
Answers to Secondary 3 Practice Midterm

1. The **cranium (D)** protects the brain from trauma. The scapula is your shoulder blade, the patella is in your knee, and the clavicle is your collar bone.
2. A blow to the head constitutes **compression (C)**.
3. Since the constraint is compression, choose the two thick arrows that are facing each other **(B)**. Note that the force symbols must be drawn in these thick arrows.
4. Since the outer shell resists breaking under shock, it is **resilient (C)**.
5. Since the middle layer bends without breaking it is **malleable (B)**.
6. Since the inner lining squeezes and returns to its original configuration, it is **elastic (D)**.
7. Since the middle layer of the helmet has been damaged (but not broken) and is unable to return to its original configuration, it has undergone **plastic deformation (B)**.
8. The buckle can be squeezed to fit into place, so it is **flexible**. It requires no linking component, so it is **direct**. The pieces cannot move independently of one another once linked, so it is **complete**. The link can always be undone, so it is **removable**. ***This is the correct answer, even though this is not a choice.***
9. The top view of this object is shown in **(B)**. Even though C looks similar, it includes hidden lines.
10. A multiview projection typically shows the front, top, and right side of an object. These are the views you drew for your hydraulic arm **(C)**
11. The top view in an orthographic drawing should appear lined up, directly above the front view **(D)**.
12. Choice **(C)**.
13. Thick lines on an engineering drawing show visible lines **(A)**.
14. These small marks indicate the middle of each line, which is the **centre line**.
15. A ball and socket joint (such as your humerus bone at the shoulder) is capable of abduction and adduction (moving a limb further away from the body, then back toward it), as well as flexion and extension (reducing the angle at the joint, then extending it). It is also able to rotate **(D)**.
16. **Not valid**
17. This bone has been subjected to a twisting force, which is **torsion (D)**.
18. The bone affected in this picture is a **long bone (A)**.
19. The elbow joint is a **hinge joint**. It serves as a **rotational guide (A)**
20. Muscles are attached to bones by **tendons (B)**. Ligaments link bones to bones.

21. Your deltoid muscle is near your shoulder **(A)**.
22. The base of your thumb forms a **saddle joint (C)**.
23. When you nod your head, you reduce and increase the angle between your head and your chest. This is **flexion and extension (A)**.
24. The quadriceps muscle is skeletal, so it is striated, multinucleated, and voluntary **(D)**.
25. The patella is in your knee... so it doesn't do anything to help your brain! **(C)**
26. Spongybone has a sponge-like texture, but it is not soft and squishy (you felt it when we looked at real bones in the lab) **(C)**.
27. Only **skeletal** muscles move voluntarily **(C)**.
28. The pectoralis major and latissimus dorsi have an antagonistic relationship (when one flexes, the other extends) **(B)**.
29. The Haversian canal is the central canal of bone tissue. According to the diagram, its diameter is between 0.05 mm and 0.12 mm **(B)**.
30. All of these statements are **true**.

Labelling Section

Skeleton

1. Cranium
2. Vertebrae
3. Scapula
4. Humerus
5. Pelvis
6. Radius
7. Phalanges
8. Femur
9. Tibia
10. Fibula

Parts of Long Bone

1. Cartilage
2. Epiphysis
3. Diaphysis
4. Compact bone
5. Periosteum
6. Bone marrow
7. Spongybone
8. Growth plate

Muscles

1. External obliques
2. Hamstrings
3. Deltoid
4. Biceps
5. Rectus abdomenus
6. Quadriceps
7. Pectoralis major
8. Trapezius
9. Triceps
10. Latissimus dorsi
11. Gluteus maximus
12. Gastrocnemius

Synovial joint

1. Synovial fluid
2. Ligament
3. Cartilage
4. Tendon

Types of Guiding

1. This is a helical guide
2. This is a translational guide
3. This is a rotational guide

Types of Muscle Cells

1. This is cardiac muscle
2. This is skeletal muscle
3. This is smooth muscle

PART 2

1. Density = $r = \frac{m}{V} = \frac{45 \text{ g}}{3 \text{ cm}^3} = 3 \frac{\text{g}}{\text{cm}^3}$

2. Density = $r = \frac{m}{V} = \frac{60 \text{ g}}{30 \text{ cm}^3} = 2 \frac{\text{g}}{\text{cm}^3}$

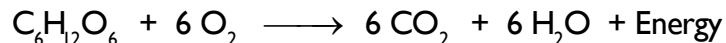
3. The rock in question 2 is heavier because it has a higher mass.

4. The rock in question 1 is more dense.

5. A gas that:

- a. Forms a white precipitate in limewater is: CO_2
- b. Relights a glowing splint: O_2
- c. Causes a popping sound with a splint: H_2

6. The formula for cellular respiration is:



7. When your diaphragm relaxes, it rises up, reducing the volume inside your chest cavity. This reduction of volume increases the air pressure inside your chest cavity, to the point where it is greater than the air pressure outside the body. Because high pressure tends to move toward low pressure, this air will want to rush out of your chest cavity, which is exhalation.

8. Inhaled air is rich in O_2 and dust (which is filtered out). Exhaled air is rich in CO_2 , water, and is warmer. All other substances do not change.

11. Oxygen going into cells from the blood and CO_2 going into the blood is part of **systemic circulation**. Both of these movements are caused by diffusion (high pressure moving toward lower pressure). O_2 going into the blood at the alveoli (and CO_2 going back into the alveoli to be exhaled) is caused by diffusion as well, which is **pulmonary circulation**.

12. Inhaled O_2 is diffusing into the capillaries that surround an alveolus because the O_2 pressure inside the alveolus is currently greater than the pressure inside the blood (high pressure moves toward low pressure). The CO_2 is diffusing from the capillary into the alveolus to be exhaled because the CO_2 pressure inside the blood is greater than inside the alveolus.

13. Labelling the respiratory system.

- 1. Nose
- 2. Mouth
- 3. Larynx
- 4. Lung
- 5. Bronchi
- 6. Diaphragm
- 7. Pharynx
- 8. Trachea
- 9. Bronchiole
- 10. Alveoli

I4. Labelling the heart:

1. Aorta (ascending)
2. Superior vena cava
3. Pulmonary artery
4. Pulmonary veins
5. Right atrium
6. Tricuspid valve
7. Right ventricle
8. Inferior vena cava
9. Pulmonary artery
10. Pulmonary veins
11. Left atrium
12. Bicuspid valve
13. Aortic valve
14. Left ventricle
15. Aorta (descending)

The natural pacemaker is next to the right atrium

I5. The circulatory system

Hydraulic (blood is a liquid)
Closed (blood does not exit the body)
Incompressible (liquid)
This is quiet

Respiratory system

Pneumatic (involves air)
Open (air does exit the body)
Compressible (gas)
This is noisy!

I6. If you have Type A- blood, you can receive blood from other A- or O-.

If you have Type AB+, you can receive from all blood types.

If you have Type O-, you can receive only from other O-.

I7. Anemia affects red blood cells (lower than 45%)

Leukemia affects white blood cells

Hemophilia affects platelets.

I8. The circulatory system releases heat when capillaries dilate, and sphincters allow blood to move to the surface to cool off.