1. The diagram shows part of the human alimentary canal.

Which two structures produce substances involved in the digestion of fat?
A 1 and 5
B 2 and 3
C 3 and 4
D 4 and 5

3. Which secretion, released into the alimentary canal, contains no enzymes but speeds up fat digestion?
   A bile
   B intestinal juice
   C pancreatic juice
   D saliva
   [J2000/P1/Q13]

4. Which chemical change takes place in green plants, but not in mammals?
   A glucose → cellulose
   B glucose → glycogen
   C glycogen → glucose
   D starch → glucose
   [J2000/P1/Q9]

5. Which part of the alimentary canal is most acidic?
   A colon
   B ileum
   C mouth
   D stomach
   [J2000/P1/Q10]

6. In which two body organs does re-absorption of water take place?
   A colon and kidneys
   B kidneys and liver
   C liver and duodenum
   D duodenum and colon
   [J2000/P1/Q11]

7. How do the muscles in the wall of the alimentary canal act when pushing a bolus of food along?
   A circular contract
   B muscles contract
   C behind bolus relax
   D relax
   [J2000/P1/Q12]
8. The diagram shows some food moving along the alimentary canal, by peristalsis.

In which state are the muscles in the wall of the alimentary canal at point X?

- circular muscles contracting
- longitudinal muscles relaxing

A
B
C
D

11. Which molecules are produced by the digestion of starch and of protein?

- Starch: glycerol
- Protein: amino acids

A
B
C
D

9. After eating, the pH in the mouth decreases. Which statement explains this decrease?

- A: bacteria release acids
- B: enzymes in saliva release acids
- C: salivary glands release acids
- D: taste receptors release acids

10. The diagram shows a section through a villus.

What is the function of structure X?

- A: to absorb amino acids
- B: to carry blood
- C: to transport fats
- D: to transport glucose

12. The diagram shows the structure of a villus in the small intestine. The arrows show the direction of flow of fluids. After a meal of fried chicken, whose will fatty acids and glycerol be present in the largest amounts?

13. Which two organs are connected by the hepatic portal vein?

- A: intestine and kidneys
- B: intestine and liver
- C: liver and kidneys
- D: lungs and heart
14. Which digestive processes take place in the mouth?

<table>
<thead>
<tr>
<th>chemical digestion</th>
<th>physical digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>✓</td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
</tr>
<tr>
<td>C</td>
<td>X</td>
</tr>
<tr>
<td>D</td>
<td>✓</td>
</tr>
</tbody>
</table>

key
✓ = takes place in the mouth
X = does not take place in the mouth

15. Which region of the alimentary canal has the greatest internal surface area?
A colon
B duodenum
C ileum
D stomach

16. The diagram shows the liver and associated blood vessels.

What are the blood vessels labelled P, Q and R?

P
A hepatic artery
B hepatic artery
C hepatic vein
D hepatic vein

Q
A hepatic portal vein
B hepatic vein
C hepatic artery
D hepatic portal vein

R
A hepatic vein
B hepatic portal vein
C hepatic artery
D hepatic artery

17. The diagram shows part of the human alimentary canal.

Which two structures produce substances involved in the digestion of fat?
A 1 and 5
B 2 and 3
C 3 and 4
D 4 and 5

18. Where do chemical digestion and absorption of food occur in the human alimentary canal?

chemical digestion absorption
A oesophagus colon
B oesophagus stomach
C stomach liver
D stomach ileum
19. Lipase solution was added to milk. After 30 minutes, the milk had become more acidic. What were the substrate and product in this reaction?

<table>
<thead>
<tr>
<th>substrate</th>
<th>product</th>
</tr>
</thead>
<tbody>
<tr>
<td>A fats</td>
<td>amino acids</td>
</tr>
<tr>
<td>B fats</td>
<td>fatty acids</td>
</tr>
<tr>
<td>C proteins</td>
<td>amino acids</td>
</tr>
<tr>
<td>D proteins</td>
<td>fatty acids</td>
</tr>
</tbody>
</table>

20. In the human body, where is bile produced?

A gall bladder  
B liver  
C pancreas  
D stomach

21. Where does bile enter the alimentary canal?

A oesophagus  
B stomach  
C duodenum  
D colon

22. Which substance consists of small, soluble molecules and does not have to be digested before it can pass through the wall of the alimentary canal?

A fat  
B glucose  
C protein  
D starch

23. The diagram shows the effect of pH on the activity of two enzymes, a protease and an amylase, in the alimentary canal.

![Diagram of enzyme activity vs. pH]

24. In which regions of the alimentary canal would these enzymes be most active?

<table>
<thead>
<tr>
<th>enzyme</th>
<th>region</th>
</tr>
</thead>
<tbody>
<tr>
<td>protease</td>
<td>duodenum</td>
</tr>
<tr>
<td>amylase</td>
<td>colon</td>
</tr>
</tbody>
</table>

25. The diagram shows a section through a villus.

What is the function of structure X?

A to absorb amino acids  
B to carry blood  
C to transport fats  
D to transport glucose

When food is present, which two structures usually contain bile?

A 1 and 3  
B 1 and 4  
C 2 and 3  
D 2 and 4
26. As food passes along the alimentary canal, proteins are digested in the
A duodenum, ileum and liver.
B ileum, liver and colon.
C mouth, stomach and duodenum.
D stomach, duodenum and ileum.

