

MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: COMPUTERS AND MATHEMATICS

Tuesday, May 31, 2005

Time: 3 Hrs.

Max. Marks: 80

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

SECTION – A: COMPUTERS: 40 MARKS

1. Explain the major functional units of a digital computer system with a neat block diagram. (5 marks)
2. Define the following and explain any two of the following:
a) Main memory b) Cache memory c) Secondary memory. (5 marks)
3. What are the major classifications of printers? (5 marks)
4. Discuss the following with neat diagrams.
a) Floppy disks b) Hard disks (5 marks)
5. Define an algorithm. Write a flow chart to calculate a factorial of a given number. (5 marks)
6. Convert the following:
a) $(255)_{10} = ()_8$ b) $(2A47)_{16} = ()_{10}$ c) $(40BD)_{16} = ()_2$
d) $(5280)_{10} = ()_{BCD}$ e) $(11000001110110)_2 = ()_{16}$ (5 marks)
7. With the aid of a block diagram explain the computer hardware components and information flow. (5 marks)
8. Explain the applications of computers in Nuclear Medicine. (5 marks)

SECTION – B: MATHEMATICS: 40 MARKS

Answer any Seven of the following:

- 9A. $f: \mathbb{R} \rightarrow \mathbb{R}$ is a function defined by $f(x) = 8x^2 - 4$. Verify whether f is 1-1 or not.
- 9B. Convert 50° into radian measure.
- 9C. A hemispherical dome has a radius of 10.5 cm. Calculate its volume.
- 9D. Prove that $\frac{1 - \tan^2 A}{1 + \tan^2 A} = 1 - 2\sin^2 A$.
- 9E. Find the slope of normal to the curve $y = 7x^2 - 4$ at $(-1, 2)$.

9F. Show that $\frac{\log_3 64}{\log_9 8} = 4$.

9G. Solve for x : $9x^2 + 18x - 17 = 0$.

9H. Define a function.

(7×1=7 marks)

Answer any Eleven of the following:

10. Prove that $\frac{1}{\operatorname{Cosec} A - \operatorname{Cot} A} - \frac{1}{\operatorname{Sin} A} = \frac{1}{\operatorname{Sin} A} - \frac{1}{\operatorname{Cosec} A + \operatorname{Cot} A}$.

11. Form the Differential Equation of the family of the curve $y^2 = 4a(x+a)$.

12. Integrate with respect to x :

12A. $\int \cos^3 x dx$.

12B. $\int \frac{\sin x}{\cos^2 x} dx$.

13. Differentiate with respect to x :

13A. $\sec x(3\log x - x^2)$

13B. $\frac{\log x}{x}$.

14. Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{8-x} - \sqrt{8+x}}{x}$.

15. Simplify: $\left(x^{\frac{b+c}{c-a}}\right)^{\frac{1}{a-b}} \left(x^{\frac{c+a}{a-b}}\right)^{\frac{1}{b-c}} \left(x^{\frac{a+b}{b-c}}\right)^{\frac{1}{c-a}}$.

16. If $\frac{1}{\log_2 x} + \frac{1}{\log_4 x} + \frac{1}{\log_8 x} = 6$ find x .

17. An arc of a circle subtends 30° at the centre. If the radius is 5 cm find the length of the arc and area of the sector formed.

18. Define $f: \mathbb{R} \rightarrow \mathbb{R}$ as $f(x) = \frac{2x-3}{4}$ find $f^{-1}(2)$.

19. If $\sin \theta = \frac{-1}{4}$ and $\pi < \theta < \frac{3\pi}{2}$ find $\frac{\cos \theta + \tan \theta}{\cot \theta + \sec \theta}$.

20. Differentiate $\sec x$ using the 1st principle method.

21. Draw the graph of the function $\sin x$ and $\tan x$.

(11×3=33 marks)



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FIRST YEAR B.Sc. M.L.T./ B.Sc. N.M.T./ B.Sc. R.T./ B.Sc. M.I.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: ANATOMY

Wednesday, June 01, 2005

Time: 1½ Hrs.

