D 90685 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION NOVEMBER 2020

(CUCSS)

Biochemistry

BC 3C 08—MOLECULAR BIOLOGY, GENETIC ENGINEERING, PATENTING AND IPR

(2013 Admissions)

Time : Three Hours Maximum : 36 Weightage

Section A

Answer any **fourteen** *questions.*
Each question carries a weightage of 1.

1. Identify the different types of histones associated with DNA.
2. Other than nucleus, where else is DNA present ?
3. Identify the start and stop codons of bacterial genetic code.
4. What are restriction endonucleases ?
5. How is mRNA different from a primary transcript ?
6. Identify the important role of Taq polymerase in PCR.
7. What is the difference between PCR and RT-PCR ?
8. Write the principle of electroporation.
9. List two important properties of a good cloning vector.
10. Write the purpose of site directed mutagenesis.
11. What is the principle of RFLP ?
12. List the physical properties of siRNA.
13. Define a patent.
14. Differentiate between trade secret and copy right.
15. What is meant by intellectual property right ?
16. Mention the role of FDA in patenting.

(14 × 1 = 14 weightage)

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Section B

Answer any **seven** *questions.*
Each question carries a weightage of 2.

17. Identify the different types of RNA.
18. What are topoisomerases ? Write their role in DNA replication.
19. What are DNA libraries ? Explain their types and applications.
20. Explain the principle and procedure of quantitative PCR.
21. What is western blotting ? Explain the applications of this technique.
22. Explain RNA interference technology.
23. Comment on the ethical issues with interfering with natural process.
24. Write a short essay on patentability of micro-organisms.
25. Comment on the implications of GATT and TRIPS on intellectual property right.

(7 × 2 = 14 weightage)

Section C

Answer any **two** *questions.*
Each question carries a weightage of 4.

26. Explain in detail the process of DNA replication and the differences in prokaryotes and eukaryotes.
27. Give a detailed account on the process of gene transcription and their regulation.
28. Write an essay on the different methods of DNA introduction into a host cell.

(2 × 4 = 8 weightage)

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D 90971 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION NOVEMBER 2020

(CBCSS)

Biochemistry

BCH 3E 02—PROTEIN CHEMISTRY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Weightage 2 *each.*

1. Define Km value of an enzyme and mention its significance.
2. Write a short note on allosteric enzymes.
3. Mention one amino acid derivative and its function.
4. Write the role of tetra methyl ethylene diamine in electrophoresis.
5. Define active site of an enzyme and write its characteristics.
6. Name different protein databases.
7. Write the principle of circular dichroism.

(4 × 2 = 8 weightage)

Part B (Short Essays)

Answer any **four** *questions.*
Weightage 3 *each.*

8. Illustrate the separation of organelles by using ultracentrifugation.
9. Derive Lineweaver Burk equation and draw the L-B plot for competitive inhibition.
10. What are the major forces involved in primary, secondary and tertiary structure of protein ?

Turn over

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11. Write a note on different types of protein.
12. Elaborate on structural determination of a protein by using X-ray diffraction technique.
13. Describe cyclic peptides and their functions.
14. Write short note on enzyme immobilization and its applications.

(4 × 3 = 12 weightage)

Part C (Long Essays)

Answer any **two** *questions.*
Weightage 5 *each.*

15. Describe 2D gel electrophoresis for the separation of proteins.
16. Write an essay on Surface Plasmon Resonance method of protein analysis.
17. Explain different types of ELISA.
18. Give an account of chemical structures and classification of amino acids.

(2 × 5 = 10 weightage)

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D 90967 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION NOVEMBER 2020

(CBCSS)

Biochemistry

BCH 3C 01—METABOLIC REGULATION AND BIOENERGETICS

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Weightage 2 *each.*

1. State the rate limiting reaction in glycogenolysis.
2. Name two inhibitors of ETC and their site of inhibition.
3. Why ATP is called the energy currency ?
4. Compare anaplerosis and cataplerosis.
5. State an example for a redox reaction in biological system.
6. Name two physiologically active products of amino acid decarboxylation.
7. How is fructosuria different from fructose intolerance ?

(4 × 2 = 8 weightage)

Part B (Short Essays)

Answer any **four** *questions.*
Weightage 3 *each.*

8. Describe the significance of Cori cycle.
9. Detail on the formation of energy yielding ketone bodies.

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10. How is the rate limiting enzyme of glycolysis regulated ?
11. Briefly explain the regulation of citric acid cycle.
12. Describe the synthesis of triglycerides.
13. ATP formed by oxidation of $FADH_2$ is lesser compared to that of NADH. Why ?
14. How is isocitrate dehydrogenase significant in the context of regulation in plants ?