27. The diagram shows the structure of a villus in the small intestine. The arrows show the direction of flow of fluids.
Where will fatty acids and glycerol be present in the largest amounts?

28. What would happen if a person’s bile duct became blocked?
A Carbohydrate digestion would be reduced.
B Fat digestion would be reduced.
C Protein digestion would slow down.
D The duodenum contents would be neutralised more quickly.

29. Which region of the alimentary canal has the greatest surface area for absorption of food molecules?
A colon
B duodenum
C ileum
D stomach

30. The diagram shows part of the human alimentary canal.

 Which two structures produce substances involved in the digestion of fat (lipid)?
A 1 and 5
B 2 and 3
C 3 and 4
D 4 and 5

31. Which of the following is an energy-rich carbohydrate stored in large quantities in liver and muscle cells?
A glucose
B glycogen
C starch
D sucrose

32. Which of the following breaks down fat molecules into fatty acids and glycerol?
A amino acids
B amylase
C lipase
D protease

33. In the human body, where is bile produced?
A gall bladder
B liver
C pancreas
D stomach
Questions 34 and 35 refer to the diagram of part of the human alimentary canal.

34. In which region are most amino acids absorbed into the blood stream?
   (J93/P1/Q10)

35. Which region produces an enzyme which works best at pH 2?
   (J94/P1/Q10)

36. Which secretion, released into the alimentary canal, contains no enzymes but speeds up fat digestion?
   A bile
   B intestinal juice
   C mucus
   D pancreatic juice
   (J94/P1/Q10)

37. What is the final product of protein digestion?
   A amino acids
   B fatty acids
   C glucose
   D glycogen
   E sucrose
   (J93/P1/Q10)

Questions 38 and 39 refer to the diagram of the liver and associated blood vessels.

38. What are the blood vessels labelled P, Q and R?
   P hepatic artery
   Q hepatic portal vein
   R hepatic vein
   B hepatic artery
   C hepatic portal vein
   D hepatic vein
   E hepatic portal vein
   (J93/P1/Q10)

39. In which blood vessel will the level of glucose change most during a day?
   A P
   B Q
   C R
   D S
   E T
   (J93/P1/Q11)

40. The diagram shows the digestive system of a typical mammal.

Which structure is the ileum?
   (J93/P1/Q12)
41. Five tubes containing cooked egg-white are set up as shown. Protease solutions of different pH are added to each tube.

Which diagram shows the result of this experiment for a protease from the stomach?

- A P and Q
- B P and R
- C Q and S
- D R and S

43. Which is not a function of the liver?
- A formation of glycogen
- B formation of urea
- C production of bile
- D secretion of digestive enzymes

44. Where is lipase produced, and into which part of the intestine is it secreted?

<table>
<thead>
<tr>
<th>produced in</th>
<th>secreted into</th>
</tr>
</thead>
<tbody>
<tr>
<td>A liver</td>
<td>duodenum</td>
</tr>
<tr>
<td>B liver</td>
<td>ileum</td>
</tr>
<tr>
<td>C pancreas</td>
<td>duodenum</td>
</tr>
<tr>
<td>D pancreas</td>
<td>ileum</td>
</tr>
</tbody>
</table>

45. What are the functions of the colon?

<table>
<thead>
<tr>
<th>water absorbed</th>
<th>enzymes secreted</th>
</tr>
</thead>
<tbody>
<tr>
<td>A no</td>
<td>no</td>
</tr>
<tr>
<td>B no</td>
<td>yes</td>
</tr>
<tr>
<td>C yes</td>
<td>no</td>
</tr>
<tr>
<td>D yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

46. The table shows nutrients present in four foods.

<table>
<thead>
<tr>
<th>food</th>
<th>carbohydrate</th>
<th>fat</th>
<th>protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Q</td>
<td>x</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>R</td>
<td>x</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>S</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
</tbody>
</table>

key: ✓ = present  x = absent

Which foods would both be partly digested in the stomach?
The table shows the results of an investigation into the absorption of products of digestion in the presence and absence of oxygen. Which conclusion can be drawn from these results?
A All products of digestion are absorbed by both active transport and diffusion.
B All products of digestion are absorbed by diffusion only.
C Amino acids and glucose are absorbed by active transport only.
D Fatty acids and glycerol are absorbed mainly by diffusion.

49. Where in the alimentary canal is most water absorbed?
A colon
B ileum
C oesophagus
D stomach

50. The diagram shows some organs of the human body. Which structure does not move its contents by peristalsis?

47. The diagram shows part of the circulatory system. After a meal, which blood vessel will contain blood with the most glucose?

48. Starch is digested to maltose by the enzyme amylase. According to the ‘lock and key’ hypothesis, which is the ‘key’ and which is the ‘lock’?

<table>
<thead>
<tr>
<th>‘key’</th>
<th>‘lock’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A amylase maltose</td>
<td></td>
</tr>
<tr>
<td>B amylase starch</td>
<td></td>
</tr>
<tr>
<td>C starch amylase</td>
<td></td>
</tr>
<tr>
<td>D starch maltose</td>
<td></td>
</tr>
</tbody>
</table>