Martin Caon

Examination Questions and Answers in Basic Anatomy and Physiology

2900 Multiple Choice Questions and 64 Essay Topics

Third Edition

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Preface

Two thousand nine hundred multiple-choice questions (MCQs) that could be asked of a student of introductory human anatomy and physiology are presented in 20 chapters and to more descriptively describe the contents and to facilitate their access are subdivided into 68 categories. In addition, there are 64 topics for a written assignment (essay topics) that may be used in such a course and as an assessment task for such students.

It is assumed that users of these questions are teachers or students who have completed at least part of an anatomy and physiology course that might be offered in the first year of a university degree program. It is also assumed that they would have access to one of the Anatomy and Physiology textbooks (or similar) listed in the bibliography below. Each question category has an introduction containing a summary of useful knowledge pertinent to that category of question. However, not all possible information is provided within these introductions, so a textbook is indispensable. The summary introductions are composed of vocabulary that may be unfamiliar to the beginning student but which should be known in order to understand the questions. You will need to look up the meaning of many unfamiliar words as your studies progress.

All questions have been used at least once, during the author's teaching career, by the end of semester examinations of a university first-year undergraduate introductory anatomy and physiology course or a physical science course for health sciences students to support their anatomy and physiology study. Consequently they reflect the author's choice of content. Students enrolled in the courses for which these questions were written include nursing, midwifery, paramedic, physiotherapy, occupational therapy, nutrition and dietetics, health science students, exercise science students and students taking the course as an elective. Many of the students do not have an extensive background in science from their secondary schooling. Some knowledge of physical science is required to understand physiology; hence, physical science questions are included. Students without some background knowledge in chemistry and physics will find such questions challenging and will need to work a little harder to develop their background knowledge. The boundary between chemistry and biochemistry is not distinct; nevertheless, chemistry is implicit in

physiology. Furthermore, the physics of the body becomes physiology, so gradually that sometimes the boundary between the two is only noticed after it has been crossed.

Some questions were difficult to categorise and may span two (or more) categories. Furthermore, in order to answer some questions, you may need knowledge drawn from other "sections" of anatomy different from the name of the section in which the question appears. This is not a bad thing as it emphasises the connected nature of human anatomy and physiology. Each question is unique (there are no duplicates). However, many questions will be examining the same (or similar) material albeit with a differently worded question or a different selection of answers. If the questions are to be used to compile an examination, then care should be taken to exclude questions that are too similar to already selected ones. On the contrary, if the questions are to be used for instruction or study purposes, I would suggest including several similar questions in consecutive order to emphasise the point and to give the students practice.

Advice to the Exam Candidate

The correct choice of answer for each question is provided. Accompanying the correct choice is a justification for the choice or an explanation of the correct answer and sometimes of why the other choices are incorrect. The degree of difficulty varies, but not by intentional design. The perception of difficulty depends on that part of science that the question examines, the level of scientific background brought to the course by the student and their level of studious preparation for the examination.

There is only one best correct answer for each of the multiple-choice questions among the four choices presented. However, there may be more than one correct answer. You must choose the **best** one. In marking multiple-choice questions, I suggest that 1 mark be allocated for a correct answer and that a quarter of a mark be deducted for a wrong answer or an unanswered question. Deducting a quarter mark will reduce the score that would be gained by selecting an answer from the four choices purely at random (i.e. guessing), from about 25% to about 6%. Not to deduct a quarter mark is, in my opinion, unsound. Hence, in an examination, the students should never leave a question unanswered. If you cannot decide on an answer, guess at it (after eliminating any choices that you deem to be incorrect). That is, you will be rewarded for the ability to decrease the number of choices from which you are guessing, from 4 to 3 or 2.

Be aware of questions that are asked in the negative, that is, have NOT true or FALSE or INCORRECT or EXCEPT one in the stem. In this case, you are seeking a statement that is wrong in order to answer the question. Do not be intimidated by arithmetical calculations. The calculation itself will be simple. Deciding what to add, multiply or divide with what is the tricky part.

Some questions have been published before in the book: Caon, M. & Hickman, R. (2003) *Human Science: Matter and Energy in the Human Body* 3rd edn.,

Crawford House Australia Publishing, Belair South Australia, and are used with the authors' permission.