(4 × 3 = 12 weightage)

Part C (Long Essays)

Answer any **two** *questions.*

Weightage 5 *each.*

15. Describe the steps involved in metabolism of fructose and galactose.
16. Oxidative phosphorylation is coupled to ETC. Explain.
17. Brief on high energy phosphate compounds.
18. Describe the synthesis of heme.

(2 × 5 = 10 weightage)

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D 90968 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION NOVEMBER 2020

(CBCSS)

Biochemistry

BCH 3C 02—PHYSIOLOGY AND ENDOCRINOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Each question carries a weightage of 2.

1. Define Haematopoiesis.
2. Write about hypoxia and cyanosis.
3. Write the biochemical cause of rigor mortis.
4. Brief on the role of lung surfactants with an example.
5. Write a short note on cell surface receptors.
6. Name any *four* pituitary hormones and its specific site of production in the gland.
7. Write a short note on congenital adrenal hyperplasia.

(4 × 2 = 8 weightage)

Part B (Short Essays)

Answer any **four** *questions.*
Each question carries a weightage of 3.

8. Write about the structure and functions of a muscle cell.
9. Give a brief account of different types of disorders related to thyroid hormone.
10. Explain the mechanism of nerve impulse transmission.

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11. Brief on G-protein coupled receptors.
12. Discuss about any two diseases related to digestion and absorption of food.
13. Brief on gaseous exchange in lungs.
14. Discuss the role of blood buffers in maintaining homeostasis.

(4 × 3 = 12 weightage)

Part C (Long Essays)

Answer any **two** *questions.*
Each question carries a weightage of 5.

15. Describe the mechanism of blood coagulation.
16. Give a detailed account of disorders related to pituitary hormone.
17. Discuss in detail the structure of eye and physiology of vision.
18. Give a detailed account of different types of second messengers in hormonal action.

(2 × 5 = 10 weightage)

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D 90969 **(Pages : 2)** **Name.....**

Reg. No.....

THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION, NOVEMBER 2020

(CBCSS)

Biochemistry

BCH 3C 03—GENETICS, RDNA TECHNOLOGY AND IPR

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Each question carries 2 *weightage.*

1. What is Conjugation?
2. What is Bioremediation ?
3. Define Cloning.
4. Give four examples of secondary metabolites.
5. What is a cell line ?
6. Explain the term 'knock out'.
7. Define the term 'patent'.

(4 × 2 = 8 weightage)

Part B (Short Essays)

Answer any **four** *questions.*
Each question carries 3 *weightage.*

8. Discuss on Mendel's laws of Inheritance.
9. Write short notes on gene transfer methods.

Turn over

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10. Write briefly on Hybridoma technology.
11. Discuss on genetically modified foods.
12. Give an acocunt on bio-fertilizers.
13. Discuss on UPOV Convention.
14. Give a brief note on TRIPS agreement.

(4 × 3 = 12 weightage)

Part C (Long Essays)

Answer any **two** *questions.*
Each question carries 5 *weightage.*

15. Give a detailed account on chromosomal aberrations.
16. Discuss in detail Recombinant DNA Technology.
17. Outline the large scale production of antibiotics and enzymes using transgenic technology.
18. Write an essay on the patent system.

(2 × 5 = 10 weightage)

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D 90970 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION NOVEMBER 2020

(CBCSS)

Biochemistry

BCH 3E 01—NEURO BIOCHEMISTRY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Each question carries a weightage of 2.

1. What is a Neuron ? Write its structural features.
2. What is the function of myelin sheath ?
3. Define the term 'neurotransmitter'.
4. Explain the characteristics of Blood brain barrier.
5. What is synapse ?
6. Explain the term 'dementia'
7. What are neurotoxic agents ?

(4 × 2 = 8 weightage)

Part B (Short Essays)

Answer any **four** *questions.*
Each question carries a weightage of 3.

8. Discuss on the relation between CSF and Blood.
9. Write short notes on the role of nervous system in homeostasis.
10. Write briefly on pre and post synaptic events.

Turn over

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11. Discuss on the function of nervous neurotransmitters.
12. Give an account on hallucinogenic agents.
13. Discuss on muscular dystrophies.
14. Give a brief note on the electrophysiology of channels.

(4 × 3 = 12 weightage)

Part C (Long Essays)

Answer any **two** *questions.*
Each question carries a weightage of 5.

15. Give an account on the chemical composition of brain.
16. Discuss in detail the propagation of nerve impulse.
17. Outline the mechanism of neuronal integration.
18. Write an essay on neurodegenerative disorders.

(2 × 5 = 10 weightage)

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D 91437 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3C 03—MOLECULAR BIOLOGY AND GENETICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions in two* **or** *three sentences.*
Each question carries 2 marks.

