# MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

**FIRST YEAR B.Sc. M.L.T./ B.Sc. N.M.T./ B.Sc. M.I.T. DEGREE EXAMINATION – SEPTEMBER 2005**
**SUBJECT: ANATOMY**

Monday, September 05, 2005

Time: 1½ Hrs.                                                                                       Max. Marks: 40

✍   **Answer all questions. Draw neat labeled diagram wherever necessary.**

1.   Define bronchopulmonary segment. Name the bronchopulmonary segments of right and left lungs. Give their clinical significance.

$$(2+4+2 = 8 \text{ marks})$$

2.   Name the endocrine glands. Discuss the parts, relations and blood supply of the pituitary gland.

$$(2+6 = 8 \text{ marks})$$

3.   Answer briefly on:

$$(3 \times 8 = 24 \text{ marks})$$

3A.   Typical synovial joint.

3B.   Connective tissue fibres.

3C.   Right atrium.

3D.   Small intestine.

3E.   Nephron.

3F.   Origin, course and termination of pyramidal tract.

3G.   Cerebellum.

3H.   Microscopic structure of the ovary.

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## FIRST YEAR B.Sc. M.L.T./ B.Sc. N.M.T. DEGREE EXAMINATION – SEPTEMBER 2005
## SUBJECT: PHYSIOLOGY
## (NEW REGULATION)
Tuesday, September 06, 2005

Time: 3 Hrs.                                                                 Max. Marks: 80

✍ **Answer ALL questions.**

1A. Define erythropoiesis. With labelled diagrams describe the stages of erythropoiesis. Mention any four factors regulating it.

1B. Define the terms:      i)   Anemia    ii)   Jaundice   iii)   Haemophilia

(10 marks)

2A. Define reflex. Draw a neat labelled diagram of reflex arc to show the components. Name any two properties of reflexes.

2B. Give normal plasma $Ca^{++}$ level. List any four functions of $Ca^{++}$. Name two hormones which regulate plasma $Ca^{++}$ level.

2C. Draw a neat labelled diagram to show nerve supply to salivary glands. List any four functions of saliva.

2D. Draw a neat labelled diagram of nephron. Name two hormones which act on renal tubules with their actions.

2E. Draw a neat labelled diagram of sarcomere. Briefly explain two properties of skeletal muscles.

(4×5 = 20 marks)

3A. How much is the normal body temperature? Give the location of thermoregulatory centers.

3B. Mention the likely day of ovulation in a 32 day menstrual cycle. Name the hormone which causes ovulation.

3C. Give the cause and two symptoms each of diabetes mellitus and diabetes insipidus.

3D. List four differences between $1^{st}$ and $2^{nd}$ heart sounds.

3E. Give the normal arterial $pCO_2$. Name the different forms of $CO_2$ transport in blood.

(2×5 = 10 arks)

4A. Draw a neat labelled diagram of spirogram showing volumes and capacities.  Define vital capacity. Give its significance.

4B. Draw a neat labelled diagram of respiratory membrane and name any two factors which influence diffusion across the membrane.

(6+4 = 10 marks)

5A. Define cardiac output. Give the normal value. Give any two factors influencing it.

5B. Name four hormones of anterior pituitary. List the actions of any two of the hormones.

5C. Draw a neat labelled diagram of ECG. Give any two uses of it.

5D. Define Micturition. Draw a neat labelled diagram to show the Micturition reflex arc.

5E. Name the lobes of cerebral cortex. Give two features of cerebral cortex.

(4×5 = 20 marks)

6A. List four factors influencing conduction velocity along a nerve fiber.

6B. List four functions of platelets.

6C. List four functions of large intestine.

6D. Name two hormones produced by adrenal cortex. List one action of each.

6E. Name two properties of cardiac muscle.

