C 20527 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Biochemistry

BCH 6B 16—MOLECULAR ENDOCRINOLOGY

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. Define signal transduction
2. What are the causes of hypothyroidism ?
3. What are hormones ?
4. What are the functions of thyroxine ?
5. Write short note on ELISA
6. Name any *four* hormones synthesized by anterior pituitary.
7. What is the chemical nature of progesterone ?
8. What is acromegaly ?
9. What are the functions of gastrin ?
10. Name the cells present in islets of Langerhans ? Which hormone is secreted by each of them ?
11. Draw the structure of cAMP
12. What is diabetes mellitus ?

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. What are the different classes of hormones ? Explain with suitable examples ?
14. Describe the functions and properties of growth hormone.
15. What are second messengers ? Explain any *two* classes of second messengers with suitable examples.
16. Discuss the feedback regulations with suitable examples.
17. Why are hypothalamus and pituitary known as master regulatory glands ?
18. Briefly explain the salient features of G protein coupled receptors.
19. Explain the role of tyrosine kinases in signal transduction ?

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. Critically examine the synthesis, secretion, transport, metabolic fate and biological actions of glucocorticoids ?
21. Give an account of chemical nature and functions of Gastrointestinal hormones.

(1 × 11 = 11 marks)

C 20526 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Biochemistry

BCH 6B 15—RECOMBINANT DNA TECHNOLOGY

(2019 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

Section A

Answer atleast **ten** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 30.

1. Define Cosmids.
2. How are restriction enzymes named ?
3. Name the tools of recombinant DNA technology.
4. What are the salient features of BAC ?
5. Mention the function of Ti plasmid. Name the source organism from which it is isolated.
6. Write any two differences between genomic library and cDNA library.
7. What is lipofection ?
8. What is a DNA probe ?
9. Write down the applications of western blotting.
10. Define transgenic plants.
11. What are the uses of DNA sequencing ?
12. What are the conditions required for cell line growth ?
13. Give examples of human cell lines.
14. What are knockout animals ?
15. Gene transfer in plants.

(10 × 3 = 30 marks)

Turn over

Section B (Short Answers)

Answer atleast **five** *questions.*
Each question carries 6 *marks.*
All questions can be attended.
Overall Ceiling 30.

16. Describe the strategies for constructing genomic libraries.
17. What are the properties of a cloning vector ? Discuss about plasmid based cloning vectors.
18. List out some examples of transgenic plants developed for therapeutic purposes.
19. What is gene therapy and how many types of gene therapy are there and what are they ?
20. Brief note on biosafety issues of GM food.
21. What are the properties and applications of artificial chromosomes ?
22. Discuss the principle, applications and method of PCR technique.
23. Describe RFLP in detail.

(5 × 6 = 30 marks)

Section C (Essay)

Answer any **two** *questions.*
Each question carries 10 *marks.*

24. Define recombinant DNA technology and briefly describe the steps carried out during the process.
25. Explain the steps of Southern blotting in detail with labeled diagrams.
26. Discuss the methods for creating transgenic animals.
27. What is DNA sequencing ? Give a detailed account on enzymatic method of DNA sequencing.

(2 × 10 = 20 marks)

C 20525 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Biochemistry

BCH 6B 14—CLASSICAL GENETICS AND MOLECULAR BIOLOGY

(2019 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

Section A

Answer at least **ten** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 30.

1. Give a brief description of law of segregation.
2. What is incomplete dominance ? Give an example.
3. Identify and comment on the type of genetic abnormality in a human cell with 47 chromosomes.
4. What are linked genes ?
5. What are the different symbols and their meaning in a pedigree analysis chart ?
6. Identify and comment on the kind of gene transfer observed in Griffith's experiment with *Staphyloccocus pneumoniae.*
7. What is the central dogma of molecular biology ?
8. Briefly explain 'C value paradox'.
9. Give a brief account on the characteristics of cancer cells.
10. What are mutagens ?
11. Identify any two inhibitors of transcription and their mode of action.
12. Highlight the role of aminoacyl tRNA synthetase in translation.
13. Comment on the importance of N-formyl Methionine as the first amino acid.
14. What is wobble hypothesis ?
15. Identify the genes encoded in the Lac operon system.

