15

SK—0426

FIRST YEAR B.Sc. RADIOGRAPHY DEGREE EXAMINATION, 1999

PHYSIOLOGY (R.S.)

(1997—98 Batch)

Time : Three Hours | Maximum : 80 Marks

1. Describe chemical regulation of respiration. (10 marks)

2. Describe digestion and absorption of proteins in the gastrointestinal tract. (10 marks)

3. Write a brief relevant notes on any *eight* of the fallowing :—

   1 Smell sensation.
   2 Tympanic reflex.
   3 Five actions of sympathetic system.
   4 Rh system of blood group.
   5 Growth hormone.
   6 Inspiration.
   7 Secretory phase of menstrual cycle.
   8 Visual pathway.
   9 Anaemia.
   10 Diastolic phases of cardiac cycle.

   (8 × 5 = 40 marks)

4. Write most appropriate answers for the following :—

   (a) Name inspiratory muscular.
   (b) Name hormones of posterior pituitary.
   (c) Name *four* abnormal constituents of urine.
   (d) Name *four* errors of refraction.
   (e) Name *two* constituents of saliva and their action.
   (f) Heart sounds.
   (g) Name different parts of large intestine.
   (h) Name four constitutents of Bile.
   (i) Name *two* ascending tracts.
   (j) Name *two* hormones secreted by Thyroid gland.

   (10 × 2 = 20 marks)

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SK—0423

FIRST YEAR B.Sc. RADIOGRAPHY DEGREE EXAMINATION, 1999

ANATOMY AND PHYSIOLOGY

(1996—97 batch)

Time : Three Hours Maximum : 80 Marks

Answer Section A in a **separate** *answer books and Section B.*

Your answers shall be specific to the questions asked.
Draw neat and labelled diagrams wherever necessary.

Section A (Anatomy)

I. Long Essay :

Define a joint. Classify synovial joints and types of movements. Give suitable examples. (1 × 10 = 10 marks)

II. Short Essay answer any *four* of the following :—

1 Describe briefly the Gross Anatomy of the tongue.
2 Give an account of the ovary.
3 Describe the structure of compact bone.
4 Give a brief account of the arterial supply of the heart.
5 Classify joints with examples.

(4 × 5 = 20 marks)

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III. Short Answers :

1 Name the parts of the Hind Brain.
2 Classify ribs.
3 Name any *two* muscles of the upper extremity with actions of the muscles.
4 Give the importance of the secondary centre in the lower end of the femur.
5 Name the hormones secreted by the islets of Langerhans of pancreas.

(5 × 2 = 10 marks)

Section B (Physiology)

I. Long Essay :

Describe the formation of urine in brief. (10 marks)

II. Short Essay :

1 Mention the functions of W.B.C.'s (White blood corpuscles.)
2 Name the anterior pituitary hormones. Mention the functions of each.
3 What is normal body temperature ? Write in brief about regulation of body temperature.
4 Draw a neat labelled diagram of visual pathway.
5 Describe the micturition reflex.

(4 × 5 = 20 marks)

Turn over

III. Short Answers :

1 Define the menstrual cycle.
2 Mention the functions of saliva.
3 Mention the functions of conducting zone of the respiratory tract.
4 Mention the primary tastes.
5 Define micturition reflex.

(5 × 2 = 10 marks)

17

SK—0422

FIRST YEAR B.Sc. RADIOGRAPHY DEGREE EXAMINATION, 1999

ENGLISH

Time : Three Hours Maximum : 80 Marks

Your answers shall be specific to the questions asked.

I. Answer any *ten* of the following :—

1 Why do people commit suicide ?
2 What are the three ways in which cigarette smoking can cause sudden death ?
3 What is meant by "Cult" ? Why is drug addiction called a Cult ?
4 What is the author hinting in this sentence "They all had to sleep standing up" ?
5 What are the *three* major factors that cause pollution ?
6 What are the several forces that draw people into the computing world ?
7 What is an "artery" ?
8 Who is said to be unemployed ?
9 What is meant by curriculum vitae ?
10 What are the *two* simplest and commonest words in English ?
11 Why are Employment exchanges are called "Exchanges" ?
12 In what ways General Knowledge is helpful.

(10 × 3 = 30 marks)

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II. Who *or* what are they ?

1 Yuri Gagarin.
2 Amrita Pritam.
3 Bankim Chandra Chatterji.
4 Charles Darwin.
5 Zodiac.
6 Paradise Lost.
7 War and Peace.
8 Shakuntala.
9 A syllable.
10 Lexicographer.

(10 marks)

I. Fill up the blanks as directed :

1 Select the correct word and write it in the space provided :

(a) Robert is a very ——— person. (practicable ; practical)
(b) He is the ——— speaker. (principle ; principal)

2 Fill in the blanks with suitable prepositions :

This is a money order sent ——— Srinath, who lives ——— Madras, ——— the finance officer ——— Aruna Textiles.

