Endocrine and Gastrointestinal Tract

Section 1

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1 With regard to carbohydrate digestion:
   a) salivary amylase works best at alkaline pH
   b) approximately 40% of adult Europeans are lactose intolerant
   c) oligosaccharidase deficiency results in osmotic diarrhoea
   d) salivary amylase continues to digest carbohydrates in the stomach

2 Carbohydrate absorption:
   a) all glucose, galactose and fructose is co-transported with Na by the SGLT-2 transporter into enterocytes
   b) all glucose/galactose and fructose is transported across the basolateral membrane by GLUT2
   c) fructose absorption is a secondary active transport mechanism
   d) absorption is decreased by insulin

3 The liberation of proteins to free amino acids (final digestive step) occur in all of the following EXCEPT:
   a) enterocyte cytoplasm
   b) brush border
   c) small intestine lumen
   d) stomach

4 Steatorrhoea occurs with all of the following EXCEPT:

   a) gastrinoma
   b) congenital defect in gastric lipase
   c) ileal disease with failure to reabsorb bile salts
   d) exocrine pancreatic disease

5 Which is a water soluble vitamin?
   a) D
   b) B_{12}
   c) A
   d) K
   e) E

6 Which is not Na^+ dependent for absorption?
   a) thiamin
   b) riboflavin
   c) niacin
   d) folate
   e) biotin

7 Which is absorbed mainly in the colon?
   a) short chain fatty acids
   b) calcium
   c) vitamin K
   d) oligosaccharides

8 Which is INCORRECT regarding nerve supply to the gut?
   a) the blood vessels are known to have enteric, parasympathetic and sympathetic innervation
   b) the myenteric plexus lies between the longitudinal and circular muscle layers
   c) parasympathetic supply is via vagal and sacral nerve
   d) sympathetic supply is often inhibitory on cholinergic postganglionic fibres

9 Gastrin secretion is stimulated by all but:
   a) luminal peptides
   b) vagal discharge
   c) luminal acid
   d) phenylalanine

10 The actions of gastrin include all but:
   a) insulin secretion in response to a carbohydrate meal
   b) a trophic effect on colonic mucosa
   c) a trophic effect on gastric mucosa
   d) pepsin secretion
   e) contraction of muscle at the gastro-oesophageal junction

11 Which is NOT an action of CCK?
   a) gallbladder contraction
   b) increased gastric motility and emptying
   c) glucagon secretion
   d) secretion of pancreatic juice

12 Which hormone is most important in insulin secretion?
a) gastrin
b) CCK
c) GIP
d) secretin

13 Which produces the majority of salivary volume?
a) lingual glands
b) sublingual
c) parotid
d) submandibular

14 Which nerve is NOT involved in the efferent (motor) swallow reflex?
a) trigeminal
b) vagus
c) facial
d) hypoglossal

15 Which is NOT part of the normal content of gastric juice?
a) HPO_4^{2-}
b) mucus
c) lipase
d) amylase

16 Chief cells secrete:
a) HCl
b) pepsinogen
c) intrinsic factor
d) HCO_3^-

17 Which stimulates parietal cell secretion?
a) prostaglandins
b) aspirin
c) vinegar
d) acetylcholine

18 Regarding bilirubin:
a) unconjugated bilirubin is more soluble than conjugated
b) all conjugated bilirubin is excreted via the intestine
c) bile duct obstruction causes jaundice secondary to unconjugated hyperbilirubinaemia
d) haemolytic anaemia may cause ?????? hyperbilirubinaemia

19 Which form of intestinal smooth muscle contraction does NOT occur in normal health?
a) peristalsis
b) weak antiperistalsis
c) peristaltic rushes
d) tonic contractions
e) segmental contractions

20 In the adrenal medulla:
a) epinephrine is formed by the hydroxylation and decarboxylation of tyrosine
b) 10% of the cells are the epinephrine-secreting type
c) plasma norepinephrine levels are generally unchanged after adrenalectomy
d) catecholamine t1/2 is 10 minutes in the circulation
e) norepinephrine and epinephrine are stored in granules with APT and chromagranin C

