KUMARAGURU
college of technology
character is life

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

BIOTECHNOLOGY

U18BTE0013 Human Physiology and allied Diseases

COURSE OUTCOMES

CO1: Describe the digestion and absorption physiology, and to evaluate the pathophysiological conditions

CO2: Understand, elaborate and interpret the functioning of cardiac cycle, mechanism of regulation of blood pressure, and allied pathophysiology

CO3: Demonstrate the physiological and pathophysiological processes of renal and respiratory systems

CO4: Discuss the phenomenon of conduction of nerve impulses and interpret the mechanism of Parkinson's disease

CO5: Understand and illustrate the physiological phases of spermatogenesis and menstrual cycle, and explain the etiology of menopause

CO6: Analyze and interpret the clinical oriented diagnostic results of selected diseases

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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1.	Observe the depicted oligopeptide W R T Y H G G R Can you list the enzyme(s) that hydrolyze the "end **(or)** exo" part(s) of the depicted peptide?	CO1	[K_3]
2.	A six-year old baby was clinically presented with the following complaint: "**Free of pain but presented with caries affecting upper and lower posterior teeth".** Whether any natural defense system is exhibited by the salivary gland? If so, list the same [**Note: Dental caries:** loss of tooth substance (enamel and dentine) that is caused by acid production resulting from bacterial metabolism of sugars]	CO1	[K_5]
3.	Define a cardiac cycle	CO2	[K_2]
4.	Observe the depicted anatomy of heart and identify the **WRONG** flow of blood pattern	CO2	[K_3]
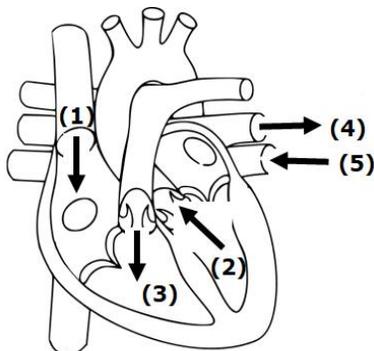
5.	What is a relay neuron?	CO4	[K_2]

6. Observe the below depicted nerve impulse image and identify the action potential part   CO4   [K₃]

(A)   (B)   (C)   (D)   (E)

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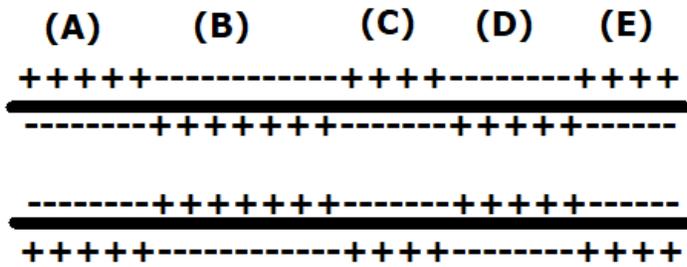
7. Observe the below provided diagram related to the spermatogenesis process of a new *Homo sapiens* strain. Assume that the total number of chromosomes in spermatogonium is 110. Calculate the number of chromosomes present in the labelled parts   CO5   [K₃]
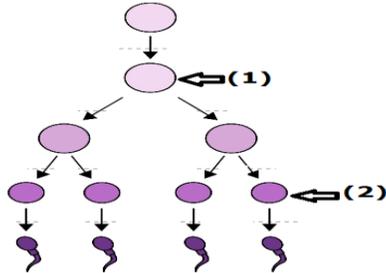
8. Define Bohr's effect   CO3   [K₂]
9. What is familial hypercholesterolemia? Provide the normal plasma total cholesterol range   CO6   [K₂]
10. List the name of few urinary crystals   CO6   [K₂]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11. a)   Observe the below depicted image.   10   CO1   [K₄]
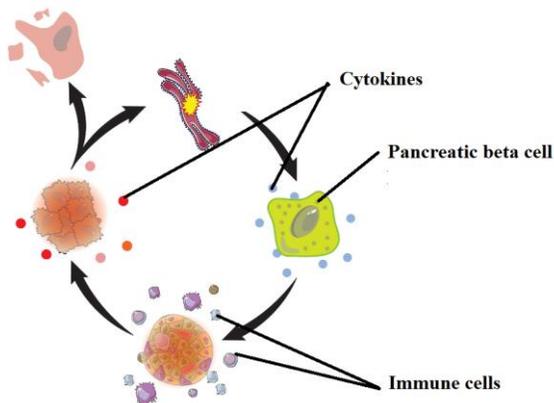
     Do you suspect the contract or acquirement of any disorder due to the process that is depicted in the image? If so, explain the normal signaling process and also, add a note on its pathophysiology

   b)   Describe in brief the digestion and absorption of lipids   6   CO1   [K₂]

