

**MEDICAL
EXAMINATION
REVIEW BOOK**

Volume 2C

Textbook Study Guide of Cardiology

SECOND EDITION

**1308 Multiple Choice Questions
and Referenced Answers**

By

LOUIS E. GRENZER, M.D.

**MEDICAL
EXAMINATION
REVIEW BOOK**

Volume 2C

Textbook Study Guide of Cardiology

SECOND EDITION

**1308 Multiple Choice Questions
and Referenced Answers**

By

LOUIS E. GRENZER, M.D.

Department of Medicine
Cardiology Division
Mercy Hospital
Baltimore, Maryland



Medical Examination Publishing Co., Inc.
an Excerpta Medica company

969 Stewart Avenue

•

Garden City, New York 11530

MEDICAL
EXAMINATION
REVIEW BOOK

Volume 2C

Textbook Study Guide of Cardiology

SECOND EDITION

1500 Multiple Choice Questions
and Reasons of Answers

Copyright © 1979 by
MEDICAL EXAMINATION
PUBLISHING CO., INC.
an Excerpta Medica company

Library of Congress Card Number
61-66847

ISBN 0-87488-153-6

April, 1979

All rights reserved. No part of this
publication may be reproduced in any
form or by any means, electronic or
mechanical, including photocopy,
without permission in writing from
the publisher.

Printed in the United States of America

preface

This book was originally written while I was preparing for the Cardiology Board Examinations. It should be used in conjunction with J. Willis Hurst, *et al.*: *The Heart*, 4th Edition, 1978. To answer the following questions requires an understanding of most of the material covered in that textbook.

I gratefully acknowledge the help of my secretaries Linda Kirk, Dorothy Lyons, and Arlene Tucker in preparing the manuscript.

Louis E. Grenzer, M.D.

notice

The editor(s) and/or author(s) and the publisher of this book have made every effort to ensure that all therapeutic modalities that are recommended are in accordance with accepted standards at the time of publication.

The drugs specified within this book may not have specific approval by the Food and Drug Administration in regard to the indications and dosages that are recommended by the editor(s) and/or author(s). The manufacturer's package insert is the best source of current prescribing information.

Volume 2C

Textbook Study Guide of Cardiology

SECOND EDITION

CONTENTS

I	: Embryology, Anatomy, and Physiology	1
	Questions 1 - 98	
II	: Examination of the Cardiovascular System	16
	Questions 99 - 296	
III	: Disorders of the Cardiovascular System	44
	Questions 297 - 366	
IV	: Diseases of the Heart and Pericardium	53
	Questions 367 - 1004	
V	: Medical, Emotional, and Environmental Factors Affecting the Cardiovascular System	142
	Questions 1005 - 1119	
VI	: Diseases of the Aorta, Venae Cavae, and Peripheral Arteries and Veins.	160
	Questions 1120 - 1252	
VII	: Pharmacology, Medicolegal, and Insurance Problems.	178
	Questions 1253 - 1308	
	Answer Key.	185

SECTION I: EMBRYOLOGY, ANATOMY, AND PHYSIOLOGY

FOR EACH OF THE FOLLOWING QUESTIONS, MATCH EACH NUMBERED ITEM WITH ONE LETTERED ITEM. EACH CHOICE MAY BE USED ONLY ONCE:

- A. Bachmann
- B. Thorel
- C. Wenckebach

- 1. ___ Middle internodal tract
 - 2. ___ Anterior internodal tract
 - 3. ___ Posterior internodal tract
- REF: p. 54

- A. Z band
- B. T system
- C. Longitudinal system

- D. Intercalated disk
- E. Sarcomere
- F. A band

- 4. ___ Responsible for the inward spread of the electrical impulse into the cell
 - 5. ___ Composed of thin and thick filaments
 - 6. ___ Includes the H and M bands
 - 7. ___ End of the sarcomere
 - 8. ___ Forms a zigzag border between cells
 - 9. ___ Electromechanical coupling
- REF: pp. 65-69

- A. Energy conservation
- B. Energy utilization
- C. Energy liberation

- 10. ___ Acetylcoenzyme A enters the Krebs's cycle
 - 11. ___ Oxidative phosphorylation
 - 12. ___ ATP converted to ADP
- REF: p. 107

ANSWER THE FOLLOWING QUESTIONS BY USING THE KEY BELOW:

- A. If both statement and reason are true and related cause and effect
 - B. If both statement and reason are true but not related cause and effect
 - C. If the statement is true and the reason is false
 - D. If the statement is false and the reason is true
 - E. If both statement and reason are false
13. From the beginning of pregnancy in the human being, it takes about sixteen weeks until the heart reaches its definitive four-chambered fetal structure BECAUSE during development of the heart, its component cells participate in growth, differentiation, morphogenesis, and cell death.
REF: p. 6
14. Failure of the trabeculation and expansion of the ventricular cavities (left, right, or both) underlies single ventricle BECAUSE embryologically this condition is usually caused by a virtual absence of the interventricular septum.
REF: p. 13
15. Interventricular septal defects most commonly result from an aberration in the formation of the muscular septum BECAUSE the muscular interventricular septum is derived from three separate masses of cushion tissue.
REF: p. 14
16. An aneurysm of the sinus of Valsalva may rupture into the right atrium BECAUSE the torus aorticus is a normal bulge in the lateral wall of the right atrium.
REF: p. 22
17. The left circumflex artery is not infrequently injured during surgical amputation of the left atrial appendage BECAUSE the left circumflex artery sometimes courses directly into the myocardium of the base of the appendage.
REF: p. 34
18. The posterior descending artery forms the principal collateral circulation to the interventricular septum BECAUSE the interventricular septum is supplied predominantly by branches from the anterior descending artery.
REF: p. 41

19. Most cases of perforation of the interventricular septum secondary to myocardial infarction, occur in patients with occlusions in both the posterior descending artery and in the anterior descending artery BECAUSE the posterior descending artery is a terminal branch of the left circumflex artery in 10% of human hearts.
REF: p. 41
20. Ruptured papillary muscles are usually secondary to occlusion of more than one major artery BECAUSE the anterior papillary muscle usually receives part of its blood supply from the right coronary artery.
REF: p. 42
21. Atrial infarction is usually associated with occlusion of flow into the sinus node artery BECAUSE this artery originates from the left anterior descending artery in 45% of human hearts.
REF: p. 42
22. An inferior myocardial infarction complicated by an atrial arrhythmia, usually indicates a proximal right coronary occlusion BECAUSE the sinus node artery itself is frequently occluded.
REF: p. 42
23. Atrial arrhythmias associated with a lateral myocardial infarction, due to left circumflex artery occlusion, carry a grave prognosis BECAUSE this indicates an occlusion in the first few millimeters of the left circumflex artery and may result in blockage of the left main coronary artery.
REF: p. 42
24. The AV node is supplied by the right coronary artery in 90% of humans BECAUSE collateral circulation to the AV node is provided by Kugel's artery.
REF: p. 42
25. The sinus node is in excellent position to monitor central aortic pressure BECAUSE the artery to the sinus node passes directly through the center of the node.
REF: p. 49
26. The sinus node is frequently involved in pericarditis BECAUSE it is located a millimeter or less beneath the epicardium.
REF: pp. 48-49

4/ Embryology, Anatomy, and Physiology

- KEY: (A) Statement and reason true; related cause and effect
(B) Statement and reason true; unrelated cause and effect
(C) Statement true; reason false
(D) Statement false; reason true
(E) Statement and reason false

27. The Von Bezold-Harisch reflex was first described in the human heart BECAUSE there are vagal receptor sites in the area of the AV node.
REF: p. 52
28. Conduction to the left atrium probably occurs primarily by way of Bachmann's bundle BECAUSE this is the only one of the internodal pathways entering the left atrium.
REF: p. 54
29. The length of a myocardial sarcomere at which maximal force develops is 2.2 microns BECAUSE at that length, the actin and myosin myofilaments are most ideally situated to provide the greatest number of force-generating sites.
REF: pp. 81-82
30. A decrease in ejection fraction is a hallmark of ventricular failure BECAUSE in heart failure, the stroke volume may remain normal.
REF: p. 88
31. Increased oxygen extraction is a valuable reserve mechanism for the myocardium BECAUSE the myocardium normally extracts about 75% of its arterial oxygen content.
REF: p. 88
32. Increased anaerobic metabolism is a valuable reserve mechanism for the myocardium BECAUSE during exercise, patients with heart failure may obtain 30% of their immediate total energy requirements by anaerobic metabolism.
REF: p. 88
33. The resistance of four small tubes in parallel is the same as that of a single, large tube of equal, total cross-sectional area, BECAUSE total resistance of vessels connected in parallel is calculated by adding the conductance of each individual vessel to obtain the total conductance of all the vessels.
REF: p. 89