Some Thoughts on Writing Good MCQs and on Answering Poorly Prepared MCQ Quizzes

Ten Pieces of Advice for Writing Good Multiple-Choice Questions

1. Make all the choices of answer about the same length.
2. Do not write choices that use "all of the above", "none of the above", "both A and B", "never", "all", etc. (If you cannot think of sufficient choices for distractors, then discard that question.)
3. Use plausible distractors (do not use funny, absurd or cute choices).
4. If the choices are all numbers, list them in order of increasing magnitude.
5. Avoid choices where two are the opposite of each other (one might be guessed to be true).
6. Make the stem ask a question. Do not include irrelevant material in the stem. Do not unintentionally provide a clue in the question.
7. Spread the correct answer evenly (and randomly) among the choices. In questions with four choices of answer, about 25% of the correct choices should be "A", about 25% "B", etc. Do not avoid having two or three consecutive answers that are the same letter choice.
8. Limit the number of questions "asked in the negative", that is, where a false statement is the correct choice.
9. Be grammatically correct when writing the question and the choices. Do not be ambiguous.
10. If only one choice is meant to be the best correct answer, make sure that it is so.

Five Ways to Score More Highly on a Poorly Prepared Multiple-Choice Question Test

Knowing the subject matter is the best way to score well in a multiple-choice test, but if you do not know the answer, always guess at it after crossing out the obvious wrong answers first. Your guess will then be an educated guess.

1. Eliminate the obvious wrong answers first!!!
   (a) If marks are deducted for incorrect answers but NOT deducted for unanswered questions, do not answer the questions you are sure that you do not know the answer to.
   (b) If one of the choices is "none of the above" or "all of the above", choose that answer.

(c) Look at the answers to the preceding and following questions. If you are guessing, do not select a choice that is the same as the previous or the next choice. (This only works if you have chosen those answers correctly!)
(d) Choose the longest answer.
(e) Eliminate the choices with absolute statements such as never, always and all.

Some Thoughts on the Marking of MCQ Tests (Where There Are Four Choices of Answer, One of Which Is the Best Correct)

Testing for knowledge is an imprecise science. Using multiple-choice questions (MCQs) for the testing simplifies the marking but also introduces additional uncertainties and some unfairness.

I award 1 mark for each correct answer. This would mean that someone may score 25% without any study simply by guessing (assuming that correct choices are spread evenly among the four choices). Hence, I also deduct ¼ of a mark for each incorrect answer or unanswered question. With this deduction, it follows that in a 100 question quiz, the mark that a total guesser will score is approximately: 25 correct − (75 incorrect) × ¼ = 25 − 18¾ = 6¼% rather than about 25% if marks were not deducted for incorrect answers.

My reasoning is as follows. If you randomly choose the answers for four questions that each have a choice of four answers, the probability of guessing one correct answer from the four questions is: ¼ + ¼ + ¼ + ¼ = 1 and you would be awarded 1 mark out of 4. This would be undeserved as you did not know any answers. By deducting ¼ for each wrong answer, your score for guessing the answers of these four questions would become 1 − ¾ = ¼ mark. The score is still undeserved but more reasonable. Nevertheless, I advise my students to guess at the answer if they do not know it, after eliminating the obviously erroneous choices. If the student can reduce the potentially correct answers from 4 to 3 or 2 before guessing, the probability of guessing correctly from the remaining choices is higher, and they will score more marks. For example the probability of guessing four answers correctly after eliminating one or two obviously incorrect choices may be: $1/3 + 1/2 + 1/3 + 1/2 = 1.67$. Hence, on average, you would be awarded 1.67 of the 4 marks (minus the deduction for wrong answers). This is reasonable as the student deserves some credit for knowing that some of the choices were wrong.

Should a ¼ mark be deducted for each *unanswered* question? Before I answer this, let us consider four possible strategies for awarding marks to a multiple-choice question quiz with 100 questions.

Strategy 1: award 1 mark for a correct answer.
Strategy 2: award 1 mark for a correct answer and deduct a $1/3$ mark for wrong answers.
Strategy 3: award 1 mark for a correct answer and deduct a ¼ mark for wrong answers.