(2×5 = 10 marks)

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### FIRST YEAR B. Sc. M.L.T./ B. Sc. N.M.T. DEGREE EXAMINATION – SEPTEMBER 2005

### SUBJECT: BIOCHEMISTRY

Thursday, September 08, 2005

Time: 1½ Hrs.                                                                 Max. Marks: 40

✍ *Answer all questions.*

1.  Explain the term mutarotation with an example.

2.  Define coenzyme. How do they participate in the reaction? Explain with two examples.

3.  Describe digestion and absorption of dietary triacyl glycerols.

4.  What is the normal serum calcium level? Explain how serum calcium level is regulated.

5.  Outline the steps for Rhodopsin cycle.

6.  Write the steps of urea cycle.

7.  Write briefly on:
7A. SDA of food stuffs
7B. Biological value of a protein

8.  Write the normal serum creatinine level. Briefly explain Creatinine clearance test.

9.  Write a neat labelled diagram of Watson-Crick model of DNA.

10. What is the normal fasting blood glucose level? Define the terms hyperglycemia and hypoglycemia.

(4×10 = 40 marks)

# MANIPAL ACADEMY OF HIGHER EDUCATION
(Deemed University)

## FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – SEPTEMBER 2005
### SUBJECT: COMPUTERS AND MATHEMATICS
Friday, September 09, 2005

Time: 3 Hrs.　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 80

✍　ANSWER SECTION – A AND SECTION – B IN TWO SEPARATE ANSWER BOOKS.

### SECTION – A: COMPUTERS: 40 MARKS

1.　What is a computer? Explain the different classification of computer systems.

2.　With a neat block diagram explain the different components of a digital computer.

3.　What is an input device? Explain the different input devices used in digital computer.

4.　What is memory? How do you classify the memory of a computer?

5.　What is an Algorithm? What is a Flow chart? Write a Flowchart to find largest of three numbers.

6.　Explain Binary and octal number systems with one example.

7.　Explain any two software systems used in Nuclear medicine.

8.　Explain the effect of image matrix size on memory required in a 16-bit computer.

$(5×8 = 40 \text{ marks})$

### SECTION – B: MATHEMATICS: 40 MARKS

Answer any Seven of the following:

9A.　If $A = \{x \mid x \in n \text{ and } x \le 4\}$, $B = \{x \mid x^2 - 9 = 0 \text{ and } x < 0\}$ then find $A \times B$.

9B.　Prove that $2\log\dfrac{16}{15} + \log\dfrac{25}{24} - \log\dfrac{32}{27} = 0$.

9C.　Factorise : $-6x^2 - 5x + 11 = 0$.

9D.　$f : R \rightarrow R$ defined by $f(x) = x^2 + 1$. Verify whether above function is 1-1or not.

9E.　Find the order and degree of the differential equation: $\left(a^2 \dfrac{d^2y}{dx^2}\right)^4 = \left[1 + \left(\dfrac{dy}{dx}\right)^2\right]^3$.

9F.　Determine whether $f(x) = x^7 - 7x$ is an odd or even function.

9G.　Define a function.

9H.　Solve for $x$: $3-x^2 = 2x^2 + 1$.

$(1×7 = 7 \text{ marks})$

**Answer any Eleven of the following:**

10. Prove that $(1 - \sin A + \cos A)^2 = 2(1 - \sin A)(1 + \cos A)$.

11. Evaluate: $\displaystyle \lim_{x \to 0} \frac{\sin^2 x}{\tan^2 2x}$.

12. The radius of a hemisphere is 3.5 cm. Find the total surface area and volume of the hemisphere.

13. Differentiate with respect to x:
    $x^4 \sin 4x\, a^x$

14. Integrate with respect to x : $\left(3x - \dfrac{2}{x^2}\right)^2$.

15. Form the differential equation of $3x^2 y = x^3 - C$

16. Suppose a chemical reaction proceeds according to the law of conversion, if half of the substance A is converted at the end of 10 seconds, find when $\dfrac{9}{10}^{th}$ of the substance will have been converted.

17. Draw the graph of:    i)    $x + 2y = 5$      ii)    $5x + 3y = 4$ in the same graph sheet.

18. Define: i) Periodic function    ii) Modulus function    iii) Range of the function

19. Solve for x: $\dfrac{3}{x} - \dfrac{4}{5x} = \dfrac{1}{10}$.

20. A wire of length 20cm is bent so as to form an arc of a circle of radius 4 cm. What is the angle at the centre in radians?

21. If $\sec \alpha = \dfrac{13}{5}$ $\alpha$ is acute, find $\dfrac{2\sin \alpha - 3\cos \alpha}{4\sin \alpha - 9\cos \alpha}$.

$(3 \times 11 = 33 \text{ marks})$