34. Veins have a greater wall tension than their arterial counterparts at the same pressure BECAUSE according to the Law of Laplace, tension is directly proportional to vessel radius and directly proportional to wall thickness.
REF: p. 90
35. The beginning of ejection of blood into the aorta slightly precedes ejection into the pulmonary artery BECAUSE contraction of the left ventricle begins prior to contraction of the right ventricle.
REF: p. 74
36. The left ventricular output exactly equals the right ventricular output BECAUSE all blood pumped by the left ventricle eventually returns to the right ventricle.
REF: p. 76
37. Aortic insufficiency can result in decreased coronary blood flow BECAUSE the diastolic pressure is low in aortic insufficiency.
REF: p. 102
38. In right ventricular hypertension, right-sided coronary insufficiency may develop BECAUSE an elevation in right atrial pressure is a frequent cause of obstruction to coronary venous exit.
REF: p. 102
39. The heart utilizes glucose and lactate as its predominant fuel BECAUSE the metabolic system of the heart is almost exclusively aerobic.
REF: p. 107
40. The heart has a high concentration of mitochondria BECAUSE the reactions of the citric acid cycle and oxidative phosphorylation occur in the sarcosomes.
REF: p. 107
41. Postprandially, the heart utilizes significant amounts of glucose, lactate, and small amounts of pyruvate as sources of energy BECAUSE free fatty acids and ketone bodies are converted to acetyl-CoA which is oxidized in the citric acid cycle.
REF: p. 110

6/ Embryology, Anatomy, and Physiology

- KEY: (A) Statement and reason true; related cause and effect
(B) Statement and reason true; unrelated cause and effect
(C) Statement true; reason false
(D) Statement false; reason true
(E) Statement and reason false

42. During severe prolonged exercise, the heart may obtain 60% of its energy from lactate BECAUSE lactate taken up by the myocardium is converted to pyruvate, and then metabolized.
REF: p. 111
43. Amino acids contribute significantly to the energy production of the heart BECAUSE the myocardium is rich in SGOT and SGPT.
REF: p. 112

ANSWER THE FOLLOWING QUESTIONS BY USING THE KEY BELOW:

- A. If only A is correct
B. If only B is correct
C. If both A and B are correct
D. If neither A nor B is correct
44. On a routine chest x-ray, the right lateral cardiac border is formed by:
A. The right atrium
B. The right ventricle
REF: p. 19
45. The coronary sulcus:
A. Contains the right coronary artery
B. Contains the left circumflex artery
REF: p. 19
46. The interventricular sulci usually:
A. Contain branches of the left coronary artery
B. Contain branches of the right coronary artery
REF: p. 19
47. Defects in the membranous ventricular septum:
A. May lead to aortic regurgitation
B. May allow a shunt from left ventricle to right atrium
REF: p. 21

48. Superior vena cava:
 - A. Eustachian valve
 - B. Thebesian valveREF: p. 22
49. Left ventricle:
 - A. Trabeculae carneae
 - B. Crescent-shapedREF: pp. 22-25

ANSWER THE FOLLOWING QUESTIONS BY USING THE KEY BELOW:

- A. If 1, 2, and 3 are correct
 - B. If 1 and 3 are correct
 - C. If 2 and 4 are correct
 - D. If only 4 is correct
 - E. If all four are correct
-
50. Right ventricle:
 1. Posterior papillary muscle
 2. Anterior papillary muscle
 3. Conus papillary muscle
 4. Septal papillary muscleREF: pp. 23, 27
 51. Branches of the left coronary artery:
 1. Anterior descending artery
 2. One to three diagonal branches
 3. Circumflex artery
 4. Conus arteryREF: pp. 32-33
 52. Branches of the left anterior descending artery include:
 1. Three to five septal branches
 2. Branches to the right ventricle
 3. Three to five branches to the free wall of the left ventricle
 4. A small artery which curves about the pulmonary conusREF: p. 33
 53. Branches of the left circumflex artery:
 1. Branch to the sinus node in about 45% of human hearts
 2. Conus artery
 3. Left atrial circumflex artery
 4. Coronary sinusREF: pp. 34-35

8/ Embryology, Anatomy, and Physiology

KEY: (A) 1, 2, 3; (B) 1, 3; (C) 2, 4; (D) 4 only; (E) All

54. Branches of the right coronary artery:

1. Conus artery
 2. Right half of Vieussens's ring
 3. Three to four anterior right ventricular branches
 4. Branch to the sinus node in about 55% of human hearts
- REF: pp. 35-36

55. Veins which drain directly into the right atrium:

1. Thebesian veins
2. The anterior cardiac vein
3. Coronary sinus
4. Oblique vein of Marshall

REF: pp. 36-37

56. Hereditary medial necrosis, resulting in small coronary artery disease occurs in:

1. Friedreich's ataxia
2. Progressive muscular dystrophy
3. Congenital deafness
4. Primary pulmonary hypertension

REF: p. 46

57. P-cells are characterized by:

1. Large size
2. Well-developed sarcoplasmic reticulum
3. Abundant glycogen
4. Empty-appearing cytoplasm

REF: pp. 58-60

58. Transitional cells are:

1. The only link between P cells and the rest of the heart
2. Oval or rounded in cross section
3. The principal cell type in the AV node and are more numerous than P cells in the sinus node
4. Primarily concerned with mechanical activity of the heart

