C. U. PHYSIOLOGY (HONS.) QUESTION PAPERS—2017

| Under 1+1+1 System Part–I, II & III | New Syllabus

FIRST PAPER—2017

Full Marks —100

Unit—I

1. *(a)* Distinguish among the uniport, symport and antiport translocation system. *(b)* What is a gap junction? Describe in structura model. *(c)* Write a note on functional significance of connexion. 5+(1+2)+2

Or, *(a)* Distinguish between ion-channels and ionophores. *(b)* Describe the structure and function of rough endoplasmic reticulum. *(c)* What are microsomes? 3+(4+2)+1

2. *(a)* Discuss the role of MAP-Kinase in signal transduction. *(b)* How is cell cycle regulated by cyclins? *(c)* What is genome? Mention its characteristics. 3+4+(1+2)

Or, *(a)* Distinguish between nuclear and mitochondrial DNA. *(b)* Discuss the role of IP_3 and DAG in cetlular signal transduction. *(c)* What are mitoplasts? 3+(3+3)+1

3. *(a)* What is surface tension? Name two factors influencing surface tension. *(b)* Briefly explain the implication of surface tension phenomenon in lung compliance. *(c)* What is viscosity? Discuss its biological applications. (1+2)+2+(2+3)

Or, *(a)* Deduce Henderson-Hasselbalch equation and mention its significance. *(b)* Describe the "salting in" and "salting out" properties of colloids. *(c)* What is osmotic work? (3+2)+(2+2)+1

4. *(a)* Differentiate between active site and allosteric site of an enzyme. *(b)* Explain the "induced fit" model of enzyme-substrate interaction. *(c)* State the significance of rate limiting enzyme. *(d)* What are ribozymes? 2+4+2+2

Or, *(a)* Distinguish between prosthetic groups and co-enzyme. *(b)* Describe the kinetic properties of non-competetive inhibition of enzymes. *(c)* What is Hill's equation? Mention its significance. 2+4+(3+1)

5. *(a)* What is steatorrhea? *(b)* Write a note on gall-stone. *(c)* State the identifying characteristics of histological structure of pancreas. *(d)* State the significance of enterohepatic circulation. 2+3+2+3

Or, *(a)* Discuss the mechanism of fat absorption in the G.I. tract. *(b)* Explain deglutition reflex. *(c)* Write a note on gall-stone. 4+3+3

Unit–II

6. *(a)* What is meant by anomerism of sugars ? *(b)* Explain why a disaccharide like lactose exhibit reducing properly where as sucrose does not. *(c)* What are eicosanoids? *(d)* Explain the significance of saponification number of fat. 2+4+2+2

Or, *(a)* What happens when glucose reacts with strong mineral acid and dilute alquous alkali? *(b)* What are sphinomyelines? Where are they found in human body? *(c)* Distinguish between steroid and sterol. (2+2)+(2+1)+3

7. *(a)* Mention Sanger's and Edman's reagents. *(b)* Explain the principle of ninhydrin reaction and mention its practical significance. *(c)* What is meant by denaturation and annealing of DNA ? 2+(3+1)+(2+2)

Or, *(a)* Write down the systemic name and structure of histidine and valine. *(b)* What are *phi* and *psi* angles in structures of peptide bonds? *(c)* What is half cot value? (2+2)+(2+2)+2

8. *(a)* Why should the practice of consumption of raw egg be discouraged ? *(b)* Mention the physiological role of riboflavin. *(c)* State the physiological function of phosphorous. *(d)* Explain the biochemical basis of the problem caused due to intake of water containing excess of fluoride. 2+2+3+3

Or, *(a)* Discuss the importance of iron in human body. *(b)* Mention the deficiency symptoms of Vitamin B_{12}. *(c)* Discuss the physiological importance of inositol. 4+3+3

9. *(a)* What is Ryanodine receptor? Discuss its role during excitation contraction coupling of skeletal muscles. *(b)* Distinguish between isometric and isotonic contraction. (2+4)+(2+2

Or, *(a)* Discuss the molecular basis of smooth muscle contraction. *(b)* Distinguish between isometric and isotonic contractions. *(c)* What is optimal load? 5+3+2

10. *(a)* With the help of a strength-duration curve, explain Rheobase, Chronaxie and utilization time. *(b)* Differentiate between End Plate Potential (EPP) and Miniature End Plate Potential (MEPP). *(c)* What is synaptosome? 5+(2+2)+1

