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MANIPAL UNIVERSITY

FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – AUG/ SEPT 2008

SUBJECT: ANATOMY

Friday, August 29, 2008

Time available: 1½ Hours

Max. Marks: 40

✍ Answer ALL the questions.

✍ Draw neat labeled diagram wherever necessary.

1. Give an account of the external features of lung. Add a note on roof of the right lung.

(4+4 = 8 marks)

2. Give an account of the arterial supply of the heart. Write briefly about the cardiac muscle

(5+3 = 8 marks)

3. Answer briefly on:

3A. Pituitary gland

3B. Microscopic structure of skin

3C. Hyaline cartilage

3D. Liver

3E. Urinary bladder

3F. Uterine tube

3G. Functional areas of cerebrum

3H. Stomach

(3×8 = 24 marks)



MANIPAL UNIVERSITY

FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – AUG/ SEPT 2008

SUBJECT: PHYSIOLOGY

Saturday, August 30, 2008

Time available: 3 Hours.

Max. Marks: 80

1. Define systolic and diastolic blood pressure and give their normal values. Enumerate the different mechanisms by which blood pressure is regulated. Discuss in detail the role of baroreceptors in regulation of blood pressure. (10 marks)

2. Enumerate the functions of hypothalamus. Explain any two in detail. (10 marks)

3. Write briefly on the following:
 - 3A. Explain the role of peripheral chemoreceptors in regulation of respiration.
 - 3B. Classify leucocytes. Explain the functions of each one.
 - 3C. Draw a neat labeled diagram to show the reflex arc. Briefly explain stretch reflex.
 - 3D. Enumerate factors affecting venous return. Explain one of them.
 - 3E. Describe the changes observed in the eye during accommodation.
 - 3F. Draw a neat labelled diagram of multipolar neuron. Give its functions.
 - 3G. Explain the functions of gastric juice. What is the normal gastric emptying time?
 - 3H. State any two changes that occur during moderate exercise in:
 - i) cardiovascular system
 - ii) respiratory system.
 How are they brought about? (5×8 = 40 marks)

4. Write short answer to each of the following:
 - 4A. Define the following terms and give their normal values:
 - i) Clotting time
 - ii) GFR
 - 4B. List one function of:
 - i) Corpus luteum
 - ii) Testis
 - 4C. State any two clinical features of cerebellar disease.
 - 4D. Give the average normal values in males for the following:
 - i) RBC count
 - ii) Tidal volume
 - 4E. Tabulate any two differences between smooth muscle and cardiac muscle.
 - 4F. State the normal body temperature. Enumerate any two changes that take place when exposed to cold environment.
 - 4G. List two uses of electrocardiogram.
 - 4H. List any two hormones secreted from anterior pituitary gland. Give the hormonal basis of Acromegaly.
 - 4I. Mention any two errors of refraction. Give correction for one of them.
 - 4J. Draw a neat labeled diagram of nephron. (2×10 = 20 marks)



MANIPAL UNIVERSITY

FIRST YEAR B.Sc. N.M.T. DEGREE EXAMINATION – AUG/ SEPT 2008

SUBJECT: COMPUTERS AND MATHEMATICS

Monday, September 01, 2008

Time: 3 Hrs.

Max. Marks: 80

✍ Answer Section – “A” and Section – “B” in TWO separate answer books.

SECTION – A: COMPUTERS: 40 MARKS

✍ Answer ALL the questions.

1. Which is the brain of the computer and write on any one of its primary components?
2. Write a short note on Normalization.
3. Differentiate between list mode and frame mode.
4. Is it necessary to understand the concept of bytes and word in Nuclear Medicine? Why?
5. Calculate the left ventricular ejection fraction (LVEF) using the following parameters:

ROI	No: of Pixels	Total Counts
ED	400	80000
ES	250	45000
Bkg	55	6000
6. For a gamma camera having 0.96cm as FWHM and 700mm as the FOV, which matrix size would give an optimum resolution?
7. Define the following terms:
 - 7A. BUS
 - 7B. Static Image Acquisition
 - 7C. ADC
 - 7D. Bit depth
8. Convert the following:
 - 8A. $(11001)_2$
 - 8B. $(256)_{10}$

(5×8 = 40 marks)

SECTION – B: MATHEMATICS: 40 MARKS

✍ Answer any EIGHT of the following:

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

9B. Convert the following angle in radians to degrees:

i) $6\pi/5$ ii) $\pi/10$

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

9D. Find the value of $\sin(\pi/3) \cdot \cos(\pi/6)$.

9E. Define intersection and disjoint set of two sets.

(1×5 = 5 marks)

10A. Define periodic function and quadratic function and give one example for each.

10B. Derive $\cos x$ by first principle.

(2+3 = 5 marks)

11A. State Rolle's Theorem.

11B. Verify Rolle's theorem for the function $2x^3 - 6x$ in $[0, \sqrt{3}]$ in $a = 0$, $b = \sqrt{3}$.

(2+3 = 5 marks)

12A. Prove that $\log_4 2 + \log_8 2 + \log_{16} 2 = 13/12$.

12B. Prove that $\frac{1 + \sin \theta - \cos \theta}{1 + \sin \theta + \cos \theta} = \tan \theta / 2$.

(2+3 = 5 marks)

13A. Solve the pure quadratic equation $6x^2 + 21 = 885$

13B. Form the differential equation $3x^2 y = x^3 - c$

(2+3 = 5 marks)

14A. A circular sector has perimeter 250 cm and central angle 120° , find the sector area.

14B. Evaluate $\int \sin^3 x \cdot dx$.

(2+3 = 5 marks)

15A. Evaluate: $\lim_{x \rightarrow -2} \frac{x^5 + 32}{x + 2}$.

15B. Show that the curve $y^2 = \frac{x^2(1+x)}{(1-x)}$, $(-1, 0)$ the tangent is perpendicular to x-axis.

(2+3 = 5 marks)

16. Derive the exponential law for radioactive decay.

(5 marks)

17. 300mCi of I^{131} calibrated on Monday 12 noon. Find the activity remaining on next day afternoon 4 p.m. ($t_{1/2} = 8$ days)

(5 marks)

18. Evaluate $\int \frac{2x + 1 \, dx}{x^2 + 3x + 2}$

(5 marks)