Strategy 4: award 1 mark for a correct answer and deduct a ¼ mark for wrong answers AND for unanswered questions.

Given that there are four choices to each question and only one is correct and that the correct choice is evenly allocated between choices A, B, C and D, which strategy is fairer? Clearly, the more you get correct, the higher the score. It is also clear that students who bring their knowledge to bear on answering the quiz, that is, are not merely selecting choices at random, will choose far more than 25% of the answers correctly.

Consider strategy 1. If a student attempts all questions, the lowest probable score (by random guessing) is 25%, not zero. Hence, 25% is equivalent to zero (no knowledge), and the range of possible scores in a four-choice MCQ quiz is from 25 to 100, rather than from 0 to 100. This strategy suffers from rewarding lack of knowledge with 25% of the marks and also constricts the range of marks to about three quarters of the total range. To account for marks obtained by guessing, the examiner may choose to set as a pass mark, a number greater than 50/100 as the passing score for the quiz, for example 60 or 70 or 75/100. If another student leaves some questions unanswered, perhaps because this student does not know the answers, then his or her maximum possible score is reduced by the number of unanswered questions. The scenario for such students remains largely as described above. However, it is possible for both the students to answer the same number of questions correctly and so attain the same score despite the second student leaving some questions unanswered (Table 1, column 4). The examiner may consider that this outcome is fair.

It seems reasonable to me to deduct marks for an incorrect answer when the answer is chosen from four possibilities, as is the case for the type of multiple-choice questions being considered here. It also seems too great a penalty to deduct a mark (or half a mark) for an incorrect choice as the result would be a negative score when less than 50% (or 33%) of questions are answered correctly. Would deducting a $1/3$ mark or a ¼ mark produce a fairer result?

Consider strategy 2. In a 100-question quiz, when a $1/3$ mark is deducted for incorrect answers only, Student 1 who answers 50 questions correctly and 50 incorrectly is awarded 33.3 (see Table 2, column 6). Furthermore, Student 3 who chooses not to answer ten questions but still answers 50 questions correctly (and 40 incorrectly) is awarded a higher score (36.7) than Student 1. Is this an intended consequence?

Compare this with strategy 3 where a ¼ mark (rather than $1/3$ mark) is deducted. The same scenarios above result in Students 1 and 3 being awarded 37.5 and 40, respectively, for their 50 correct answers (see Table 1, column 6), instead of 33.5 and 36.7 (if $1/3$ of a mark were deducted). Hence there is more reward for effort when only a ¼ mark is deducted. However, both the strategies will result in students scoring more highly if they are able to strategically omit answering questions that they are sure they do not know the answer to. Thus students are rewarded for knowing what they do not know—or for omitting to study a section of the course and avoiding the questions on that part of the course. This is the same as inviting students to choose which questions they wish to answer and rewarding them for

answering fewer questions. It is for this reason that I deduct a ¼ mark for unanswered questions. When marks are deducted for wrong answers (but not for unanswered questions), even for the same number of correct answers (50 in Tables 1 and 2), the more MCQs you leave unanswered (between 0 and 50), the higher will be the score. Hence, students would be encouraged to leave answers to questions that they are unsure about (or have not studied) blank.

Consider strategy 4. When a ¼ mark is deducted for wrong answers and also for unanswered questions, students are compelled to answer all the questions. In a 100-question quiz, Student 1, who answers 100 questions—50 correctly and 50 incorrectly—is awarded 37.5 (see Table 1, column 7). Student 3 who chooses not to answer ten questions but still answers 50 questions correctly (and 40 incorrectly) is also awarded the score of 37.5 (rather than the higher score of 40 if strategy 3 was used to encourage the student to guess at the answers to the ten unanswered questions). If the second student had, instead of leaving ten MCQs unanswered, simply guessed at the ten answers, they would probably have scored another 2 or 3 marks (Table 1, column 8). Indeed, if they had guessed the answers after first eliminating any choices they knew to be incorrect, they may have scored more than 2.5 extra marks (on average).