Or, *(a)* Discuss the ionic events that take place during the various phases of nerve action potential. *(b)* Discuss briefly the thermal changes of nerve during activity. *(c)* What is current of injury? 5+3+2

PHYSIOLOGY—HONOURS

SECOND PAPER—2017

(Group—A)

Full Marks — 50

Unit—3

1. (a) Why more carbonic acid is formed within the RBC than plasma? (b) Describe the fate of hemoglobin in our body. (c) Why blood does not coagulate within the blood vessels? (d) Why haem is tagged with globin? (e) What is thrombosis? (f) Mention two major functions of plasma protein in human. 1+3+2+1+1+2

Or, (a) What is iron overload disease? (b) Describe the role of vitamin B-12 and folic acid on erythropoiesis. (c) Discuss briefly the precautions taken during blood transfusion. (d) What is procoagulants? 2+4+3+1

2. (a) What do you mean by exploring electrode and indifferent electrode ? (b) Describe the physiological significance of PR-interval in ECG. (c) What is slow diastolic depolarisation phase? (d) Name the different auscultatory areas where heart sounds are better heard. (e) State Fick's law in the measurement of cardiac output. 2+2+2+2+2

Or, (a) What is vectorcardiogram? (b) What are the differences between unipolar limb leads and augmented limb leads? (c) Describe with diagram the Length-Tension relationship of cardiac muscle.

(d) Graphically show the pressure changes of the atria during different phases of cardiac cycle and explain. 2+3+2+3

3. (a) Distinguish between 'Capacitance' and 'Resistant' vessels. (b) Explain the factors causing the tendency for turbulent flow. (c) What do you mean by short term and long term regulation of blood pressure? (d) What is ANF ? 2+2+(2+2)+2

Or, (a) What is Poiseuille's law? How does this law affect the resistance to blood flow ? (b) Describe the role of chemoreceptor in the regulation of blood pressure in human. (c) What is the arterial pulse? State its physiological significance. (2+2)+4+2

4. (a) Why coronary flow is reduced during systole of the heart? (b) Describe the significance of portal circulation. (c) Why protein content is greater in lymph than tissue fluid ? (d) State the role of bradykinin in skeletal muscle circulation. (e) What is stress relaxation of blood vessel? 2+2+2+2+2

Or, (a) Distinguish between the histological structure of lymph gland and spleen with labelled diagram. (b) Mention the peculiarities of pulmonary circulation. Why pulmonary bed remains dry ? 4+(4+2)

5. (a) What is Ventilation-Perfusion ratio? (b) Mention the importance of Spirometry in the diagnosis of respiratory disease. (c) What is the significance of alveolar surfactant? Mention its source and composition. 2+3+(2+1+2)

Or, (a) What are Hering-Breuer inflation and deflation reflex? (b) What is emphysema? (c) Discuss the non-respiratory functions of Lungs. (d) What is reverse chloride shift ? 4+2+2+2

PHYSIOLOGY — HONOURS [Part—II : 2nd year]

THIRD PAPER — 2017

Full Marks — 100

Unit–05

1. (a) Mention the anatomical, functional and the chemical classification of autonomic nervous system. (b) Describe gray and white rami communicals with a labelled diagram. (2+2+2)+(2+2)

Or, (a) Give reason of internal hydrocephalus. Why is it called noncommunicating hydrocephalus? (b) Define Stellate and Coccygeal ganglia. (c) Give a comparative account of summation, occlusion and subliminal fringe in reflex action. (2+1)+2+5

2. (a) Describe the sensory and motor changes that occur after hemisection of spinal cord. (b) Write the functions of spino-reticular and reticulospinal tracts. 6+(2+2)

Or, (a) Describe with a diagram the origin, course and termination of corticobulbar tract. (b) What is Comma tract of Schultz ? (2+6)+2

3. (a) Discuss the role of γ motor neuron in the maintenance of muscle tone. (b) What are the location and functions of cristae ampullaris ? (c) Write the role of hypothalamic centres in hunger and thirst. 4+(1+1)+4

Or, (a) Describe the symptoms developed due to the bilateral destruction of temporal lobe of Cerebrum. (b) Differentiate decerebrate rigidity and decerebellar rigidity. (c) Differentiate specific and non-specific nuclei of thalamus with examples. 4+2+4