21 In the adrenal cortex:
a) the zona glomerulosa has 17 alpha-hydroxylase and no aldosterone synthase
b) all the cholesterol is synthesised from acetate
c) zona fasciculata makes up 10% of the mass of the adrenal gland
d) angiotensin II binds to receptors in the zona reticularis
e) ATCH increases the synthesis of all 5 P450 cytochromes involved in the formation of adrenocortical hormones

22 Regarding the islets of Langerhans:
a) D cells secrete pancreatic polypeptide
b) A cells are the most common
c) they are most plentiful in the body of the pancreas
d) blood from the islets drain into the hepatic portal vein
e) B cell secretion of glucagon occurs by exocytosis

23 Which factor stimulates insulin secretion?
a) thiazide diuretics
b) phenytoin
c) theophylline
d) β blockers
e) epinephrine

24 Thyroid hormones increase the oxygen consumption of:
a) lymph nodes
b) spleen
c) brain
d) anterior pituitary gland
e) liver

25 The action of gastrin includes all EXCEPT:
a) stimulation of insulin secretion after a carbohydrate meal
b) stimulation of gastric acid secretion
c) stimulation of gastric motility
d) contraction of gastro-oesophageal junction musculature
e) stimulation of growth of large intestine mucosa

26 Regarding protein metabolism, which statement is CORRECT?
a) increases the respiratory quotient to values > 1.0
b) has a specific dynamic action (SDA) of approximately 10%
c) endogenous protein breakdown is inhibited by glucagon
d) creatinine excretion is not depressed in starvation
e) NH_4^+ formed during transamination of amino acids is excreted in the urine as urea

27 Regarding fat metabolism, which statement is CORRECT?
a) ketone bodies accumulate in DKA due to a lack of acetyl-CoA substrate
b) fatty acids are transported in the plasma bound to lipoprotein complexes
c) cholesterol is transported from extra-hepatic cells to the liver by high-density lipoproteins (HDLs) in the endogenous pathway
d) eicosanoids are synthesised from cholesterol
e) simvastatin reduces plasma cholesterol levels by increasing hepatic biliary excretion

28 Thyroxine:
a) is mostly bound to albumin in the plasma, since this has the largest capacity
b) is 2-5 times more potent that triiodothyronine (T_3)
c) stimulates TSH release
d) ~33% is deiodinated in the liver to T_3
e) does not cross the placenta

29 Insulin:
a) binds to GLUT 1-5 receptors in the peripheral tissues
b) deficiency results in increased gluconeogenesis
c) has a plasma half-life of 2-3 hours
d) is secreted by the pancreatic A cells
e) average secretion is around 40U/day

30 With respect to calcium metabolism / bone formation:
a) osteoclasts secrete alkaline phosphatase
b) osteoblasts are haemopoietic derivatives of monocyte lineage
c) $1,25(OH)_2$???D_3 and PTH stimulate both osteoblasts and osteoclasts
d) oestrogens are thought to be protective of osteoporosis as their main effect is osteoblasts stimulation
e) the plasmic calcium may be markedly elevated in “disuse” osteoporosis

31 All of the following, except one, inhibit insulin secretion. Which is it?
a) somatostatin
b) thiazide diuretics
c) propranolol
d) insulin
e) glucagon

32 All but one of the following compounds releases large amounts of energy on breakdown:
a) cAMP
b) ATP
c) creatine phosphate
d) ADP
e) coenzyme A

33 Which is TRUE?
a) adenosine triphosphate is a low energy phosphate
b) reduction involves loss of hydrogen or electrons
c) oxidative phosphorylation occurs in the endoplasmic reticulum
d) ATP is precursor of cyclic AMP
e) ADP has no feedback on oxidative phosphorylation

34 Small intestine:
a) the ligament of Treitz the jejunum becomes the ileum
b) the distance pylorus to ileocecal valve in living humans is 700cm
c) malabsorption syndrome may develop if 25% of the small intestine is removed
d) colonic peristalsis is the first smooth muscle action of the GIT to return after abdominal operation
e) deficiency of gluten hydrolase causes coeliac disease