This marking strategy rewards students for correctly guessing at answers instead of leaving some questions unanswered. This is compensated for by the ¼ mark deduction for incorrect answers. However, students are penalised if they do not answer (or do not guess at) questions on some parts of the course. Furthermore, students who guess from fewer choices are rewarded for having the knowledge to eliminate some choices prior to guessing from the remaining choices. Such students will probably guess correctly more than 25% of the time. This is a more searching test of their knowledge of the course and is why I deduct ¼ for each unanswered question.

Deducting ¼ mark for incorrect and blank answers also advantages the better students—those who answer more questions correctly—by increasing their score. Table 3 displays the result of four students who all answer 90 questions (and leave ten unanswered) and score different numbers of correct answers. If strategy 1 is used, the students' scores would range from 90 to 50 (Table 3, column 4). Strategy 4 would result in a spread of scores between 87.5 and 37.5 (column 7) when ten MCQs are left unanswered. The score would likely increase 2.5 or more if the students had guessed at these ten answers, rather than leaving them blank, and the highest scoring student has his or her mark "restored" to 90. Hence the student marks would be spread out over a larger range of scores (90–40) than for strategy 1.

When ¼ marks are deducted for wrong answers and also for blank answers, the lowest possible score (by random guessing) is close to 6%, not zero. Hence, 6% is equivalent to zero, so the range of possible scores is from 6 to 100 (see Table 4). The examiner may wish to neglect this discrepancy from zero and use a score of 50% as the passing score for the quiz. Note also from Table 4 that the student who gets 80/100 answers correct has his or her score adjusted down to 75 due to the guessing deduction, while the student who gets only 40/100 answers correct has his or her score adjusted more severely to 25 due to the guessing deduction.

Table 1 Four students who all answer 50 questions correctly but choose to leave different numbers of questions unanswered

	No. of MCQs answered	Unanswered MCQs	Correctly answered MCQs	Incorrectly answered MCQs	Score when ¼ subtracted for incorrectly answered MCQs	Score when ¼ subtracted for incorrect and for unanswered MCQs	Extra score if the unanswered MCQs were guessed at
Student 1	100	0	50/100	50	37.5	37.5	Na
Student 2	95	5	50/95	45	38.75	37.5	+1.25
Student 3	90	10	50/90	40	40	37.5	+2.5
Student 4	50	50	50/50	0	50	37.5	+12.5

Two scenarios are considered where a ¼ mark is deducted for wrong answers (column 6) and for wrong answers and also for unanswered questions (column 7)

Table 2 Four students who all answer 50 questions correctly but choose to leave different numbers of questions unanswered

	No. of MCQs answered	Unanswered MCQs	Correctly answered MCQs	Incorrectly answered MCQs	Score when $^1/_3$ deducted for incorrect answers
Student 1	100	0	50/100	50	33.3
Student 2	95	5	50/95	45	35
Student 3	90	10	50/90	40	36.7
Student 4	50	50	50/50	0	50

A $^1/_3$ mark is deducted only for wrong answers

Table 3 Four students who all answer the same number of questions (and choose to leave ten questions unanswered), but who answer different numbers of questions correctly

	No. of MCQs answered	Unanswered MCQs	Correctly answered MCQs	Incorrectly answered MCQs	Score when ¼ deducted for incorrectly answered MCQs	Score when −¼ also for unanswered MCQs	Extra score if unanswered MCQs were guessed
Student 1	90	1c0	90/90	0	90	87.5	+2.5
Student 2	90	10	80/90	10	77.5	75	+2.5
Student 3	90	10	70/90	20	65	62.5	+2.5
Student 4	90	10	50/90	40	40	37.5	+2.5

Table 4 When 1 mark is awarded for a correct answer and ¼ marks are deducted for wrong answers AND also for questions that are not answered, column 2 of this table displays the score that would be awarded by answering correctly the number of questions in column 1

Correct answers (out of 100)	Awarded score (%)	Correct answers (out of 100)	Awarded score (%)	Correct answers (out of 100)	Awarded score (%)
100	100	73	66	46	33
99	99	72	65	45	31
98	98	71	64	44	30
97	96	70	63	43	29
96	95	69	61	42	28
95	94	68	60	41	26
94	93	67	59	40	25
93	91	66	58	39	24
92	90	65	56	38	23
91	89	64	55	37	21
90	88	63	54	36	20
89	86	62	53	35	19
88	85	61	51	34	18
87	84	60	50%	33	16
86	83	59	49	32	15
85	81	58	48	31	14
84	80	57	46	30	13
83	79	56	45	29	11
82	78	55	44	28	10
81	76	54	43	27	9
80	75%	53	41	26	8
79	74	52	40	25	6%
78	73	51	39	24	5
77	71	50	38	23	4
76	70	49	36	22	3
75	69	48	35	21	1
74	68	47	34	20	0

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[1] Textbooks suitable for use in an introductory anatomy and physiology course. Later editions may exist, and earlier editions will suffice.

