Lesch - Nyhan syndrome
    b) Severe combined immunodeficiency
    c) Gouty arthritis
    d) Orotic aciduria

13. The major fat in adipose tissue is
    a) Phospholipid
    b) Cholesterol
    c) Sphingolipids
    d) Triacyl glycerol

14. A 12 year child was brought to the hospital with puffiness of face, pitting pedal odema, decreased urine output, fever and was treated with steroids and antibiotics. On examination, he was febrile, BP 140/94 mm Hg, pulse 92/min, regular. Biochemical evaluation revealed: urine proteins +++, serum albumin 2.0 g/dL, serum cholesterol 280 mg/dL, serum Creatinine 2.0 mg/dL, blood urea 120mg/dL. Serum electrophoresis showed increased alpha-2 band.
The probable diagnosis is
    a) Nephritis
    b) Nephrotic syndrome
    c) Acute renal failure
    d) Chronic renal failure

15. A 64 yrs old man presented with complaints of frequent episodes of dizziness and numbness in his legs. During a routine history and physical examination, the patient was obese with BMI of 32, BP of 200/120 mmHg, Lab investigations showed high fasting blood sugar, Dyslipidemia, Hyperinsulinemia and Glucose tolerance test showed Glucose intolerance. The patient was diagnosed as Insulin Resistance Syndrome. Insulin Hormone is known to act specially through the following receptor
    a) Receptor that activates guanylyl cyclase
    b) Hormone response elements
    c) Receptor with tyrosine kinase activity
    d) Receptor that activates adenylate cyclase

16. A major constituent of lung surfactant is
    a) Sphingomyelin
    b) Plasmalogen
    c) Cardiolipin
    d) Dipalmitoyl lecithin

17. A 60 year male was brought to the emergency department with complains of headache and dizziness. His blood pressure (BP) was 180/120 mm Hg and was treated for the hypertension with intravenous nitroprusside for 48 hours. His BP was restored to normal, however, he complained of burning sensation in the throat followed by nausea

and vomiting, excessive sweating and dyspnoea. There was a sweet almond smell in his breath and arterial blood gas analysis revealed metabolic acidosis. The person was suspected to be with cyanide toxicity. Immediately he was treated with nitrites. Nitrites acts by converting

a) Ferrihaemoglobin into ferrohaemoglobin
b) Ferrohaemoglobin into ferrihaemoglobin
c) Methaemoglobin into carboxyhaemoglobin
d) Carboxyhaemoglobin into methaemoglobin

18. Example for trace element with an antioxidant role is
    a) Chromium
    b) Zinc
    c) Selenium
    d) Nickel
19. A 23 year old man was diagnosed with metastatic liver disease. The grain storage facility outside his house was contaminated with aflatoxin- B. The following might act as a carcinogen in the development of patient's cancer is
    a) Human T- cell lymphotropic virus
    b) Hepatitis- B virus
    c) Asbestos
    d) Aniline dyes

20. DNA Oncogenic virus is
    a) Acute transforming virus
    b) Hepadnavirus
    c) Slow transforming virus
    d) Human T- cell lymphotropic virus