Turn over

3 Fill in the blanks with a, an, *or* the :

Were you born in ——— large city ? ——— place I was brought up in had ——— very small population. It was such ——— small place that it did not have a movie theatre.

(10 marks)

IV. 1 What is the most common pattern adopted while writing a paragraph ?

2 Write a paragraph on *one* of the following :

(a) The advantages of using a bicycle as a mode of transport.

(b) Deforestation and the damage done to the environment.

3 Describe the general procedure adopted while note-making.

4 Expand : A stick in time saves nine.

(4 × 5 = 20 marks)

V. 1 Make a mention of the *three* different types of reports.

2 Write a report on any *one* :

(i) Torrential rains and how it affected road transport.

(ii) How a lost child was restored to its mother at a fair.

(2 × 5 = 10 marks)

SC—0653 18

FIRST YEAR B.Sc. (RADIOGRAPHY) DEGREE EXAMINATION, 1999

PHYSIOLOGY

(1997–98 Batch)

Time : Three Hours

Maximum : 80 Marks

Instructions to Candidates :

(1) *Your answers shall be specific to the questions asked.*
(2) *Draw neat and labelled diagrams wherever necessary.*
(3) *Answer the questions completely in one place only.*

I. Long Essays (Answer any *two*) :

1 Describe the steps of Erythropoiesis. Enumerate factors required for it.
2 Describe different phases of menstrual cycle.
3 Name the hormones produced by the posterior pituitary gland and describe its actions.

(2 × 10 = 20 marks)

II. Short Essays. (Answer any *eight*) :

4 Haemoglobin.
5 Blood groups.
6 Lung volumes and capacities.
7 Actions of Thyroxine.
8 Errors of refraction.
9 Temperature regulation.
10 Function of Bile juice.
11 GFR.
12 Systolic phases of cardiac cycle.
13 Functions of middle ear.

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(8 × 5 = 40 marks)

III. Short Answers :

14 Name expiratory muscles.
15 Name primary taste sensations.
16 Nephron.
17 Name hormones of Adrenal cortex and medulla.
18 Name hormones of Pancreas.
19 Receptors of vision.
20 *Five* actions of parasympathetic system.
21 Name *four* abnormal constituents of urine.
22 Name hormones of Anterior pituitary.
23 Name *four* respiratory centres.

(10 × 2 = 20 marks)

19

SK—0424

FIRST YEAR B.Sc RADIOGRAPHY DEGREE EXAMINATION, 1999

PRINCIPLE OF PHYSICS AND MATHEMATICS

(1996—97 Batch)

Time : Three Hours | Maximum : 75 Marks

Answer Section A and B **separately.**

Section A (Physics)

(Marks 38)

I. State fundamentals postulates of Bohr's atomic theory and write down general expression for radii and energy of the Bohr orbits and explain the terms involved in it.

Calculate the radius and energy of the first orbit of hydrogen using following data. $n = 6.634 \times 10^{-34}$ J. Sec. $m_e = 9.11 \times 10^{-31}$ kg. and $e = 1.602 \times 10^{-19}$ Coulombs.

(8 marks)

II. Answer the following questions :—

1 What is radioactivity ? List *five* important properties of α, β and γ radiation.

2 State and explain Newton's second law of motion and define force in C.G.S. and M.K.S. systems.

3 What is photoelectric effect ? Write down Einsttein's photoelectric equation and explain the terms involved in it. A Photon has an energy of 10 eV. Calculate its wavelength.

4 What are X-rays and how they are produced ? Discuss their properties and important application.

(4 × 5 = 20 marks)

III. State and explain the following :—

(a) Define velocity, acceleration and give their units in S.I. and C.G.S. system.

(b) Isotopes and hold-life period.

(c) Electron volt.

(d) Draw the energy level diagram of hydrogen atom and mention its series.

(e) The velocity of Photo electron is depend on frequency of incident height. Why ?

(5 × 2 = 10 marks)

Section B (Mathematics)

(Marks 37)

I. If u and v are the function of x, show that :

$$\frac{1}{y}\cdot\frac{dy}{dx} = \frac{1}{u}\cdot\frac{du}{dx} + \frac{1}{v}\cdot\frac{dv}{dx},$$

where $y = u \cdot v$.

(7 marks)

II. Solve :

(a) If $y = x^3 \tan x - \frac{e^x}{x}$ find $\frac{dy}{dx}$.

(b) $\lim_{x \to 1} \frac{x^2 - 4x + 3}{x^2 - 5x + 4}$.

Turn over

(c) Show that the function :

$$f(x)=\begin{cases} x+2 & \text{in} \quad 1\le x<2 \\ 4 & \text{when} \quad x=2 \\ 3x-2 & \text{in} \quad x>2 \end{cases}$$

is continuous at $x = 2$.

(d) Evaluate $\int_0^{\pi/4} \frac{\text{Sec}^2 x}{1+\tan x} \cdot dx$.

(4 × 5 = 20 marks)

III. Evaluate the following :

(a) If $f(x) = \sqrt{2x+3}$, find $f'(3) = ?$

(b) Find the complex conjugate of $\frac{1}{(1+i)^2}$.