Contents

Chapter 1
Organisation of the Body

A large part of beginning the study of anatomy and physiology is learning the specialised words that are used. This new terminology may seem daunting, but the challenge lies in its unfamiliarity rather than its difficulty of comprehension. You must expect to encounter a lot of new words and be prepared to learn them over the course of your study. Most of the words contain information as the words are constructed with a prefix and a suffix or a stem that identifies the word as referring to a specific part of anatomy or physiology. Many anatomical and physiological terms are in fact descriptions. For example extensor carpi radialis longus refers to a muscle that extends (extensor) the hand at the wrist (the carpals) that lies over the radius bone (radialis) and is the longer (longus) of the two muscles. The name also implies that there is a similar muscle that is not "longus"—it is the extensor carpi radialis brevis. Deoxyribonucleic acid (DNA) refers to a molecule that contains units of a ribose sugar with an oxygen atom removed, attached to a base to form a nucleoside and also attached to a phosphoric acid. This sometimes makes the words rather long or unusual.

You should know what the anatomical position of the body is and in what direction the transverse, sagittal and coronal planes of the body lie. Directional terms such as proximal/distal; deep/superficial; superior/inferior; lateral/medial; anterior/posterior and caudal/cephalic allow the location of one anatomical feature to be placed relative to another. The dorsal and ventral body cavities are located on different sides of the body and contain different organs. For ease of communication, the abdomen is divided into nine regions: right hypochondriac, epigastric, left hypochondriac, right lumbar, umbilical, left lumbar, right inguinal, hypogastric (or pubic) and left inguinal regions. Furthermore, you should be aware that superficial anatomical landmarks are referred to by regional names such as popliteal, calcaneal, cephalic, axillary and acromial. You should know the difference between physiology and anatomy and the definitions of metabolism, anabolism and catabolism.

M. Caon, *Examination Questions and Answers in Basic Anatomy and Physiology*, https://doi.org/10.1007/978-3-030-47314-3_1

1. Which of the listed term is described as “All the chemical processes that take place in the organelles and cytoplasm cells of the body”?
   A. Metabolism
   B. Cellular respiration
   C. Homeostasis
   D. Physiology

Answer is A: The quoted statement is the definition of metabolism.

2. Which of the following is the best definition of physiology?
   A. The microscopic study of tissues and cells
   B. The study of how the body works
   C. All the chemical processes that take place in the organelles of the body cells
   D. The body’s automatic tendency to maintain a relatively constant internal environment

Answer is B: Physiology is indeed the study of how the (healthy) body functions.

3. What is the study of how body parts function called?
   A. Histology
   B. Physiology
   C. Homeostasis
   D. Metabolism

Answer is B: Physiology refers to function.

4. What does the process known as anabolism refer to?
   A. The use of energy for producing chemical substances
   B. The breaking down phase of metabolism
   C. All the chemical processes that take place in the organelles of the cells
   D. The supply of nutrients to the body cells

Answer is A: Anabolism refers to the process of constructing/building molecules (think anabolic steroids). B refers to catabolism. C is metabolism.

5. Which major organ lies deep to the right hypochondriac region?
   A. Stomach
   B. Spleen
   C. Liver
   D. Duodenum

Answer is C: Hypochondriac = below the rib cartilage (chondra = cartilage); liver is located mostly on the right side.

6. Which plane divides the body into dorsal and ventral regions?
   A. Transverse
   B. Axial
   C. Coronal
   D. Sagittal

Answer is C: Dorsal and ventral = front and back—a coronal section so divides the body into these sections.

