

MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – MAY/JUNE 2006**SUBJECT: COMPUTERS AND MATHEMATICS**

Wednesday, May 31, 2006

Time: 3 Hrs.

Max. Marks: 80

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

SECTION – A: COMPUTERS: 40 MARKS

ANSWER any FIVE questions. All carries equal marks.

1. Define a computer. Explain the basic structure of a computer.
2. Draw the blocks schematic of Nuclear Medicine computer.
3. Explain how the computers are classified. In brief explain any one type of classification.
4. Explain the magnetic disks with neat sketch.
5. Explain the Binary system.
6. Define a computer memory. Explain how it operates.
7. Differentiate the main memory and Auxillary Memory.
8. Define algorithm. Write an algorithm to computer the sum and average of 3 number.

(8×5 = 40 marks)

SECTION – B: MATHEMATICS: 40 MARKS

ANSWER any EIGHT of the following:

- 9A. Convert the following angle in radians to degree
 - i) $6\pi/5$
 - ii) $4\pi/3$
- 9B. Show that $(\sin A + \cos A)^2 = 1 + 2 \sin A \cdot \cos A$.
- 9C. If $\sin \theta = 3/5$, $\pi/2 < \theta < \pi$, find $\cos \theta$.
- 9D. Define sub set and union of the set with example.
- 9E. Solve $[8 \div (4 \times 2)]^2 + 9 - 4 \times 2$

(1×5 = 5 marks)

10A. Solve the equation by using the formula: $x^2 - 5x = 14$.

10B. Solve the affected quadratic equation by completing the square: $x^2 - 160 - 6x = 0$.

(2+3 = 5 marks)

11A. Solve: $\lim_{x \rightarrow 1} \frac{x^2 - 4x + 3}{x^2 - 5x + 4}$.

11B. Show that: $\sin^3 A + \cos^3 A = (\sin A + \cos A)(1 - \sin A \cos A)$.

(2+3 = 5 marks)

12A. Differentiate with respect to x : $5e^x - \log x + \sqrt[3]{x^2}$.

12B. Derive $\sin x$ by the first principle.

(2+3 = 5 marks)

13A. State Lagrange's Theorem.

13B. Verify Rolle's Theorem for $f(x) = x(x+3)e^{-x/2}$ in $[-3, 0]$.

(2+3 = 5 marks)

14A. Define odd and even function and give one example for each.

14B. Show that: $\log(81/8) - 2 \log(3/2) + 3 \log(2/3) + \log(3/4) = 0$.

(2+3 = 5 marks)

15A. Evaluate $\int^2 (3x^2 - 2x + 1) dx$.

15B. Evaluate $\int^1 x \cos^2 x dx$.

(2+3 = 5 marks)

16A. Form the differential equation $ay^2 = x^3$.

16B. The radius of the right circular cylinder is 9cm. The height of the cylinder is 12 cm. Then calculate surface area and total surface area.

(2+3 = 5 marks)

17. Derive the exponential law for radioactive decay.

(5 marks)

18. 200mCi of Tc 99m is calibrated at 11a.m., find the activity on the next day at 9 a.m. ($t_{1/2} = 8$ hours).

(5 marks)



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FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – MAY/JUNE 2006

SUBJECT: ANATOMY

Thursday, June 01, 2006

Time: 2 Hrs.

Max. Marks: 40

Answer all questions. Draw neat labeled diagram wherever necessary.

1. Name the parts of the male reproductive organs. Give an account of the testis.
(2+6 = 8 marks)

2. Discuss the ventricles of the brain in brief. Add a note on C.S.F circulation.
(6+2 = 8 marks)

3. Answer briefly on:
 - 3A. Microscopic structure of the skeletal muscle
 - 3B. Microscopic structure of a compact bone
 - 3C. Normal constrictions of the oesophagus
 - 3D. Trachea
 - 3E. Right atrium
 - 3F. Urinary bladder
 - 3G. Liver
 - 3H. Microscopic structure of pituitary gland.
(3×8 = 24 marks)



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FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – MAY/JUNE 2006**SUBJECT: PHYSIOLOGY**

Friday, June 02, 2006

Time: 3 Hrs.

Max. Marks: 80

✍ **Answer ALL questions.**

1. Define arterial blood pressure. Give its normal values. Name the instrument used to estimate blood pressure. Name four factors that determine BP. Explain how baroreceptors regulate blood pressure.

(10 marks)

- 2A. Mention the agglutinogens and agglutinins present in each of the groups of ABO and Rh systems. Give two complications of blood transfusions.

- 2B. Mention two functions of cerebellum. Give any two features of cerebellar disorders.

- 2C. Draw a normal spirogram showing lung volumes and capacities.

- 2D. Draw a neat labeled diagram of neuron. What is the function of nerves? What are the types of nerve fibers?

- 2E. Draw a neat labeled diagram of nephron. Name the two major sites of H₂O reabsorption in renal tubules.

(4×5 = 20 marks)

- 3A. List four actions of Cortisol.

- 3B. List four actions of testosterone.

- 3C. List two ascending tracts and give the role of each.

- 3D. Name the bile salts. List any two functions of it.

- 3E. Give the normal value for the following:

i) Total WBC count

ii) RBC count

iii) Platelet count

iv) Hb concentration

(2×5 = 10 marks)

- 4A. Give the normal fasting blood glucose level. Mention the mechanisms by which insulin lowers the blood glucose level? List four features of diabetes mellitus.

- 4B. Briefly explain milk ejection reflex with diagram.

(6+4 = 10 marks)

- 5A. Classify WBCs. Enumerate four functions of white blood cells.

- 5B. Draw a neat labeled diagram of respiratory membrane. List four factors which influence diffusion of gases across the membrane?

- 5C. Define GFR. Give its normal value. Mention two factors which influence GFR. Name the other steps in urine formation.
- 5D. Define deglutition. Name its different stages. Explain the II stage of deglutition.
- 5E. Give the locations of respiratory centers. Explain briefly how they bring about normal respiration.

(4×5 = 20 marks)

- 6A. List two difference between skeletal and cardiac muscle.
- 6B. Define clotting time. Give the normal value. Name two anticoagulants.
- 6C. Define vagal tone. What is the effect of vagal stimulation on the heart?
- 6D. List four functions of hypothalamus.
- 6E. List two changes that occur in the skin when the body is exposed to a hot environment. Give the normal body temperature in degrees Celsius and degrees Fahrenheit.

(2×5 = 10 marks)



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FIRST YEAR B. Sc. N.M.T. DEGREE EXAMINATION – MAY/JUNE 2006**SUBJECT: BIOCHEMISTRY**

Saturday, June 03, 2006

Time: 1½ Hrs.

Max. Marks: 40

1. Explain digestion and absorption of carbohydrates.
2. Explain Watson and Crick model of DNA with labelled diagram.
3. Mention the normal blood Urea level. Enumerate various factors causing hyper uremia.
4. Define respiratory quotient. Explain the factors affecting respiratory quotient.
5. Write a note on calcium homeostasis.
6. Write metabolic functions of niacin.
7. Write the reactions of urea cycle.
8. Explain the Frederickson's classification of hyperlipidemia.
9. Write a note on clinical significances of transaminases.
10. Trace the pathway of ketone body formation. In which condition they are produced?

(4×10 = 40 marks)