12. a)   Explain the coordinated events of cardiac cycle with appropriate steps   10   CO2   [K₂]

b) Observe the depicted electrocardiogram (ECG) pattern of two different individuals. **6**   CO2   [K₄]

i) Whether any abnormal pattern is observed? **(1)**
ii) If yes/ no, interpret with appropriate reason **(5)**
[**Hint:** If yes, explain the pathophysiology of the identified disease]

13. a) Describe the propagation of action potential in a neuron with appropriate steps   **10**   CO4   [K₂]
    b) i) Identify the type of the below shown glial cell and list any TWO of its functions **(2)**   **6**   CO4   [K₃]
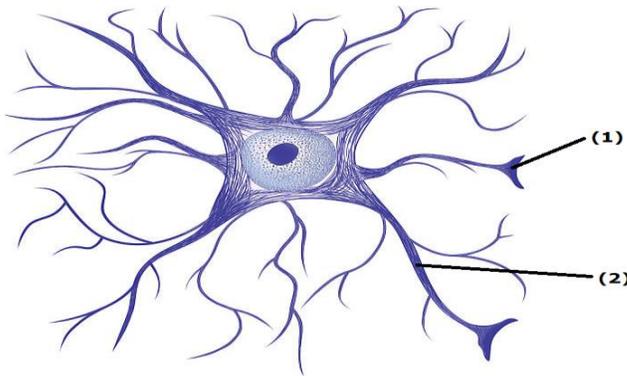

ii) In the above depicted image, name the labelled parts and outline their functions **(4)**

14. a) Elaborate the process of menstrual cycle with suitable phases   **10**   CO5   [K₂]
    b) List the functions of progesterone   **6**   CO5   [K₂]

15. a) Discuss the detailed process of urine formation in kidneys   **10**   CO3   [K₂]
    b) Outline the pathophysiological process of pulmonary tuberculosis   **6**   CO3   [K₃]

16. a) Calculate and compare the INR for the depicted plasma samples, and identify the cardiac patients   **6**   CO6   [K₅]
(**Hint: Control PT = 12 sec**)

Samples	Prothrombin time (PT) (sec)	ISI
Sample A	25	1.5
Sample B	43	0.25
Sample C	55	0.75
Sample D	18	1
Sample E	39	2

b)
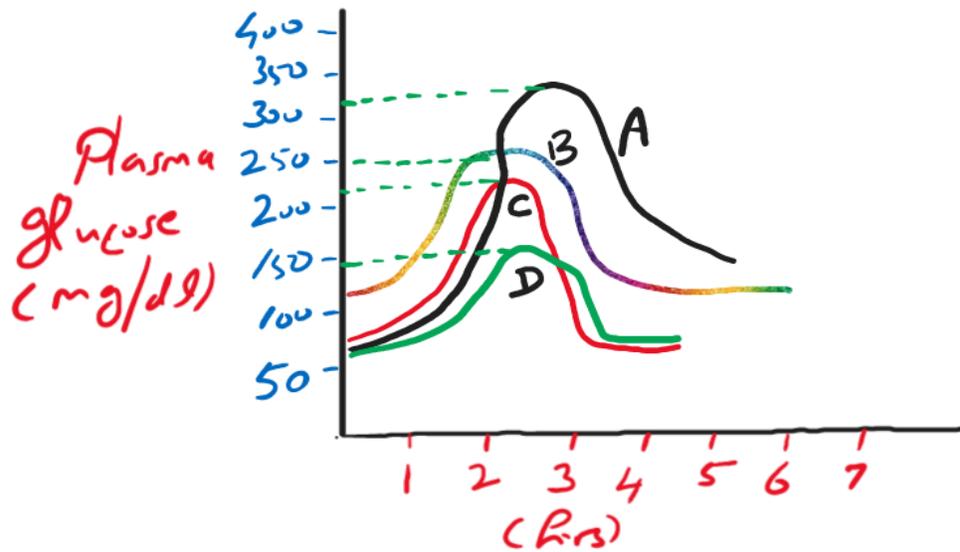
Observe the depicted graph plotted against plasma glucose level (mg/ dl) and time duration (hrs) for four different samples

   i) Which individual(s) is/ are normal? **(2)**

   ii) Which sample(s) reveal the presence of glycosuria? **(2)**

   iii) Which sample(s) may positively respond to OGTT? **(3)**

   iv) Assuming that the individuals age as >= **45 yrs**, whether ELISA based insulin quantification is necessary (only for disease identified samples)? If yes/ no, justify the same **(3)**

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