REF: p. 63

59. Purkinje cells:

1. Exhibit automaticity
2. Link the transitional cells to the rest of the heart
3. Are the principal cell type in the His bundle and the bundle branches
4. Are found in the sinus and AV nodes

REF: pp. 64-65

60. Which of the following apply to V-max?
1. Shortening of the contractile element
 2. Isometric contraction
 3. Lengthening of the series elastic element
 4. Not affected by increases in heart rate
- REF: pp. 77, 81
61. Which of the following would cause a shift to the right of a left ventricular function curve?
1. Hypoxia
 2. The infusion of catecholamines
 3. Propranolol
 4. A decrease in end-diastolic fiber length
- REF: p. 80
62. Heterometric autoregulation:
1. Involves the Frank-Starling principle
 2. Does not involve a change in initial fiber length
 3. Protects against pulmonary edema
 4. Results in identical stroke outputs for any single beat of the left and right ventricle
- REF: p. 80
63. An increase in initial muscle fiber length:
1. Causes an increase in P_o
 2. Increases V-max
 3. Results in an increased number of available active contractile sites
 4. Results in a qualitative change in the force generated by each contractile site
- REF: p. 81
64. An increase in the heart rate:
1. Increases V-max
 2. Increases P_o
 3. Significantly changes the force velocity curves
 4. Shifts the ventricular function curve significantly to the left
- REF: pp. 81-82
65. Which of the following apply to the idioventricular kick?
1. Increased contractility of initially contracting fibers
 2. Increased end-diastolic fiber length of late contracting fibers
 3. Increased force of contraction of late contracting fibers
 4. Unrelated to Starling's law of the heart
- REF: p. 81

10/ Embryology, Anatomy, and Physiology

KEY: (A) 1, 2, 3; (B) 1, 3; (C) 2, 4; (D) 4 only; (E) All

66. Which of the following apply to increased contractility of cardiac muscle?
1. Invariable increase in V-max
 2. Invariable increase in Po
 3. Significant shift to the right in the force velocity curve
 4. The most sensitive indicator is the ventricular function curve

REF: p. 83

67. Sympathetic stimulation:
1. Increases heart rate
 2. Leads to rapid elastic recoil of the ventricular muscle
 3. Increases contractility
 4. Increases diastolic suction

REF: pp. 81, 85

68. After-load on the left ventricle:
1. Aortic impedance
 2. Peripheral vascular resistance
 3. Mass and viscosity of the blood
 4. Anrep effect

REF: pp. 85-86

69. Which of the following increases myocardial contractility?
1. Adrenocorticosteroids
 2. Aldactone
 3. Angiotensin
 4. Glucagon

REF: p. 86

70. Which of the following decrease myocardial contractility?
1. Cardioglobulin
 2. Serotonin
 3. Paired electrical stimulation
 4. Lidocaine

REF: pp. 86-87

71. Bowditch effect:
1. Increased ventricular contractility
 2. Increase in pulse rate
 3. Increase in intracellular calcium ions
 4. Depends upon the much greater half time for decay of positive inotropic effect of activation than of negative inotropic effect of activation
- REF: p. 73. (See also: Berne, Robert M., Levy, Matthew N.: Cardiovascular Physiology, C. V. Mosby Co., 1972, p. 161)
72. Factors responsible for the redistribution of cardiac output during conditions of increased demand:
1. Local and autoregulation
 2. Sympathetic nervous system
 3. Parasympathetic nervous system
 4. Venos constriction
- REF: p. 88
73. Poiseuille's Law:
1. Rigid tubes
 2. Radius²
 3. Vessel length x fluid viscosity
 4. Turbulent flow
- REF: p. 89
74. Arterial dilatation may be enhanced by:
1. Hypoxia
 2. Release of adenosine in the myocardium
 3. Increase in PCO₂
 4. Hypoxia in the pulmonary vessels
- REF: p. 90
75. Blood vessels are controlled by:
1. Sympathetic vasoconstrictive fibers
 2. Sympathetic vasodilator fibers
 3. Parasympathetic vasodilator fibers
 4. Parasympathetic vasoconstrictive fibers
- REF: pp. 90-91
76. The Z point:
1. Precedes an S-4 gallop
 2. Presystolic
 3. Precedes the A wave
 4. Atrial and ventricular pressures essentially equal in normal individuals
- REF: p. 74