35 Regarding thyroid hormones:
a) little T_3 is produced peripherally by deiodination T_4
b) albumin has more capacity to bind thyroid hormones than TBG
c) TBG has less affinity for thyroid hormone than albumin
d) thyroid hormones stimulate lipogenesis
e) RT_3 is slightly less active than T_4

36 A calorie is:
a) standard unit of heat energy necessary to raise the temperature of 1L of water 1° from 15-16°C
b) standard unit of heat energy necessary to raise the temperature of 1gm of mercury 1° from 17-18°C
c) the standard unit of heat energy necessary to raise the temperature of 1gm of water 1° from 17-18°C
d) the standard unit of heat energy necessary to raise the temperature of 1gm of water 1° from 15-16°C
e) the standard unit of heat energy necessary to raise the temperature of 1gm of water 1° from 15-16°F

37 Regarding the respiratory quotient:
a) it is the ratio of CO_2 to O_2 at any time
b) RQ of fat is 0.8
c) increases with hyperventilation
d) increases in metabolic alkalosis
e) RQ of carbohydrate is 1.0

38 Regarding basal metabolic rate:
a) it is higher in women
b) it is determined at rest within 12 hours after the last meal
c) increases by 18% for each 1°C of fever
d) is about 40Kcal/m^2/h in an average man
e) is about 4,000Kcal/d in an average man

39 Which is NOT a high energy compound?
a) CoA
b) GGP
c) ITP
d) creatine phosphate
e) GTP

40 Regarding the flavoprotein – cytochrome system:
a) cytochrome oxidase is the first step in the chain
b) occurs within the endoplasmic reticulum
c) substrates are pyruvate, water and oxygen and ATP

41 Regarding carbohydrate metabolism:
a) glucokinase is increased in starvation
b) the breakdown of glycogen is called glycolysis
c) the direct oxidative pathway involves the breakdown of glucose through triose
d) the conversion of pyruvate to acetyl-CoA is irreversible
e) conversion of fructose 6-phosphate to fructose 1,6-diphosphate produces 1 ATP

42 Which is NOT produced by the citric acid cycle?
a) NAD^+
b) CO_2
c) GTP
d) $FADH_2$
e) H^+

43 Regarding phosphorylase:
a) it clea???? 1:6α linkages in glycogen
b) it is activated by norepinephrine
c) phosphorylase kinase is directly activated by cyclic AMP
d) activation of protein kinase A inhibits glycogen synthesis
e) α_1 adrenergic receptors in the liver have no part in glycogen breakdown

44 Which amino acid is not found in protein?
a) ornithine
b) arginine
c) valine
d) aspartic acid
e) glycine

45 Which is a nutritionally essential amino acid?
a) taunine
b) leucine
c) glutamate
d) alanine
e) tyrosine

46 Which amino acid is not ketogenic?
a) leucine
b) isoleucine
c) phenylalanine
d) tyrosine
e) alanine

47 Regarding starvation:
a) glycogen provides enough fuel for 48 hours
b) ketoacids derived from fats, are used by the brain and other tissues
c) hypoglycaemia has a protein sparing effect
d) average time until death is 40 days
e) urine creatine levels are unchanged

48 Regarding lipid transport:
a) chylomicrons enter the blood directly from the enterocyte
b) the major aproproteins are apoB, apoD and apo???
c) chylomicrons are broken down to FfA, glycerol and chylomicron remnants by lipoprotein lipase in the liver
d) VLDL provides cholesterol to the tissue
e) LDL is taken up by receptor mediated endocytosis ????

49 Regarding electrolyte absorption:
a) cholera toxin binds to adenosine diphosphate ribose to the subunit of Gs, stimulative ATPase activity
b) active transport of Na^+ into the small intestine enterocytes is coupled with the absorption of glucose
c) magnesium sulphate absorption is coupled with Na^+-K^+-ATPase pump
d) the Na^+-K^+ ATPase pumps are located at the luminal membrane of the enterocyte
e) osmolality in the jejunal lumen is close to that of plasma