(10 × 3 = 30 marks)

Turn over

Section B

Answer at least **five** *questions.*
Each question carries 6 *marks.*
All questions can be attended.
Overall Ceiling 30.

16. Write a short essay on the types of chromosomal aberrations observed.
17. Explain the molecular mechanism of crossing over.
18. Give an account of transposable elements and their significance.
19. Explain the molecular necessity and advantages of a semiconservative replication.
20. DNA integrity is maintained despite physical damage. Explain.
21. Comment on the post-transcriptional processing mechanisms.
22. Justify the need for nascent protein to undergo post-translational modifications.
23. Why are prokaryotic mRNA polycistronic ?

(5 × 6 = 30 marks)

Section C

Answer any **two** *questions.*
Each question carries 10 *marks.*

24. Give a detailed account on the events involved in prokaryotic transcription.
25. Explain in detail the differences between prokaryotic and eukaryotic DNA replication.
26. Write an essay on the events and regulation of translation in prokaryotes.
27. Elaborate on the molecular model and functioning of Tryptophan operon.

(2 × 10 = 20 marks)

C 20081

(Pages : 4)

Name.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Biochemistry

BCH 6B 15—MOLECULAR ENDOCRINOLOGY

(2014 to 2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Section A

Answer **all** *the questions.*
Each question carries one mark.

1. Glucocorticoid belongs to which of the following class of hormones :

   (a) Protein. (b) Steroid.

   (c) Amino acid. (d) Carbohydrate.

2. Which of the following hormone inhibit the secretion of TSH by feedback regulation ?

   (a) Growth hormone. (b) Luteinizing hormone.

   (c) Cortisol. (d) T3andT4.

3. Which of the following is the location of thyroxine receptors ?

   (a) Plasma membrane. (b) Nucleus

   (c) Cytoplasm. (d) Endoplasmic reticulum.

4. Which of the following kinase activated during the binding of epinephrine or glucagon to the G protein coupled receptors ?

   (a) Protein kinase G. (b) Protein kinase C.

   (c) Protein kinase B. (d) Protein kinase A.

5. _____ is the essential element required for the synthesis of T3 and T4.

   (a) Calcium. (b) Potassium.

   (c) Magnesium. (d) Iodine.

6. Which of the following is involved in the conversion of angiotensinogen to angiotensin-I ?

(a) Angiotensin converting enzyme. (b) Renin.

(c) Aldosterone. (d) None of the above.

7. Myxedema characterized by an abnormally low basal metabolic rate (BMR) is due to :

(a) Hyperthyroidism. (b) Hypoglycemia.

(c) Hypothyroidism. (d) Hypocalcaemia.

8. G protein associated with G protein-coupled receptors (GPCR) is a ———— protein.

(a) Monomeric. (b) Dimeric.

(c) Trimeric. (d) Seven transmembrane.

9. The Glucagon plays a role in :

(a) Decreasing the conversion of glycogen into glucose.

(b) Increasing the conversion of glycogen into glucose.

(c) Slowing down glucose formation from lactic acid.

(d) Increasing the rate of protein synthesis within cells.

10. Where do endocrine glands secrete their hormones ?

(a) Skin. (b) Ducts.

(c) Kidney. (d) Blood.

11. The Glucagon plays a role in :

(a) Decreasing the conversion of glycogen into glucose.

(b) Increasing the conversion of glycogen into glucose.

(c) Slowing down glucose formation from lactic acid.

(d) Increasing the rate of protein synthesis within cells.

12. Which of the following amino acid is the precursor for the synthesis of catecholamines and thyroid hormones ?

(a) Histidine. (b) Threonine.