7. The "anatomical position" could be described as which of the following?
   A. Lying down prone
   B. Lying down supine
   C. Standing displaying the ventral surface of the body
   D. Standing with arms and legs abducted

Answer is C: This is the best answer. Standing is required, as is having the arms hanging parallel to the sides, with palms facing forward

8. To what does the term "hypochondriac" refer?
   A. A condition of having too few chondria
   B. The region of abdomen inferior to the ribs
   C. A person who often complains of an ailment
   D. Having insufficient cartilage in the knees

Answer is B: In this case, "hypo-" means below, while "-chondr" refers to the cartilage joining the ribs to the sternum (the costal cartilages). The regions of the abdomen immediately inferior to these rib cartilages (on the left and right sides of the body) is what is being referred to.

9. If a medical image displays internal anatomy in mid-sagittal section, which of the following describes the section?
   A. A vertical section through the nose and umbilicus that divides the body into right and left halves
   B. A cross-section through the midriff at about the level of the liver
   C. A cross-section through the upper chest at about the level of the shoulders
   D. A vertical section through the midpoint of the clavicle and through either the right or left thigh

Answer is A: A sagittal section divides the body into left and right portions. A mid-sagittal section means that the dividing line is in the vertical midline of the body, so that the halves are equal.

10. Which of the following best describes the "anatomical position"?
    A. Standing vertically, arms held horizontally, legs apart so that the tips of the head, hands and feet lie on an imaginary circle, drawn around the body
    B. Standing "to attention", with hands held so that the thumbs are ventral while the fifth digit is dorsal
    C. Standing "at ease" with hands clasped behind your back while adjacent and dorsal to the sacrum
    D. Standing vertically, arms parallel and lateral to the ribs with hands inferior to the elbows and supinated

Answer is D: The anatomical position is achieved when standing with feet comfortably apart while displaying the ventral surface of the head, body, and forearms to the same direction (forwards).

11. Which of the following terms is NOT used to identify a region of the abdomen?
    A. Left hypochondriac
    B. Hypogastric
    C. Epigastric
    D. Right sacral

Answer is D: Right sacral is not a region on the anterior surface of the abdomen.

12. When the body is standing in the "anatomical position", which of the following is true?
    A. The radius is lateral to the ulna.
    B. The radius is medial to the ulna.
    C. The radius is proximal to the ulna.
    D. The radius is distal to the ulna.

Answer is A: In the anatomical position, the palms are displayed ventrally. The radius is further from the body's midline than is the ulna; hence, it is lateral to the ulna.

13. How does a coronal section divide the body?
    A. Into many transverse slices
    B. Into a ventral part and a dorsal part
    C. Into a left and right section
    D. Into superior and inferior portions

Answer is B: An imaginary cut that divides the body into a front half (or section) and back half is termed coronal. Choice C is sagittal, while choice D is a transverse section.

14. By what anatomical term is the head region known?
    A. Plantar
    B. Cephalic
    C. Hypochondriac
    D. Axillary

Answer is B: The cephalus is the head; the plantar region is the base of the foot; the hypochondriac region is inferior and deep to the rib cartilages of ribs 7–10; the axillary region is the "armpit".

15. Which organ would be found in the left hypochondriac region?
    A. Appendix
    B. Urinary bladder
    C. Liver
    D. Stomach

Answer is D: Left hypochondriac region is deep to the cartilages of the lower ribs on our left hand side. The stomach is closest to this region.

16. Which body region does “popliteal” refer to?
    A. The region around each eye
    B. The region anterior to the elbow, between arm and forearm
    C. The region dorsal to the knee
    D. The region of the anterior crease between thigh and abdomen

Answer is C: Here the popliteal artery and popliteus tendon may be located. Choice A refers to orbital; B refers to antecubital; D refers to inguinal.

17. Which region of the body is known as the acromial region?
    A. The elbow region
    B. The heel region
    C. The medial ankle region
    D. The shoulder region

Answer is D: The superior part of the shoulder, at the distal end of the clavicle is known as acromial. Here the acromion of the scapula articulates with the clavicle at the “ac” or acromio-clavicular joint. Choice A is the olecranal region; B the calcaneal; C (the medial malleolus) is not usually ascribed a region name.