50 Regarding calcium:
a) 20% of calcium is absorbed
b) active transport of Ca^{2+} out of the lumen occurs primarily in the lower small intestine
c) 1,25-dihydroxycholecalciferol induces calcium binding protein synthesis in mucosal cell
d) absorption is facilitated by phosphate
e) 1,25-dihydroxycholecalciferol is produced in the skin

51 Regarding iron:
a) it is more readily absorbed in the ferric form
b) men lose about 0.6mg/d
c) average daily iron intake is 40mg
d) ascorbic acid reduces iron absorption

Section 1 – Answers

1	C
2	B
3	D
4	B
5	B
6	D
7	A
8	A
9	C
10	A
11	B
12	C
13	D
14	B
15	D
16	B
17	D
18	D
19	C
20	C
21	E
22	D
23	C
24	E
25	A
26	D
27	C
28	D
29	E
30	C
31	E
32	A
33	D
34	E
35	B
36	D
37	E
38	D
39	B
40	No answer
41	D
42	A
43	D
44	E
45	D
46	C
47	C
48	
49	E
50	No answer
51	No answer

check answers don't correspond with questions

Section 2

GI/Digestion/Absorption/Metabolism

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1 Vitamins co-transported with Na^+ include all EXCEPT:
   a) thiamine
   b) folate
   c) niacin
   d) riboflavin
   e) pyridoxine

2 Fat soluble vitamins include all EXCEPT:
   a) vitamin A
   b) vitamin C
   c) vitamin D
   d) vitamin E
   e) vitamin K

3 The largest daily volume of secretions in the GIT originates in the:
   a) salivary glands
   b) stomach
   c) gallbladder (bile)
   d) pancreas
   e) intestine

4 Iron:
   a) most dietary iron is in the ferrous state
   b) most iron is absorbed in the upper small intestine
   c) a ferritin micelle contains 1,000 atoms of iron
   d) 90% of body iron is in haemoglobin
   e) 10% of dietary iron is normally absorbed

5 Ketone bodies:
   a) are not formed under normal conditions
   b) are all moderately strong acids
   c) are formed when intracellular glucose is deficient
   d) are easily metabolised in the liver
   e) all of the above

6 Creatinuria can occur in all EXCEPT:
a) healthy children
b) pregnant women
c) starvation
d) hypothyroidism
e) poorly controlled diabetes mellitus

7 Cations in normal (fasting) gastric juice include all EXCEPT:
a) Na^{+}
b) Ca^{++}
c) K^{+}
d) Mg^{++}
e) H^{+}

8 Human hepatic bile (hepatic bile duct) is largely:
a) water
b) bile salts
c) bile pigment
d) cholesterol
e) lecithin

9 The nutritionally essential amino acids include:
a) alanine
b) cysteine
c) tyrosine
d) methionine
e) glutamine

10 The largest glycogen store in the adult body is in the:
a) liver
b) spleen
c) muscle
d) pancreas
e) circulating red cell mass

11 TSH secretion is stimulated by:
a) dopamine
b) somatostatin
c) cold temperatures
d) stress
e) glucocorticoids

12 Thyroxine (T_4) has greater affinity for:
a) thyroxine-binding globulin
b) transthyretin
c) thyroxine-binding pre-albumin
d) albumin
e) triiodothyronine

13 GLUT is an example of:
a) simple diffusion
b) facilitated diffusion
c) primary active transport
d) secondary active transport
e) endocytosis

14 The most common cell type of the endocrine pancreas is:
a) A cells
b) B cells
c) C cells
d) D cells
e) F cells

15 Both insulin and somatostatin:
a) are released from extra-pancreatic sites
b) receptors are linked to G proteins
c) inhibit release of glucagon
d) cause K^+ uptake by cells
e) are polypeptides containing two chains linked by disulphide bonds

16 Aldosterone is secreted by:
a) zona reticularis
b) zona fasciculata
c) zona glomerulosa
d) zona fasciculata and reticularis
e) zona glomerulosa and fasciculata

17 Regarding aldosterone:
a) it is released in response to hypokalaemia
b) it has glucocorticoid action
c) it works via G proteins to increase Na^+ reabsorption
d) its release results in alkaline urine
e) it is highly protein-bound