Max. Marks: 40

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

1. Discuss the structure of the lateral wall of the nasal cavity. Add a note on the mucous membrane of the nasal cavity.

(5+3 = 8 marks)

2. Give an account of the arterial supply to the heart.

(8 marks)

3. Write briefly on:

3A. Microscopic structure of the skeletal muscle.

3B. Major openings of diaphragm.

3C. Structure of a lymph node.

3D. Oesophagus.

3E. Nephron.

3F. Ovary.

3G. Lateral ventricles of brain.

3H. Suprarenal gland.

(3×8 = 24 marks)



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FIRST YEAR B.Sc. M.L.T./ B.Sc. N.M.T./ B.Sc. R.T. DEGREE EXAMINATION – JUNE 2005

SUBJECT: PHYSIOLOGY

(NEW REGULATION)

Thursday, June 02, 2005

Time: 3 Hrs.

Max. Marks: 80

✍ **Answer ALL questions.**

1A. Define arterial blood pressure. Give its normal value. List four factors that determine blood pressure.

1B. Draw a diagram to show the location, nerve supply and central connections of arterial baroreceptors. Describe their role in regulation of blood pressure.

(10 marks)

2A. Name two factors which shift the oxygen haemoglobin dissociation curve to the right. Name the forms in which O_2 is transported in blood.

2B. Mention the agglutinogens and agglutinins present in each of the groups of ABO and Rh systems.

2C. i) Define GFR. List two factors influencing it.

ii) List two special features of renal blood flow.

2D. Draw a neat labelled diagram of action potential. List two properties of action potentials.

2E. Draw a neat labelled diagram of dorsal column tract. Name two sensations carried by it.

(4×5 = 20 marks)

3A. What is spermatogenesis? What is the normal sperm count? Name two factors that affect spermatogenesis.

3B. List four functions of hypothalamus.

3C. List four functions of skin.

3D. Give two important differences between dwarfism and cretinism.

3E. Name the different WBC.

(2×5 = 10 marks)

4. List the hormones of posterior pituitary. List two actions of each. Add a note on regulation of any one of the hormones. List two features of diabetes insipidus.

(10 marks)

5A. Give the normal pCO_2 in arterial and venous blood. In what forms is CO_2 transported in blood? Name two factors influencing for CO_2 diffusion across the respiratory membrane.

5B. Draw a labelled diagram of nephron. List four functions of kidney.

5C. List six proteolytic enzymes in GIT. Add a note on absorption of proteins.

5D. Define 'blood coagulation'. Draw a schematic diagram to show the intrinsic pathway of blood coagulation.

5E. Classify hypoxia with one example for each.

(4×5 = 20 marks)

6A. List two differences between Upper motor neuron and Lower motor neuron paralysis.

6B. Define venous return. Give its normal value.

6C. Define: i) anaemia ii) thrombocytopenic purpura

6D. List two differences between skeletal muscle and cardiac muscle.

6E. List four functions of liver.

(2×5 = 10 marks)



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FIRST YEAR B. Sc. M.L.T./ B. Sc. N.M.T./ B. Sc. R.T DEGREE EXAMINATION – JUNE 2005**SUBJECT: BIOCHEMISTRY**

Friday, June 03, 2005

Time: 1½ Hrs.

Max. Marks: 40

Answer all questions.

1. Define:
 - 1A. Calorie
 - 1B. Calorific value
 - 1C. Specific dynamic action
 - 1D. BMR
2. Trace steps of formation of lactate from glucose.
3. Classify fatty acids with one example each.
4. Classify proteins depending on functions in our body with one example each.
5. Write the coenzyme forms of riboflavin. Write any three reactions where they participate.
6. Explain various factors affecting calcium homeostasis.
7. Mention the various iso forms of creatine phosphokinase and their clinical significance.
8. Explain the principle and significance of Van den Bergh's test.
9. Trace the steps of de novo synthesis of uridine mono phosphate.
10. Calculate the energy requirement of a person weighing 55 kg with moderate physical activity on a mixed diet.

(4×10 = 40 marks)