18. What part of the body is known as the popliteal region?
    A. The fold of the knee
    B. The fold of the elbow
    C. The area around the ears
    D. The medial sides of the ankles

Answer is A: Behind the knee, opposite to the patella is the popliteal region. Here is found the popliteal pulse and popliteus tendon.

19. Which organs are likely to be found in the epigastric region of the abdomen?
    A. Aorta, vena cava and trachea
    B. Oesophagus and stomach
    C. Urinary bladder and some of the large intestine
    D. The spleen and left kidney

Answer is B: The epigastric region is above/upon “epi-” the stomach. The organs of choice A are in the chest; C are in the hypogastric region; D in the left hypochondriac or left lumbar regions.

20. Which region of the body is the “sural” region?
    A. The dorsal surface of the leg
    B. The dorsal surface of the thigh
    C. The regions left and right of the lumbar vertebrae
    D. The medial region of the arm

Answer is A: Anatomically the “leg” is between the knee and ankle. Its dorsal region, also known as the calf, is the sural region.

21. Where is the inguinal region of the body?
    A. On the ventral surface of each knee
    B. On the abdomen, immediately superior to each thigh
    C. It is the region between the two lungs
    D. It is superior to the heart and inferior to the larynx

Answer is B: Inguinal refers to two of the nine regions that the abdomen surface is usually divided into. In this case, to the two most inferior, on either side of the pubic (or hypogastric) region.

22. What part of the body is referred to as the plantar region?
    A. The crease (anterior surface) of the elbows
    B. The backs of the hands
    C. The palms of the hands
    D. The soles of the feet

Answer is D: The inferior surface of the feet that make contact with the ground are the plantar region. Plantar warts occur on the soles. Plantar flexion of the foot is the act of "pointing the toes".

23. The directional term "superior" in anatomy means which of the following?
    A. Cephalic
    B. Ventral
    C. Closer to the top of the head
    D. Closer to the skin surface

Answer is C: Cephalic refers to the head region. While superior refers to being closer to the head than is the other anatomical structure in question.

24. Which of the stated relationships is correct?
    A. The heart is inferior to the clavicle.
    B. The shoulder is distal to the carpals.
    C. The phalanges are proximal to the metacarpals.
    D. The eye is medial to the eyebrows.

Answer is A: The heart is indeed below (inferior) the clavicle. All other choices are wrong.

25. Which of the stated relationships is correct?
    A. The heart is superior to the large intestine.
    B. The shoulder is distal to the metacarpals.
    C. The phalanges are proximal to the carpals.
    D. The eye is medial to the nose.

Answer is A: The heart is indeed above (superior) the intestine. All other answers are wrong.

26. Which of the following correctly describes the two named body parts?
    A. The elbow is proximal to the shoulder.
    B. The phalanges are distal to the carpals.
    C. The ribs are proximal to the sternum.
    D. The elbow is distal to the knee.

Answer is B: Phalanges (finger bones) are indeed further from the trunk along the arm, than are the carpals (wrist bones).

27. Complete the sentence correctly: "Cervical vertebrae are …".
    A. Superior to the rib cage.
    B. Inferior to the thoracic vertebrae.
    C. Located between the thoracic and sacral vertebrae.
    D. Fused into a single bone called the sacrum.

Answer is A: Cervix refers to "neck". The cervical vertebrae are in the neck hence are above (superior) the rib cage.

28. Which term describes the location of the adrenal glands with reference to the kidneys?
    A. Proximal
    B. Distal
    C. Superior
    D. Inferior

Answer is C: The adrenal glands are on the cephalic side of the kidneys. Being closer to the head, they are termed "superior to the kidneys".

29. Which bones are located distal to the elbow and proximal to the wrist?
    A. Carpals
    B. Radius and ulna
    C. Tarsals
    D. Humerus

Answer is B: Distal to the elbow means further along the arm towards the hand—this eliminates the humerus. Proximal to the wrist means closer to the body than the wrist—this eliminates the carpals. The tarsals are in the ankle.

