Reg. No.										

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2018

SUBJECT: PHYSIOLOGY– PAPER I (ESSAY)

Friday, June 01, 2018

Time: 10:20 – 13:00 Hrs. Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long Essays:**

1. A 56 year old patient presented himself for treatment of burns after having accidentally touched a hot object. He said he neither felt heat nor pain at the time of burn. Examination showed a loss of pain and temperature sensation over thorax and upper extremities. There was no disturbance of tactile sensibility. The sense of joint movements and position were intact. There were no disturbances of motor function. A diagnosis of Syringomyelia was made.

1A. Draw a labelled diagram showing the dorsal column medial leminiscal pathway and lateral spinothalamic tract from upper limbs.

1B. Explain why pain and temperature sensations are affected while other sensations are intact in the above case?

1C. Name the receptors mediating pain and touch sensations. Mention the type of receptor adaptation in the two types of receptors.

(6+2+2 = 10 marks)

2. A 21-year-old female with a history of type I diabetes mellitus was admitted to the emergency in a state of coma. Her blood glucose was 560 mg/dL, urine showed presence of glucose and ketones; serum bicarbonate was 18 mEq/L. Her respiration was deep and rapid; breath had an acetone odour. Her blood pressure was 90/60 mm Hg and her pulse was weak and rapid (120 beats/min).

2A. Explain the acid-base status of this individual and elaborate the cause for the same.

2B. Explain the physiological actions of the hormone that is deficient in this condition on carbohydrate and lipid metabolism.

(3+7 = 10 marks)

3. **Short answer questions:**

3A. Describe the formation, circulation and drainage of aqueous humour. What is closed angle glaucoma?

3B. Mention the actions of parathormone in maintaining calcium homeostasis. What are the features of latent tetany?

3C. Based on the functional divisions, mention the role of cerebellum in control of posture and movement.

3D. A married woman who had regular 28-day-menstrual cycles, misses her period and consults her gynaecologist. The gynaecologist confirms pregnancy following the pregnancy test.

i) Give the physiological basis and principle of the pregnancy test that is performed.

ii) Explain the cause of amenorrhea in the above case.

3E. Differentiate isotonic contraction from an isometric contraction in skeletal muscle. Give appropriate example for each.

3F. List the steps and enzymes involved in synthesis of thyroid hormones. Based on this, represent the level at which TWO different antithyroid drugs exerts their actions.

3G. Explain the mechanism of activation of the receptors in semicircular canals of labyrinth, utricle and saccule. Mention TWO clinical features of damage to vestibular apparatus.

3H. List the features of REM sleep. Explain the role of hypothalamus in regulation of sleep-wake cycles.

3I. Compare and contrast postsynaptic inhibition with presynaptic inhibition.

3J. Explain the travelling wave theory of hearing.

3K. Explain the actions of ovarian hormones on the development of female secondary sex characteristics.

3L. Draw a labeled diagram to illustrate the regulation of hypothalamus-pituitary-testes axis.

3M. Describe the clinical features associated with excessive secretion of glucocorticoid hormones.

3N. A 5-year-old boy has been growing leaps and bounds. His height is 100% above normal for his age. He has been complaining of headache and vision problems. A CT scan reveals a large pituitary tumor pressing on optic chiasma causing a visual field defect.

i) Illustrate the cause of visual field defect in the boy using a labelled diagram.

ii) Define field of vision.

3O. Give the physiological basis for the following statements:

i) Na^+-K^+ ATPase pump is electrogenic.

ii) Action potential obeys "All or None law".

iii) Large fiber diameter increases the velocity of nerve conduction.

iv) Complete damage to motor neuron leads to denervation hypersensitivity.

(4 marks × 15 = 60 marks)

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MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2018

SUBJECT: PHYSIOLOGY– PAPER II (ESSAY)

Saturday, June 02, 2018

Time: 10:20 – 13:00 Hrs. Max. Marks: 80

✍ **All questions are compulsory.**

✍ **Long Essays:**

1. A 31 year old man arrived at the emergency after having sustained multiple injury that caused considerable amount of blood loss. On physical examination, the findings were as follows: BP - 80/60 mm of Hg, Pulse - 120/min & weak, RR - 22/ min & shallow.

1A. Name the above condition.

1B. Describe the cardiovascular compensatory changes that occur in the above mentioned condition to restore blood pressure.

2. Describe the role of countercurrent mechanism and ADH in formation of concentrated urine by the nephrons.

(10 marks × 2 = 20 marks)

3. **Short answer questions:**

3A. Describe the effects of preload and afterload on stroke volume.

3B. Give the Poiseuille - Hagen formula. Based on this, explain why the arterioles are considered to the principal site for regulating total peripheral resistance.

3C. Draw a labeled diagram to show the left ventricular volume changes during each cardiac cycle. Add a note on ejection fraction.

3D. Outline the changes in the fetal circulation occurring at time of birth.

3E. Define lung compliance. Explain how surfactant affects lung compliance.

3F. Explain the cause and significance of the sigmoid shape of the O_2 hemoglobin dissociation curve.

3G. Outline the role of muscles in thoracic expansion during quiet and forced breathing.

3H. Explain the role of central chemoreceptors in regulation of respiration.

3I. List any FOUR gastrointestinal hormones. Give the actions and regulation of secretion of ANY ONE.

3J. Name the proteolytic enzymes of exocrine pancreas and explain their activation and actions.

3K. Explain briefly gastric phase of gastric secretion.

3L. Briefly describe the different types of movements in small intestine.

3M. Explain the role of neutrophils in immunity.

3N. Give the total protein concentration in plasma. Explain how hypoalbuminemia leads to edema.

3O. Briefly explain all the anticlotting mechanisms occurring in vivo.

(4 marks × 15 = 60 marks)