

MANIPAL UNIVERSITY**FIRST YEAR B.Sc. M.R.T. DEGREE EXAMINATION – AUGUST 2011****SUBJECT: BASIC SCIENCE: ANATOMY**

Monday, August 22, 2011

Time: 10:00-13:00 Hrs.

Max. Marks: 80

- ✍ **Answer all questions.**
✍ **Draw diagrams wherever necessary.**

- 1A. Name the parts of male reproductive system.
1B. Describe the position, parts, external features, relations and blood supply of uterus.
(5+15 = 20 marks)
- 2A. Describe the cavity, blood supply and nerve supply of larynx.
2B. Describe the internal features of different parts of pharynx.
(10+10 = 20 marks)
3. Write briefly on:
- 3A. Testis
3B. Blood supply of heart
3C. Thyroid gland
3D. Lobes of cerebrum
3E. Classification of synovial joints with examples
(5×5 = 25 marks)
4. Write short notes on:
- 4A. Trachea
4B. Small intestine
4C. Midbrain
4D. Structure of animal cell
4E. Coats of eye ball
(3×5 = 15 marks)



MANIPAL UNIVERSITY
FIRST YEAR B.Sc.M.R.T. DEGREE EXAMINATION – AUGUST 2011

SUBJECT: BASIC SCIENCE PHYSIOLOGY

Tuesday, August 23, 2011

Time: 10.00-13.00 Hours.

Max. Marks: 80

Answer all questions.

1. Essay:

- 1A. Mention the functions of hypothalamus. Explain any two functions.
- 1B. Name the hormones of anterior pituitary and posterior pituitary. Mention one function of each of these hormones.

(10+10 = 20 marks)

2. Write short notes on:

- 2A. Functions of stomach.
- 2B. Glomerular filtration rate.
- 2C. Functions of middle ear.
- 2D. Transport of oxygen in blood.
- 2E. Functions of placenta.
- 2F. Stretch reflex.
- 2G. Functions of platelets.
- 2H. Actions of aldosterone and cortisol.

(5×8 = 40 marks)

3. Write brief answers to the following:

- 3A. Draw a labelled diagram of a sarcomere.
- 3B. Tabulate two differences between smooth and skeletal muscles.
- 3C. Mention two factors affecting cardiac output.
- 3D. Define stroke volume and give its normal value.
- 3E. Mention two actions of testosterone.
- 3F. Name the hormones secreted by the ovary.
- 3G. List two differences between a cretin and a pituitary dwarf.
- 3H. Mention any two features of cerebellar lesion.
- 3I. List any two differences between sympathetic and parasympathetic nervous system.
- 3J. Mention the location in the cerebral cortex where visual and auditory impulses are relayed.

(2×10 = 20 marks)



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MANIPAL UNIVERSITY

FIRST YEAR B.Sc. M.R.T. DEGREE EXAMINATION – AUGUST 2011

SUBJECT: RADIOBIOLOGY

Wednesday, August 24, 2011

Time: 10:00-11:30 Hrs.

Max. Marks: 40

1. Answer following questions:

- 1A. What are the effects of radiation on DNA?
- 1B. What is sub lethal and potentially lethal damage? Describe with illustrated examples.
- 1C. Write short note on Genetically significant dose (GSD).
- 1D. Discuss pair production.

(5×4 = 20 marks)

2. Answer following questions:

- 2A. Describe the effect of interaction of radiation with water molecule.
- 2B. How the radiation affects chromosome of the cell? Write a detailed description of various chromosomal aberrations induced by radiation with illustrated diagrams.

(10×2 = 20 marks)



MANIPAL UNIVERSITY

FIRST YEAR B.Sc. M.R.T. DEGREE EXAMINATION – AUGUST 2011

SUBJECT: BASIC AND APPLIED MATHEMATICS

Thursday, August 25, 2011

Time: 10:00-13:00 Hrs.

Max. Marks: 80

☞ Answer any FIVE full questions. All questions carry equal marks.

- 1A. If $A = \{x : x^2 - 5x + 6 = 0\}$, $B = \{2, 4\}$, $C = \{4, 5\}$ find $(A - B) \times (B - C)$.
- 1B. If A is a set with n elements then define the power set of A. What is its cardinality? Verify De Morgan's laws with an example.
- 1C. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{1, 2, 3, 4\}$, $B = \{1, 3, 5, 7\}$, $C = \{8\}$. Then find the following:
 $A \cap B$, $n(A \cup B)$, $A \Delta B$, $\bar{A} - \bar{B}$, $A \cap (B \cup C)$, Powerset of C.

(4+6+6 = 16 marks)

2A. Prove that

i) $(1 + \tan \theta)^2 + (1 + \cot \theta)^2 = (\sec \theta + \operatorname{cosec} \theta)^2$.

ii) $\sin 600^\circ \cdot \tan(-690^\circ) + \sec 840^\circ \cdot \cot(-945^\circ) = 3/2$.

2B. What is the angle in radian measure between the hour hand and the minute hand.

- i) at 20 minutes to 11 o'clock? ii) at 20 minutes past 11 o'clock?

2C. The horizontal distance between two towers is 50 meters. From the foot of the first tower, the angle of elevation of the top of the second tower is 60° . From the top of the second tower the angle of depression of the top of the first tower is 30° . Find the heights of the towers.

(4+6+6 = 16 marks)

3A. Show that differentiability implies continuity but the converse is not true.

3B. State Cauchy's mean value theorem and verify it for

$f(x) = \sqrt{x}$ and $g(x) = 1/\sqrt{x}$ over $[a, b]$, $a > 0$.

3C. Obtain the first three non zero terms in the Maclaurin's series expansion of $\log(1 + \sin x)$.

(4+6+6 = 16 marks)

4A. Evaluate (i) $\lim_{x \rightarrow (3)} \frac{x^5 - 243}{x - 3}$ (ii) $\lim_{x \rightarrow 2} \frac{x^2 - 3x - 2}{2x^2 - 5x + 2}$

4B. Give the domains of the following functions:

(i) $y = \frac{1}{x^2 - x}$ (ii) $y = \sqrt{x^3 - x}$ (iii) $y = \frac{x^2 + 3}{x^2 + |x|}$

4C. Define monotone functions. Sketch the graph of $f(x) = \sin x$, $-\frac{\pi}{2} < x < \frac{\pi}{2}$ and its inverse.

(4+6+6 = 16 marks)

5A. A small circle is inscribed inside a square and a larger circle circumscribes the same square. Find the ratio between areas of the circles.

5B. Evaluate (i) $\int(\sqrt{x} + x - x^{-3})dx$ (ii) $\int e^{ax} \cos bx dx$ (iii) $\int \cos^2 x dx$.

5C. Find the length of one side, the perimeter and area of a regular octagon, given the distance between two opposite sides.

(4+6+6 = 16 marks)

6A. Solve: $e^y dx + (xe^y + 2y)dy = 0$.

6B. Solve:

(i). $y(x + 1)dx + (x + 2y - 1)dy = 0$. (ii). $\cos x dy = y(\sin x - y)dx$.

6C. Solve:

(i). $y' + xy = xy^3$ (ii). $(x^2y^3 + xy) \frac{dy}{dx} = 1$.

(4+6+6 = 16 marks)