4. (a) Define mesocortex. (b) What is Septal rage? (c) What is evoked cortical potential? Describe its different phases. (d) Discuss the neural basis of EEG. 2+2+(1+2)+3

Or, (a) Write briefly about the neuronal mechanism of NREM and REM sleep. (b) Distinguish between fluent and nonfluent aphasia. (5+2)+3

5. (a) Define ionotropic receptor with suitable examples. (b) Describe the structure and functions of different types of muscarinic receptors. 4+6

Or, (a) Name two chemicals that can interact with opiate receptors. (b) Mention the functions of the opiate receptors. (c) Describe the structure and functions of different GABA receptors. 2+4+4

Unit–06

6. (a) Outline the principle of construction of Photoelectric colorimeter. (b) What do you mean by numerical aperture of a compound microscope? State its significance. 6+(2+2)

Or, (a) Mention the differentiating features of SEM and TEM. (b) Briefly write the uses of the following microscopes in examining biological specimens. (i) Phase contrast microscope. (ii) Fluorescence microscope (iii) Confocal microscope. 4+(2+2+2)

7. (a) Define filtration fraction. (b) What is splay ? Demonstrate graphically the relation between plasma. glucose level (PG) and the amount of glucose reabsorbed in renal tubules (TG). (c) What do you mean by osmotic diuresis? 2+(2+3)+3

Or, (a) Write the role of pelvic nerve. pudic nerve and hypogastric nerve in micturition. (b) Mention the importance of inulin clearence test. (c) What is meant by autoregulation of renal blood flow? 6+2+2

8. (a) Describe the structure of Olfactory epithelium with a neat diagram. (b) Describe the transduction process in the Pacinian corpuscle. (4+2)+4

Or, (a) Describe the location and cellular components of taste buds. (b) What is meant by successive contrast and simultaneous contrast in taste sensation? (c) What is umami taste modality ? Discuss the transduction mechanism of all the basic taste modalities in brief. (1+2)+(1+1)+(1+4)

9. (a) Describe the role of ear ossicles in the transmission of sound waves across the middle ear. (b) What is tympanic reflex? (c) Define the conduction deafness. 6+2+2

Or, (a) What is bel? (b) Define masking? (c) What is prestin ? (d) Write a short note on audiometry. 2+2+2+4

10. (a) What do you mean by complementary colour? Discuss briefly the physiological basis of colour perception. (b) What are meant by dichromats and trichromats ? (1+7)+2

Or, (a) Name the receptors for scotopic and photopic vision. (b) What do you mean by dark adaptation? Discuss the role of visual pigment in this mechanism. (c) What is melanopsin ? (d) What is critical fusion frequency? 2+(1+3)+2+2

PHYSIOLOGY — HONOURS

FOURTH PAPER—2017

Group – A (Unit – 07)

Full Marks – 50

1. *(a)* How can different hexose sugars enter the pathway of glycolysis? *(b)* Why does not gluconeogenesis occur just via the reversal of glycolysis? *(c)* Describe the steps of pentose phosphate pathway leading to the formation of NADPH. *(d)* Can NADPH produce ATP? Rationalize your answer. 4+2+3+1

Or, *(a)* What do you understand by oxidative decarboxylation? *(b)* Name the coenzymes and prosthetic groups of pyruvate dehydrogenase complex and state their functions. *(c)* What is meant by phosphorolysis? How does it occur in glycogenolysis? 1+5+(1+3)

2. *(a)* State the origin and synthesis of nitric oxide in human body. Mention its physiological significance. *(b)* Describe the steps of conversion of phenylalanine to fumarylacetoacetic acid in our body. (1+2+1)+6

Or, *(a)* Describe the pathway by which AMP is converted to uric acid. *(b)* What are glucogenic and ketogenic amino acids? Give examples. *(c)* What is gout ? 6+3+1

3. *(a)* What is malonyl CoA? How is it synthesized in human body? *(b)* How does excess dietary cholesterol affect its endogenous biosynthesis? *(c)* How does fatty acid oxidation inhibit glycolysis? *(d)* Name the composition of lecithin and cephalin. (1+3)+2+2+2

Or, *(a)* Describe with a suitable diagram the structural and functional organization of the multienzyme complex involved in the synthesis of fatty acids from acetyl CoA. *(b)* How are H_2O_2 and superoxide radicals formed in cells? How do they cause cell damage? (2+4)+(2+2)

4. Write short ntoes on ***any two*** of the following : 5+5

(a) Autoradiography *(b)* Density gradient ultracentrifugation *(c)* Immunoblotting.

