

2017

PHYSIOLOGY

[Honours]

PAPER –II

Full Marks : 90

Time : 4 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

Answer any two questions, taking at least
one from each Subgroup : 15 × 2

Subgroup – A(a)

1. (a) Describe the components of a nerve action potential with a diagram. What is meant by "firing level" in this action potential ?

- (b) Describe the process of origin of action potential in a nerve fibre.
- (c) Explain the ionic basis of after-hyperpolarization. (4 + 2) + 7 + 2
2. (a) Define all-or-none law. Differentiate between chronaxie and rheobase.
- (b) Mention the functions of actinin and titin in skeletal muscle. Describe the modern concept of acto-myosin cross-bridge formation in skeletal muscle with a suitable diagram. (2 + 3) + (3 + 7)
3. (a) Discuss the pacemaker potential in heart and describe the propagation of cardiac impulse through the special junctional tissues of heart.
- (b) Define Frank-Starling's law of heart. Write a brief note on heart block. (4 + 5) + (2 + 3)

Subgroup – A(b)

4. (a) Define lung compliance. Discuss the mechanics of breathing with a special reference to the elastic recoil of the lung.

(3)

- (b) What are the differences between anatomic and physiologic dead space ?
- (c) What is FRC ? $(3 + 4 + 3) + 3 + 2$
5. (a) Mention the locations and functions of Brunner's gland and Goblet cells.
- (b) Discuss the mechanism and control of gastric HCl secretion in man. $(2 + 2) + (6 + 5)$
6. (a) What do you mean by obligatory and facultative reabsorptions in nephron ?
- (b) Describe the mechanism of hypertonic urine formation in man.
- (c) State the location and functions of macula densa cells. What is vasa-recta ? $4 + 6 + (3 + 2)$

GROUP – B

Answer any five questions, taking at least two from each Subgroup :

8 × 5

Subgroup – B(a)

7. (a) Mention briefly the process of myelinogenesis in nerve fibre.
- (b) Differentiate between EPSP and IPSP. 5 + 3
8. (a) Describe the EM structure of a chemical synapse.
- (b) What are meant by 'active zone' in a synapse?
What is presynaptic grid? 4 + 4
9. (a) State the principle of echocardiography.
Name the leads used in recording ECG.
- (b) Briefly mention the nerve supply to the heart and discuss the neural regulation of cardiac functions. (1 + 2) + 5
10. (a) Calculate the stroke volume of a subject whose heart rate is 76 beats/min and cardiac output is 5472 ml/min.
- (b) Discuss the role of baroreceptors in the regulation blood pressure. 2 + 6

11. (a) Discuss the anatomical organization of cerebral circulation.
- (b) Name any two peculiarities of cerebral circulation. 6 + 2

Subgroup – B(b)

12. (a) What is cyanosis ? Mention the signs and symptoms of cyanosis.
- (b) Mention the non-respiratory functions of lung. (2 + 2) + 4
13. (a) Elucidate Hamburger's phenomenon and state its importance.
- (b) Explain the role of 2-3-DPG in O_2 dissociation. (4 + 2) + 2
14. (a) Discuss the different movements of alimentary canal with a suitable diagram.
- (b) Mention the reason of peptic ulcer. (4 + 2) + 2
15. (a) What is JG apparatus ? State its function.

(b) Define GFR. How is GFR calculated ?

16. (a) What is Barrington's reflex ? $(2 + 2) + (1 + 3)$

(b) How micturition reflexes are governed by higher centres ? $3 + 5$

GROUP -C

Answer any five questions, taking at least two from each Subgroup : 4×5

Subgroup - C(a)

17. Mention the differences between antagonist and agonist muscles with examples. 4

18. What is motor point ? Mention the significance of electromyography. $2 + 2$

19. What do you mean by cotransmitter ? Mention the chemical nature of neurotransmitter. $1 + 3$

20. Discuss the role of renin-angiotensin system in the regulation of blood pressure. 4

21. What is anastomosis ? State the importance of anastomosis in regional circulation. 1 + 3

Subgroup – C(b)

22. What is dust cell ? Mention the role of lung surfactants in respiration. 1 + 3
23. Mention the reasons of emphysema. What is dysbarism ? 2 + 2
24. Write the importances of enterohepatic circulation of bile. 4
25. Name any two abnormal constituents of urine and mention their clinical significance. 2 + 2
26. Describe briefly the causes of respiratory failure. 4