18 Calcitonin secretion is increased by:
a) gastrin
b) CCK
c) secretin
d) glucagon
e) all of the above

19 All of the following bind to intracellular receptors EXCEPT:
a) cortisol
b) aldosterone
c) 1,25-DHCC
d) parathyroid hormone
e) thyroxine

20 How many trophic hormones does the anterior pituitary produce?
a) 2
b) 3
c) 5
d) 6
e) 8

21 All of the following are high energy phosphate compounds EXCEPT:
a) adenosine triphosphate
b) glucose 6-phosphate
c) creatine phosphate
d) adenosine diphosphate
e) guanosine triphosphate

22 Under aerobic conditions, 1mol glucose forms:
a) 2mol ATP
b) 8mol ATP
c) 16mol ATP
d) 38mol ATP
e) 42mol ATP

23 The approximate ratio of fat : CHO energy stores is:
a) 2 : 1
b) 4 : 1
c) 10 : 1
d) 20 : 1
e) 40 : 1

24 Nutritionally essential amino acids include:
a) glycine
b) serine
c) lysine
d) glutamine
e) tyrosine

25 Uric acid is formed by the breakdown of:
a) purines
b) pyrimidines
c) glutamine
d) urea
e) all of the above

26 The LDL contains which aproprotein?
a) A
b) B-48
c) B-100
d) C
e) E

27 Regarding cellular metabolism of cholesterol:
a) it inhibits HMG-CoA red???
b) is processed in part to other cholesterol esters by the enzyme acetyl CoA ??? acyltransferase
c) it inhibits the formation of CO_2 receptors
d) all of the above
e) none of the above

28 Which of the following substances decreases the activity of hormone-sensitive lipase?
a) adrenaline
b) thyroxine
c) serotonin
d) TSH
e) prostaglandin E

29 Chromium deficiency leads to:
a) insulin resistance
b) hypogondal dwarfism
c) anaemia
d) changes in ossification
e) thyroid disorder

30 Vitamin B_1 (thiamine) deficiency leads to:

a) anaemia
b) beri beir
c) convulsions
d) dermatitis
e) pellagra

Section 2 – Answers

1	B
2	B
3	B
4	B
5	C
6	D
7	B
8	A
9	D
10	C
11	C
12	A
13	B
14	B
15	C
16	C
17	B
18	E
19	D
20	C
21	B
22	D
23	E
24	C
25	A
26	C
27	D
28	E
29	A
30	B

Section 3

Metabolism and Endocrinology

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1 Which of the following phosphate compounds is MOST important in the production of energy?
   a) AMP (adenosine monophosphate)
   b) ADP (adenosine diphosphate)
   c) ATP (adenosine triphosphate)
   d) GTP (guanosine triphosphate)
   e) CTP (cytidine triphosphate)

2 Which of the following is NOT produced by the citric acid cycle?
   a) CO_2
   b) H^+ ions
   c) NAD^+
   d) GTP (guanosine triphosphate)
   e) NADH

3 The renal threshold for glucose, the arterial blood level at which glycosuria appears, is approximately:
   a) 1.8g/dL
   b) 180mg/dL
   c) 18mg/dL
   d) 80mg/dL
   e) 800mg/dL

4 Which of the following amino acids are glucogenic (ie give rise to compounds readily converted to glucose)?
   a) alanine
   b) leucine
   c) isoleucine
   d) phenylalanine
   e) tyrosine

5 Which of the following lipoproteins is SMALLEST in size?
   a) chylomicrons
   b) very low density lipoproteins
   c) intermediate density lipoproteins
   d) low density lipoproteins
   e) high density lipoproteins

6 Regarding the respiratory quotient, which of the following is TRUE?
a) it is the ratio of CO_2 and O_2 in the body at any one time
b) can go as high as 2.00 because lactic acid produces more oxygen
c) in acidosis, it goes down
d) in alkalosis it goes up
e) it is possible for it to be negative

7 Regarding body surface area, which of the following statements is TRUE?
a) is calculated using weight/height
b) is calculated using 0.007184 X weight + 0.425 X weight + 0.725
c) it does not affect the basal metabolic rate
d) it does not affect the general metabolic rate
e) it has an effect on the specific dynamic action of foodstuffs