Or, *(a)* What is Svedberg's unit? *(b)* Write the principle of ion-exchange chromatography and mention its applications. *(c)* What is meant by R_f value in chromatography? 2+(4+2)+2

5. *(a)* Describe the process of initiation of transcription in prokaryotes. *(b)* What is meant by the coding strand of DNA? *(c)* Mention two major differences between prokaryotic and eukaryotic protein synthesis. 6+2+2

Or, *(a)* Explain catabolite repression of *lac* operon in *E.coli*. *(b)* Write principle, procedure and application of Southern blotting technique. 2+3+1

PHYSIOLOGY — HONOURS [Part—III : 3rd year]

FIFTH PAPER – 2017

Full Marks – 100

1. (a) Classify hormones according to their chemical natures with suitable examples. (b) State the endocrinological cause of following diseases : (i) Cushing Syndrome (ii) Addison's Disease (iii) Cretinism. 4+(3×2)

Or, (a) Mention the chemistry of growth hormone. (b) Discuss the role of growth hormone on cellular metabolism. (c) Why ADH and oxytocin are called neurohormones ? 2+6+2

2. (a) Describe with suitable diagram the histological features of thyroid gland in normal hypo and hyperactive state. (b) Discuss the role of sodium-iodide pump in synthesis of thyroid hormones. 6+4

Or, (a) Discuss the functional aspects of PTH and Calcitonin in human body. (b) What are thymosins ? (c) What is Wolf-Chaikoff effect? 6+2+2

3. (a) Mention the biochemical pathway for the synthesis of adrenal medullary hormones. (b) What are Kinins ? (c) Define foetal cortex with its two important functions. 3+4+3

Or, (a) Discuss the chemical nature of mineralocorticoids. (b) How aldosterone regulates the hydro-mineral balance? (c) What do you mean by Aldosterone escape? 2+6+2

4. (a) Describe the localisation of α and β cells in human pancreatic islets of Langerhans. (b) Discuss the pathophysiology of type I and II diabetes. (c) "Insulin is administered through intravenous injection" - explain with reason(s). 2+6+2

Or, (a) Discuss the mechanism of action and functions of PDGF. (b) Discuss the source and functions of Secretin in human body. (2+3)+5

5. (a) Write a short note on — "Sleep Wakeful Cycle". (b) Discuss the role of adrenocortical hormones and prolactin in the regulation of biorhythms. 4+(3+3)

Or, (a) Write a short note on time keeping genes. (b) How does shift work affect biorhythms ? (c) What are somnogens ? 4+4+2

6. (a) Write a note on oogenesis. (b) What is cryptorchidism ? (c) What do you mean by blood-testis barrier? 5+2+3

Or, (a) Discuss the endocrine functions of Testis. (b) Describe how estrogen positive feedback is pivotal to stimulate the LH surge required for ovulation. 5+5

7. (a) Describe the changes in the ovary and uterus in different phases of menstrual cycle. (b) What are the physiological changes associated with the onset of menopause? 6+4

Or, (a) Write a short note on the immunological basis of pregnancy test. (b) What do you know about maternal recognition of pregnancy? (c) What is lactational amenorrhoea? 4+4+2

8. (a) Describe the process of ossification. (b) What do you mean by committed stem cell ? 7+3

Or, Describe the embryonic development of human urinary system with suitable diagram. 6+4

9. (a) Write a short note on the physiology of obesity. (b) Define SDA. (c) What do you mean by ACU ? 6+2+2

Or, (a) What are the different methods that are commonly used for diet survey? (b) Write a brief note on dietary fibre. 6+4

10. (a) Discuss how Assisted reproductive technology can solve the problem of infertility. (b) Write a note on principles of immunization. 6+4

Or, Discuss the measures that could be taken for prevention of hepatitis. (b) What do you know about idiopathic and male factor infertility? (c) Write a short note on — Prevention of AIDS. 4+3+3