1. What is Cistron ?
2. Define chromosome walking.
3. Explain Hardy Weinberg theory.
4. Differentiate between linkage and crossing over.
5. Explain cytoplasmic inheritance.
6. What is meant by Fluctuation test ?
7. List out the chemical agents which causes mutation.
8. What is Ames test ?
9. How will you differentiate base excision repair and mismatch repair ?
10. Mention different types of DNA damages.
11. Define Transposons.
12. Define gene silencing.
13. What is meant by Holiday junction ?
14. Define Operon.
15. Mention the proteins involved in homologous recombination in E.coli.
16. What is the difference between σ and θ replication ?

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17. Explain what is mRNA splicing ?

18. What is the functions of topoisomerase ?

19. Define Okasaki Fragment.

20. What is the importance of teloisomerase ?

(20 × 2 = 40 marks)

Section B

Answer any **five** *of the following.*
Each question carries 8 *marks.*

21. Explain the process of Translation in prokaroytes. Mention any *five* differences from eukaryotic translation.

22. (a) Briefly explain the process of regulation of gene expression in Lac Operon.

    (b) Explain monohybrid inheritance with suitable example.

23. Write an essay on gene mapping.

24. Describe the processing of mRNA in eukaryotes.

25. Explain the molecular mechanism of mutation.

26. Discuss the genetic basis of Sex determination and dosage compensation in Drosophila.

27. Give an account on pedigree analysis and its significance in family studies.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 91440 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3C 01—METABOLISM AND REGULATION

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are isomerisation reactions. Give an example.
2. What is a metabolic pathway database ? Give two examples.
3. Give an account of Maple syrup urine disease.
4. What is the reaction catalysed by 5 lipoxygenases (5 LOX) ?
5. Define metabolic flux.
6. Give an account of lactose intolerance.
7. How is nitric oxide biosynthesised ?
8. What are Lipoxins ?
9. What are Uncouplers ? Give examples.
10. What is a Proteosome ?
11. Explain the role of inorganic polyphosphates.
12. Outline the biosynthesis of serotonin.
13. What is the role of carnitine ?
14. Name the enzymes and cofactors present in pyruvate dehydrogenase complex.

Turn over

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15. Name two inhibitors of ATP synthesis and explain their site of action.

16. How does glycogen enter the glycolytic pathway ?

17. Outline the synthesis of serine.

18. What is the biochemical cause for Alkaptonuria ?

19. What is the function of leukotrienes ?

20. Name the three ketone bodies ? How are they formed ?

(20 × 2 = 40 marks)

Part B (Essay Types)

Answer any **five** *questions.*
Each question carries 8 *marks.*

21. Write an essay on inherited disorders of lipid metabolism.

22. Write an essay on the organization of electron transport chain and the sites of ATP production.

23. Describe the regulation of glycolytic pathway.

24. Describe regulation of cholesterol metabolism.

25. Write an essay on the various experimental approaches to study metabolism.

26. Give an account of one carbon metabolism associated with amino acid and nucleic acid metabolism.

27. Give an account of glycogen metabolism.

(5 × 8 = 40 marks)

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D 91441 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3C 02—PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *the following in 2* **or** *3 sentences each.*
Each question carries 2 marks.

1. Mention the role of cryptochrome.
2. Define photoperiodism and name the hormone that responsible for photoperiodism.
3. How is glucose reabsorbed in proximal tubules ?
4. Name the hormone that stimulates the production of ethylene and from where is it derived ?
5. Mention the functions of auxin.
6. Write down structure of 2,3-bisphosphoglycerate and give its importance in hypoxia.
7. Differentiate skeletal and smooth muscle.
8. Define transport maximum.
9. Give the importance of acetyl choline as neurotransmitter.
10. List the hormones secreted by enterochromaffin cells of the pancreas and give their function.
11. Mention the different types of blastula.
12. Give the fate of ectoderm layer.
13. Mention role of Wnt protein in the development of organs.
14. What are differences among autonomous, conditional and syncytial specifications ?
15. Give the structure of female gametophyte.
16. How will plants control the timing of developmental transitions ?
17. What is cross pollination ?
18. What is the difference between cell cycle and cell division ?
19. Differentiate monocotyledon and dicotyledon plants germination.
20. What are the genes involved in pattern formation ?

(20 × 2 = 40 marks)

Turn over

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Section B

Answer any **five** *of the following.*
Each question catties 8 *marks.*

21. Describe the calvin cycle or dark reaction.
22. Elaborate on phytochrome mediated photomorphogenesis in plants.
23. Discuss on characteristics and functions of connective tissues.
24. Explain the regulation of body pH.
25. Describe the sequence of events of the sperm's journey in fertilization.
26. Give the explanation for different stages of early embryonic development.
27. Discuss on leaf and flower development of higher plants.

