

# Question Paper

Exam Date & Time: 29-Feb-2020 (02:00 PM - 04:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)  
MBBS PHASE - I STAGE - I DEGREE EXAMINATION - FEBRUARY/MARCH 2020  
Saturday, February 29, 2020

Physiology [M1PHY]

PHYSIOLOGY - PART - II (ESSAY)

Section Duration: 120 mins

Max. marks : 60

Answer all the questions

Draw diagrams wherever appropriate

1. A 53-year-old woman with history of respiratory problem visited her family physician with complaints of increasing fatigue and shortness of breath on mild exertion and more frequent bronchial infections. The physician sends her to the pulmonary function laboratory for a complete work up. The laboratory report shows the following values:  
Respiratory rate=20 breaths/min  
Tidal volume = 300 ml  
Forced vital capacity (FVC) = 3 litres  
Forced expiratory volume at the end of first second (FEV1) = 1.5 litres.
  - 1A. Calculate the 'respiratory minute volume' and 'timed vital capacity' in terms of percentage (FEV1/FVC) in this patient.
  - 1B. Comment on the respiratory rate and tidal volume in this patient.
  - 1C. Identify the type of lung disease this patient could be suffering from. Justify your diagnosis.  
(2 +1+2 = 5 marks)
- 2A. Define resting membrane potential and explain its ionic basis  
(3 marks)
- 2B. Mention any two differences between graded potential and action potential.  
(2 marks)
- 3A. Describe the regulation of secretion of thyroid hormones in the form of a flow chart.  
(3 marks)
- 3B. Mention any two actions of parathyroid hormone.  
(2 marks)
4. Describe the steps of neuromuscular transmission in skeletal muscles. Add a note on denervation hypersensitivity.  
(4+1 = 5 marks)

5. Write physiological basis for the following:
- 5A. Plasma is transfused for treatment of shock due to burns
  - 5B. Postural hypotension
  - 5C. Increased coronary blood flow during diastole
  - 5D. Decreased peripheral resistance in anemia
  - 5E. Parasympathetic stimulation decreases the slope of prepotential of SA nodal action potential (5x1 = 5 marks)
6. Define deglutition. Describe the different stages of deglutition. (1+4 = 5 marks)
7. 75-year-old Bobby, has noticed a gradual decrease in ability to hear normal conversation over the last few months. Audiometry examination revealed, increased hearing loss for higher frequency sounds.
- 7A. Name the condition observed in Bobby.
  - 7B. Which part of the basilar membrane is sensitive to high pitch sounds?
  - 7C. With the help of a flow chart explain the mechanism of generation of action potential in auditory nerve. (1+1+3 = 5 marks)
8. Draw a neat labelled diagram of juxtaglomerular apparatus. Name the cell that is a major source for secreting renin? Mention the action of renin. (3+1+1 = 5 marks)
9. Describe the endometrial changes occurring during a normal menstrual cycle and give the hormonal basis for the same. (5 marks)
- 10A. Describe four features observed in spinal shock. (4 marks)
- 10B. List any TWO characteristic features of Parkinson disease. (1 marks)
- 11A. Draw and label the neural pathway that carries fine touch and proprioceptive sensations from left great toe to the brain. (3 marks)
- 11B. Mention the sensory and motor innervation of muscle spindles. (2 marks)
12. Write the physiological basis for the following:
- 12A. Packed cell volume is decreased in pregnancy
  - 12B. Edema occurs in liver diseases
  - 12C. Polycythemia occurs at high altitude (1+2+2 = 5 marks)