PHYSIOLOGY—HONOURS

SIXTH PAPER—2017

Full Marks — 100

Unit – 11

1. (a) What is ergonomics? Discuss briefly its application in the improvement of work efficiencies of industrial workers. (b) Discuss the significance of implication of frequent work-rest cycles in a long duration (more than 8 hrs. in a day) industrial work. (2+3)+5

Or, (a) What is iso-kinetic work ? (b) Describe one direct and one indirect method for the assessment of energy cost of a 30 years old Load handling worker during lifting of 50 kg weight from ground to head level. 2+(4+4)

2. (a) What are 'warm up' and 'cool gown' activities in sports? (b) Discuss briefly the significance of maximal oxygen consumption and excess post exercise oxygen consumption of sports personals.(2+2)+(3+3)

Or, (a) What is pre competition meal? (b) What do you mean by lactate threshold? (c) How Harvard step test differs from modified Harvard step test? (d) How do you measure physical fitness of a female college student of 19 years old by the application of modified Harvard step test? 2+2+2+4

3. (a) What is pyrexia ? (b) State the importance of insensible perspiration in thermoregulation. (c) Discuss the hormonal regulation of sweat secretion. 2+3+5

Or, (a) Describe the functions of skin. (b) What is the role of brown fat in regulation of body temperature? 6+4

4. (a) Describe two different heat disorders normally experienced by human being in hot humid and hot dry environments. (b) Discuss about different preventive measures normally taken against the development of above mentioned heat disorders. (2+2)+6

Or, (a) Describe the human respiratory changes due to acclimatization to high altitudes. (b) What is hyperbaric environment? (c) What are 'bends' in Caisson disease ? 6+2+2

5. (a) Describe the effect of continuous and impact noise on the auditory system of human being. (b) State two distinct preventive measures (controls) taken by human being against the hazards of noise pollution.5+5

Or, (a) Describe the physiological effects of ionizing radiation. (b) Describe the protective measures taken by human being when working with radioactive elements. 4+6

Unit—12

6. (a) Correlate the principle of Gram staining with structure of bacterial cell wall. (b) Classify bacteria according to oxygen requirement for their growth. (c) Discuss briefly the methods of prevention of food-borne infection. 4+3+3

Or, (a) What do you mean by pasteurization? (b) Why moist heat scores over dry heat in sterilization? (c) Classify bacteria according to the temperature requirement for their growth. To which group human pathogenic bacteria belong? (d) Name one sporing bacteria. What structural peculiarity makes spore heat-resistant? 2+1+(3+1)+(1+2)

7. (a) Describe the process of bacterial transformation. What is an F+cell ? (b) Define antibiotics. State the mechanism of action of any bacteriocidal antibiotic. (5+1)+(1+3)

Or, (a) What do you mean by 'Lactic fermentation'? (b) State the significance of glyoxalate cycle. (c) Define virion. Classify viruses based on nucleic acid composition and give examples. (d) Describe with a diagram the structure of a bacteriophage. 2+1+(1+2)+4

8. (a) 'All immunogens are antigens but all antigens are not necessarily immunogens'. Explain. (b) Describe the structure of MHC class I molecule. (c) What do you mean by passive immunization? Give example. (d) What do you mean by D A vaccine? 2+4+2+2

Or, (a) Describe briefly the classical pathway of complement activation. (b) Distinguish between affinity and avidity in antigen-antibody reaction. (c) What do you mean by CTLS? (d) What are allergens? Name the antibody secreted during immune res ponses in allergy.5+2+1+(1+1)

9. (a) What is bioavailability? (b) Distinguish between an agonist and antagonist. (c) What is a dose-response curve? State its characteristics. 2+3+(2+3)

Or, (a) What is drug toxicity? (b) State the uses of zolpidem. (c) What is meant by 'therapeutic index'? (d) Name 'one specific compound for each of the following : (i) Loop diuretic; (ii) Carbonic anhydrase inhibitor; (iii) Osmotic diuretic; (iv) Potassium sparer. 2+2+2+4

10. (a) Describe the properties of students t distribution. (b) Write short notes on : (i) Degrees of freedom; (ii) Standard error. 4+(3+3)

Or, (a) State the steps for computation of a simple linear regression. (b) Explain the conditions under which a two-tail or one tail significance test is undertaken. (c) Distinguish between : Papulation and sample. (d) State the uses of pie diagram. (e) What is a dichotomous variable? 3+2+2+2+1