(5 × 8 = 40 marks)

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D 91442 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3C 03—MOLECULAR BIOLOGY AND GENETICS

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A (Short Answers)

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Compare the actions of DNA polymerase and RNA polymerase.
2. Name a physical mutagen and explain its mode of action.
3. Differentiate between point mutation and frame shift mutation.
4. What are split genes ?
5. What is the action of telomerases ?
6. Explain end replication problems of linear DNA.
7. What do you mean by abortive initiation in transcription ?
8. Origins of DNA replication are rich in AT base pairs. True *or* False ? Justify your answer.
9. Differentiate between replicative and non-replicative transposons.
10. Give an account of fluctuation test.
11. Explain hypermutation with an example.
12. What is the function of ligase ?
13. What do you mean by extra chromosomal inheritance ?
14. What is the significance of ter sites ?
15. What is a pedigree analysis ? What are its applications in humans ?
16. Differentiate between dominant traits and recessive traits.

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17. Why did Mendel choose pea plant as the model and not humans ?

18. Give an account of cytoplasmic male sterility.

19. What is the ribozymal activity of ribosome ?

20. What are the characteristics of IS elements ?

(20 × 2 = 40 marks)

Part B (Essay Types)

Answer any **five** *questions.*
Each question carries 8 *marks.*

21. Describe the various steps of the transcription in prokaryotes.

22. Describe regulation of replication.

23. Write an essay on recombination.

24. Explain different mechanisms for the reversal of DNA damage.

25. Give an outline of human genome project.

26. Explain initiation of translation in eukaryotes.

27. Describe processing of mRNA in eukaryptes.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 91444 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3E 02—CANCER BIOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions in two* **or** *three sentences.*
Each question carries 2 *marks.*

1. What are the major stress that drive the formation, progression and metastasis of cancer ?
2. What are the tumor associated plasma micro RNAs in cancer ?
3. What are the main causes of cancer ?
4. Why is cell cycle important to cancer biology ?
5. Which chromosome alteration causes retinoblastoma ?
6. Mention any four cell lines.
7. Name the genes which directly inhibit cell growth or promote cell death.
8. Which gene arrest the cell cycle if DNA is damaged ?
9. Name the chemical carcinogen which causes prostate cancer.
10. What is the origin of cancer cells ?
11. What is the important characteristic of cancer cell ?
12. Name the process of transition from normal cells to cancerous cells ?
13. What are the difference between Oncogenes and Tumor suppressor genes ?
14. What is retroviral genes ?
15. Mention the role of Telomerase in cancer.
16. What is metastasis ?
17. What is cell-cell interaction ?
18. What is Paraneoplastic syndrome ?
19. What is epigenetic silencing ?
20. What is etiology ?

(20 × 2 = 40 marks)

Turn over

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Section B

Answer any **five** *of the following.*
Each question carries 8 *marks.*

21. What are the 'hallmarks of cancer ? What features of cancerous cells allow them to evade the body and autonomous cellular mechanisms to prevent cancer ?

22. Discuss the recent trends in cancer biology ?

23. Explain the historical perspective of Cancer.

24. Discuss the cell signalling pathways associated with Cancer.

25. Write about the role of P_{53} gene molecular oncology.

26. Discuss the different forms of cancer therapy and describe the strategies of anticancer Immune therapy.

27. Describe apoptosis in Cancer Biology.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 91446 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2020

(CCSS)

M.Sc. Biochemistry

BCH 3E 04—NUTRITION AND NUTRIGENOMICS

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A (Short Answers)

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Differentiate between visible and invisible fat.
2. List the essential fatty acids. Why it is not synthesized in our body ?
3. Write the biochemical cause of Lathyrism.
4. Name two Vitamin A responsive genes.
5. What are SREBPs ?
6. Write the role of Vitamin K in blood coagulation.
7. Relate between phenotypic instability and diseases.
8. List four physiological fictions of Vitamin C.
9. Brief on the role of zinc in genomic machinery.
10. Write the significance of folate in early stages of pregnancy.
11. List any *four* conditions leading to an increase in BMR.
12. Relate nutrition and inflammation with an example.
13. Write any *four* nutritional aspects of lipids.
14. What are incomplete proteins ? Give an example.
15. List out the significance of dietary fibre.
16. What causes negative nitrogen balance ? Give two such situations.

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17. Define protein efficiency ratio.

18. Write the symptoms of nutritional marasmus.

19. Define BMI. Relate BMI and health risk.

20. Write a short note on epigenetics.

(20 × 2 = 40 marks)

Part B (Essay Types)

Answer any **five** *questions.*
Each question carries 8 *marks.*

21. Explain phase-II reactions in Xenobiotic metabolism.

22. Discuss about the physiological aspects in the regulation of food intake.

23. Give an account on nutrient regulated transcription factors.

24. Discus about the role of seleno proteins in genomic machinery.

25. Explain the role of diet in the development of cancer.

26. Discuss about genetic buffering mechanisms.

27. Give a detailed account of protein-energy malnutrition diseases.

(5 × 8 = 40 marks)

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