8 Regarding the basal metabolic rate, which of the following is TRUE?
a) it is measured in the absence of disease, at room temperature, within 12 hours of a meal with a Benedict apparatus and the subject asleep
b) it increases 24% per degree Celsius of body temperature above 37°
c) it is decreased during the latter stage of starvation, explaining the initial rapid weight loss than a slowing down of weight loss
d) it declines in pregnancy
e) it correlates closer to weight than to body surface area

9 Biological energy can be derived from all EXCEPT:
a) lactic acid
b) phosphorylcreatine
c) guanosine triphosphate
d) co enzyme A
e) urea

10 Regarding brown fat, which of the following is TRUE?
a) it is fat with a large percentage of melatonin as a constituent
b) it has extensive parasympathetic innervation
c) it is more abundant in adults than in infants
d) heat production is assisted by uncoupling of the H^+/ATP generator system in mitochondria
e) brown fat cells contain multiple droplets of fat

11 Regarding thyroid hormones, which statement is INCORRECT?
a) thyroid hormones bind to receptors in cell nuclei
b) T_3 is less potent than T_4
c) thyroid hormones increase O_2 consumption
d) T_3 promotes nitrogen excretion
e) cerebral glucose consumption is increased by thyroid hormones

12 Regarding thyroxine, which of the following is INCORRECT?
a) increases number of β adrenergic receptors on the heart
b) there is a preferential expression of α myosin in the muscle fibres of the heart in the presence of thyroxine
c) thyroid hormones decrease carbohydrate absorption by the stomach and small bowel
d) hyaluronic acid accumulates in the skin if there is a deficiency of thyroxine
e) large doses can increase body temperature

13 Regarding the respiratory quotient, which of the following is TRUE?
a) it is the ratio of CO_2 produced to the volume of O_2 consumed per unit of time
b) is related to tidal volume
c) is inversely proportioned to pO_2
d) has a value of 2.3 for fats
e) varies with age

14 Which of the following statements is INCORRECT?
a) in a low protein diet, nitrogen excretion by the kidney decreases
b) in a low protein diet, the maximal urine osmolarity is decreased
c) there is a net negative nitrogen balance following the administration of steroids
d) nitrogen balance becomes negative if a single amino acid is missing from the diet
e) insulin spares the breakdown of muscle protein

15 Which of the following is an ESSENTIAL fatty acid?
a) myristic acid
b) palmitic acid
c) stearic acid
d) linolenic acid
e) oleic acid

16 Regarding protein metabolism in starvation, which statement is INCORRECT?
a) glucose has a protein sparing effect by increasing insulin secretion
b) death occurs when protein depletion reaches 50% of normal level
c) total starvation leads to loss of up to 5gms/day of urea nitrogen due to protein catabolism
d) most protein catabolised comes from the liver, spleen and skeletal muscles
e) rapid protein depletion is the terminal phase once fat stores have been almost totally catabolised

17 Which of the following is NOT an unsaturated fatty acid?
a) oleic acid
b) arachidonic acid
c) linoleic acid
d) linolenic acid
e) stearic acid

18 Regarding brown fat, which statement is INCORRECT?
a) fat cells have extensive parasympathetic innervation
b) responsible for part of the post-prandial heat production
c) fat cells contain several droplets of fat
d) prominent between and around the scapulae of infants
e) fat cells contain many mitochondria

19 Regarding carbohydrate metabolism in starvation, which statement is INCORRECT?
a) hepatic glycogenolysis precedes skeletal muscle glycogenolysis
b) blood glucose falls less in women due to greater fat stores
c) glycogen stores are exhausted after half to one day
d) blood glucose level is maintained above a level that would produce symptomatic hypoglycaemia
e) skeletal muscle contains about four times as much glycogen as the liver

20 Regarding lipoproteins, which statement is INCORRECT?
a) VLDL transport cholesterol formed in liver to extrahepatic tissues
b) chylomicrons can cause post-prandial plasma to appear milky
c) LDL are taken up by macrophages
d) oestrogens increase plasma HDL levels
e) elevated IDL levels predispose to atherosclerosis