(c) Phenylalanine. (d) Tyrosine.

13. The number of amino acids present in oxytocin are ————.

(a) 18. (b) 9.

(c) 10. (d) 14.

14. Parathyroid hormone acts to ensure that :

(a) Calcium levels in the blood never drop too low.

(b) Sodium levels in urine are constant.

(c) Potassium levels in the blood don't escalate.

(d) Concentration of water in the bloodis sufficient.

15. Antidiuretic hormone promotes the retention of water by stimulating :

(a) The active transport of water. (b) The active transport of chloride.

(c) The active transport of sodium. (d) The permeability of the collecting duct to water.

16. Catecholamine hormones are synthesized in the :

(a) Zona glomerulosa of adrenal cortex. (b) Zona fasciculate of adrenal cortex.

(c) Zona reticularis of adrenal cortex (d) Chromaffin cells of adrenal medulla.

(16 × 1 = 16 marks)

Section B

Answer any **eight** *questions.*
Each question carries 3 *marks.*

17. Illustrate the hormone classification.

18. Mention the function of cholecystokinin in digestion.

19. Illustrate the feedback regulation of hormones.

20. Write the biological action of androgens.

21. Name *three* GI tract hormones.

22. Mention the role of calcium in hormone secretion.

23. Distinguish between epinephrine and norepinephrine.

24. Write a note on progesterone.

25. Mention the biological action of insulin on lipogenesis.

26. What is transcortin ? Give its function.

(8 × 3 = 24 marks)

Section C

Answer any **four** *questions.*
Each question carries 5 *marks.*

27. Explain the general functions of hormones.

28. Name the posterior pituitary hormones ? Mention their functions.

29. Explain the mechanism of action of peptide hormone.

30. Explain the physiological role of hormones secreted by pancreas.

31. Briefly explain the physiological role of mineralocorticoids.

32. Describe different types of hormone receptors.

(4 × 5 = 20 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

33. Describe the chemical nature, secretion, functions and disorders of thyroid hormones.

34. Explain the chemical nature and functions of hormones of testes and ovaries.

35. Write an essay on chemical nature, functions and regulation of anterior pituitary gland hormones.

(2 × 10 = 20 marks)

C 20080 (Pages : 3) Name.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Biochemistry

BCH 6B 14—RECOMBINANT DNA TECHNOLOGY

(2014 to 2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. The growth of animal cells in vitro in a suitable culture medium is called ————.
2. Which of the following culture is used for the production of primary and secondary metabolites ?
   a) Cell suspension culture. b) Callus culture.
   c) Protoplast culture. d) Somatic hybrid.
3. Which of the following does not act as a fusogen in protoplast fusion ?
   a) 2, 4 D. b) Polyethylene glycol.
   c) Calcium. d) PVA.
4. Write the name of circular DNA used for cloning.
5. Name the vector system used for plant transformation.
6. Name the disease caused by Agrobacterium in plants.
7. Which of the following particles is used in the gene gun method ?
   a) Iron particles. b) Aluminum particles.
   c) Silver particles. d) Gold particles.
8. Which among the following is not a property of a cloning vector ?
   a) Contain genetic marker for selection .
   b) Ability to replicate.
   c) Multiple restriction site for entry of DNA.
   d) Has non-essential DNA to optimize cloning.
9. Electroporation method uses an electric pulse to facilitate uptake of DNA. True *or* False ?

Turn over

10. Name the method in which the cloned gene is directly transferred in the tissues of patients.
11. Write the full form of RFLP.
12. Name the phenomenon where a single cell is able to reproduce the whole organism.
13. In transgenesis, only cloned genes are introduced into the donor. True *or* False ?
14. Name the enzyme which has silenced to delay the ripening process.
15. The ability of single cell to divide and produce all the differentiated cell in the organism is called _____.
16. Which of the following culture is used for the production of primary and secondary metabolites ?

    a) Cell suspension culture. b) Callus culture.

    c) Protoplast culture. d) Somatic hybrid.