(c) $\lim_{n\to\infty} \frac{3x^2-7x+8}{2x^2+9x-7}$.

(d) Find the area bounded by the parabola $y^2 = 4ax$, x– axis and $x = 1$, $x = 4$.

(e) Differentiate $\sqrt{\sin\ (2x+3)}$.

(5 × 2 = 10 marks)

20

(Pages 2) **SC—0654**

FIRST YEAR B.Sc. (RADIOGRAPHY) DEGREE EXAMINATION, 1999

RADIOLOGICAL PHYSICS

(1997–98 Batch)

Time : Three Hours Maximum : 80 Marks

Instructions to Candidates :

(1) *Your answers shall be specific to the questions asked.*
(2) *Draw neat and labelled diagrams wherever necessary.*
(3) *Answer the questions completely in one place only.*

I. Long Essays (Answer any *two*) :

1 Draw the figure of a rotating anode X-ray tube and label the parts.
Describe the construction of the anode and rotor part.
Explain briefly the physical processes (conduction, convection and radiation) involved in the cooling of the target.

2 Describe the construction of a step-up transformer. What is the function of the core material ? How do you overcome the iron loss and copper loss ?

3 Define (i) Linear attenuation coefficient ; (ii) Mass attenuation coefficient ; (iii) Half value thickness ; and (iv) Tenth value thickness.
Obtain the relationship between Linear attenuation coefficient and Half value thickness. If the Half value thickness for 660 KeV gamma photons is 6 mm. of lead, calculate the linear attenuation coefficient mentioning the correct unit.

(2 × 10 = 20 marks)

II. Short Essays (Answer any *ten*) :

4 Role of photoelectric effect in diagnostic radiology.
5 Continuous and characteristic X-ray spectrum.
6 Inverse square law.
7 Nuclear transformation following Alpha decay, three types of Beta decay.
8 Artificial radioactivity and its application in medicine.
9 Compton interaction of radiation with matter.
10 Effect of Filtration on a heterogeneous X-ray beam.
11 Exposure, absorbed dose and dose equivalent.
12 P-N junction as a diode rectifier.
13 Fluorescence and phosphorescence.
14 Exponential radioactive decay.
15 Ray proofing and shock proofing as applied to X-ray tube inserts.

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(10 × 5 = 50 marks)

Turn over

III. Short Answers :

16 What is the wavelength (in Angstrom units) of a 124 KeV photon ?

17 Given the half life of ^{60}Co isotope to be 5.25 years, what will be the fraction of activity remaining after Five half lives ?

18 Given that the volt per turn ratio to be equal to one in a transformer, what is the number of turns required on the secondary side to produce 100 kilovolts. (Assume zero transformer losses).

19 What is the difference between an Ammeter and an Voltmeter ?

20 What is an electron volt ?

$(5 \times 2 = 10$ marks)

SK—0427

FIRST YEAR B.Sc. (RADIOGRAPHY) DEGREE EXAMINATION, 1999

RADIOLOGICAL PHYSICS

(1997—98 Batch)

Time : Three Hours Maximum : 80 Marks

Answer **all** *questions.*

1. (a) Draw a neat diagram of a fixed Anode X-ray tube (Tube part only) and label the parts. (4 marks)

   (b) Describe the two types of X-ray photon spectrum obtained from an X-ray tube. (3 + 3 = 6 marks)

2. (a) Define (i) Linear attenuation coefficient ; (ii) Mass attenuation coefficient ; (iii) Half value thickness (HVT) ; and (iv) Tenth value thickness (HVT). (6 marks)

   (b) Obtain the relationship between Linear attenuation coefficient and Half value thickness. (2 marks)

   (c) If the HVT for 1.25 MeV gamma photons is 11 mm. of lead, calculate the linear attenuation coefficient, mentioning the correct unit. (1 + 1 = 2 marks)

3. Write short notes on the following (any *ten*) :—
   1 Importance of photoelectric effect in the diagnostic X-ray energy range.
   2 Free air ionisation chamber.
   3 Autotransformer.
   4 Hysteresis.
   5 Nuclear transformation following radioactive decay.
   6 Artificial radioactivity.
   7 Cooling of an X-ray tube target (fixed).
   8 Inverse square law.
   9 Full wave rectifier.
   10 Maximum permissible Dose.
   11 Exponential decay.
   12 Condenser ionisation chamber.

   (10 × 5 = 50 marks)

4. Short Answer :
   (a) Assuming zero transformer power losses, calculate the number of turns in the secondary winding to produce 100 kilovolts R.M.S. Given that the volt (R.M.S.)/turn ratio equal to one in the primary winding.
   (b) What do you understand by the term "Lead Equivalent Thickness" ?
   (c) How would you remove soft energy components on the X-ray spectrum ?
   (d) Differentiate between "Absolute Dose" and "Dose Equivalent".
   (e) What do you understand by the term "Copper Loss" as applied to transformers ?

   (5 × 2 = 10 marks)