30. Imagine an image of a transverse section of the upper arm. What tissues may be identified there located from the most superficial to the deepest?
    A. Skin, subcutaneous fat, muscle, hypodermis, bone
    B. Epidermis, dermis, hypodermis, muscle, bone
    C. Integument, muscle, superficial fascia, bone, marrow
    D. Hypodermis, subcutaneous fat, muscle, marrow, bone

Answer is B: Choice A is incorrect as hypodermis is more superficial than muscle. Choice C is wrong again because superficial fascia (which is a synonym for hypodermis) is more superficial than muscle. Choice D is wrong as marrow lies within bone, and also hypodermis and subcutaneous fat are almost synonyms.

31. Which of the following describes the position of the pinna of the ear with respect to the nose and chin?
    A. The ear is superior to the nose and distal to the chin.
    B. The ear is proximal to the nose and distal to the chin.
    C. The ear is anterior to the nose and superior to the chin.
    D. The ear is lateral to the nose and superior to the chin.

Answer is D: The ear is lateral (further from the body's midline) to the nose and superior (closer to the top of the head) to the chin.

32. Which of the following describes the position of the elbow with respect to the wrist and shoulder?
    A. The elbow is lateral to the shoulder but medial to the wrist.
    B. The elbow is dorsal to the shoulder but anterior to the wrist.
    C. The elbow is distal to the shoulder but proximal to the wrist.
    D. The elbow is inferior to the shoulder but superficial to the wrist.

Answer is C: Distal and proximal are terms used to describe position on a limb. The elbow is distal (further away from the torso) to the shoulder but proximal (closer to the torso) to the wrist.

33. Which of the following describes the position of the thoracic vertebrae with respect to the sternum and the kidneys?
    A. Vertebrae are posterior (or dorsal) to the sternum and medial to the kidneys.
    B. Vertebrae are superficial to the sternum and deep to the kidneys.
    C. Vertebrae are superior to the sternum and inferior to the kidneys.
    D. Vertebrae are lateral to the sternum and medial to kidneys.

Answer is A: Vertebrae are posterior (or dorsal) to sternum, which means they are closer to the back surface and medial to the kidneys, which means that the vertebrae are closer to the body's midline.

34. Which choice best describes the location of the majority of the musculoskeletal system?
    A. It is in the dorsal cavity.
    B. It is in the ventral cavity.
    C. It is in the abdominopelvic cavity.
    D. It is not located in a body cavity.

Answer is D: The musculoskeletal system is located in the arms and legs, and surrounding, but outside of the abdominopelvic, thoracic and the dorsal cavities.

35. Which of the following is/are the contents of the dorsal body cavity?
    A. Heart and lungs
    B. Brain and spinal cord
    C. Viscera
    D. Gut, kidneys, liver, pancreas, spleen, bladder, internal reproductive organs

Answer is B: Dorsal refers to the back, the cavity enclosed by the skull and vertebrae.

36. Which of the following is/are the contents of the ventral cavity?
    A. Heart and lungs
    B. Brain and spinal cord
    C. Viscera
    D. Gut, kidneys, liver, pancreas, spleen, bladder, internal reproductive organs

Answer is C: This is the best answer. It is a collective term for all organs in the thoracic and abdominopelvic cavities.

37. Which one of the following statements is correct?
    A. The diaphragm separates the brain and the spinal cord.
    B. The ventral cavity contains the male and female reproductive system.
    C. The abdominopelvic cavity contains the spinal cord.
    D. The dorsal cavity contains the brain and spinal cord.

Answer is D: Dorsal means back and that is the cavity with spinal cord and brain. B is incorrect as the genitalia are outside the ventral cavity.

38. The dorsal body cavity contains which of the following organs?
    A. Brain
    B. Brain and spinal cord
    C. Brain, spinal cord and heart
    D. Brain, spinal cord, heart and kidneys

Answer is B: Dorsal refers to the back and is opposite to ventral. Only the brain and spinal cord occupy the dorsal cavity. All other answers are incorrect.

39. What structure separates the thoracic cavity from the abdominal cavity?
    A. Mediastinum
    B. Diaphragm
    C. Peritoneum
    D. Pylorus

Answer is B: The muscular diaphragm physically separates these two ventral cavities.

40. What structure separates the abdominal and pelvic cavities?
    A. There is no separating structure.
    B. Diaphragm
    C. Peritoneum
    D. Dura mater

Answer is A: The pelvic cavity is not physically separated from the abdominal cavity. For example parts of the small intestine are located in both “cavities”.