(16 × 1 = 16 marks)

Section B

Answer any **eight** *questions.*
Each question carries 3 *marks.*

17. What are restriction enzymes ? Give two examples.
18. Brief on cosmids.
19. What is meant by lipofection ?
20. Write the advantages of YAC.
21. What are cell lines ? Mention their applications.
22. Write about the ethical issues related to GMOs.
23. List the different classes of restriction endonucleases.
24. Write a brief note on recombinant vaccines.
25. Differentiate between a knock in and knock out organism.
26. Why is agrobacterium an ideal gene transfer agent ?

(8 × 3 = 24 marks)

Section C

Answer any **four** *questions.*
Each question carries 5 *marks.*

27. Give a brief note on different gene transfer methods in animal cells.
28. Discuss about the gene transfer methods in plants.

29. Write a short essay on GMO.

30. Give a brief account on cDNA cloning.

31. Write a short essay on electroporation and conjugation.

32. Discuss on artificial chromosome vectors.

(4 × 5 = 20 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

33. Give an account of the different applications of recombinant DNA technology.

34. Discuss about the various cloning vectors.

35. Write an essay on transgenic animals as models of human diseases.

(2 × 10 = 20 marks)

C 20079 (Pages : 3) Name.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Biochemistry

BCH 6B 13—CLASSICAL GENETICS AND MOLECULAR BIOLOGY

(2014 to 2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. In Mendel's experiment, different genes were referred to as :

   (a) Alleles. (b) Factors.

   (c) Genes. (d) Units.

2. The physical expression of the genetic constitution is referred to as :

   (a) Genetics. (b) Genotype.

   (c) Phenotype. (d) Trait.

3. Which among the following depicts a monosomy condition ?

   (a) AO. (b) AAA.

   (c) AA. (d) OO.

4. Heterozygous genotype is characterized by presence of ———— alleles of a gene.

   (a) Same. (b) Inactive.

   (c) Different. (d) None of these.

5. The site for protein biosynthesis is ————.

6. Name *two* termination codons.

7. The chromatin in higher organisms is chemically composed of ————.

8. Write the nucleotide sequence of Ochre codon.

9. ———— are the mobile segments of DNA.

10. Write the repeat sequence of nucleotides in telomeres.
11. Name the sequence of RNA recognized by a small subunit of the ribosome during translation.
12. Write the size of a prokaryotic ribosome.
13. Name an inhibitor which inhibits the initiation step of translation.
14. Write the complementary strand of 3'....TACCGAACT....5'.
15. Histones are positively charged proteins. True *or* False ?
16. Name the part of ribosome that can interact with the Shine-Dalgarno sequence.

(16 × 1 = 16 marks)

Section B

Answer any **eight** *questions.*
Each question carries 3 *marks.*

17. Write about catabolite gene activator protein.
18. Write the mechanism of Actinomycin D as an inhibitor of transcription.
19. What is meant by bacterial conjugation ?
20. What is missense mutation ?
21. Write about the role of RNA primer.
22. What are transposons ?
23. Write about DNA topoisomerases.
24. Write the significance of peptidyl transferase enzyme.
25. Name any two inhibitors of transcription and translation.
26. What is hnRNA ?

(8 × 3 = 24 marks)

Section C

Answer any **four** *questions.*
Each question carries 5 *marks.*

27. State Mendel's laws of inheritance.
28. Write about different types ab.

29. Discuss about the role of different enzymes in DNA replication.

30. Explain Ames test.

31. Explain mismatch repair mechanism.

32. Discuss about features of genetic code.

(4 × 5 = 20 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

33. Describe lac operon.

34. Explain prokaryotic protein biosynthesis.

35. Discuss about any two types of DNA damage and repair mechanisms.

(2 × 10 = 20 marks)