21 Which of the following does NOT increase the activity of intracellular hormone-sensitive lipase?
a) GH
b) PGE
c) thyroxine
d) glucagon
e) cortisol

22 Which of the following causes a positive nitrogen balance?
a) increased cortisol secretion
b) starvation
c) decreased insulin secretion
d) forced immobilisation
e) increased testosterone secretion

23 Which statement regarding lipoprotein lipase is INCORRECT?
a) it is not hormone sensitive
b) it requires heparin as a co-factor
c) it is confined to adipose tissue
d) its activity is decreased by stress
e) it clears chylomicrons and VLDL from circulation by degradation of triglyceride

24 Regarding uric acid, which statement is INCORRECT?
a) the majority of filtered uric acid is reabsorbed in the proximal tubule
b) xanthine oxidase catalyses its synthesis
c) may be elevated in leukaemia and pre-eclampsia
d) does not undergo renal tubular secretion
e) its excretion rate can be halved by changing to a purine-free diet

25 Regarding ketone bodies, which statement is INCORRECT?
a) formed following ingestion of a high fat/low carbohydrate diet
b) acetoacetate and beta-hydroxybutyrate formation leads to a metabolic acidosis
c) acetone is excreted in the urine
d) readily metabolised by the liver
e) acetone formation leads to ketotic breath

26 Nucleotide breakdown releases purines and pyrimidines. Which of the following is NOT their subsequent fate?
a) re-used to form nucleosides, nucleotides and nucleic acids
b) excreted unchanged in urine
c) directly enter the urea cycle
d) pyrimidines are catabolised to carbon dioxide and ammonia
e) purines are catabolised to uric acid

27 How many ATP molecules are produced from one molecule of a 6-carbon fatty acid metabolised via the TCA cycle to carbon dioxide and water?
a) 36
b) 38
c) 40
d) 42
e) 44

28 Which of the following is NOT a purine?
a) adenine
b) cytosine
c) guanine
d) hypoxanthine
e) xanthine

29 Creatinine appears in the urine in significant amounts in all of the following EXCEPT:
a) normal men
b) thyrotoxicosis
c) post-partum
d) poorly controlled diabetes mellitus
e) children

30 Regarding free fatty acids, which statement is INCORRECT?
a) circulate in plasma bound to globulin
b) they are the major source of energy for cardiac muscle
c) combine with glycerol to form the triglyceride of neutral fat
d) contain an even number of carbon atoms
e) require linkage to carnitine in order to cross mitochondrial membranes prior to oxidation

31 Which amino acid is NOT ketogenic (ie CAN'T be converted into acetoacetate)?
a) leucine
b) isoleucine
c) phenylalanine
d) tyrosine
e) proline

32 Regarding cholesterol, which statement is INCORRECT?
a) dietary cholesterol is absorbed in the intestine and incorporated into chylomicrons formed in the mucosa
b) about 20% is in the plasma, with the remainder intracellular
c) negatively feeds back on its synthetic pathway
d) most hepatic synthesised cholesterol is incorporated into VLDL
e) thyroid hormones decrease the plasma cholesterol level

33 How many ATP molecules are produced from one glucose molecule metabolised aerobically via the Embden-Meyerhof pathway and citric acid cycle?
a) 32
b) 34
c) 36
d) 38
e) 40

34 Which lipoprotein contains the GREATEST proportion of triglyceride?
a) VLDL
b) IDL
c) chylomicrons
d) LDL
e) HDL

35 Basal metabolic rate is GREATER in all of the following circumstances EXCEPT:
a) children compared with adults
b) Caucasians compared with Chinese and Indians
c) females compared with males
d) anxiety compared with depression
e) feeding compared with starvation

36 Which lipoprotein contains the GREATEST proportion of cholesterol and cholesterol esters?
a) VLDL
b) IDL
c) chylomicrons
d) LDL
e) HDL

37 What is the basal metabolic rate of an average sized man per day?
a) 1000 Kcal
b) 2000 Kcal
c) 3000 Kcal
d) 4000 Kcal
e) 5000 Kcal

38 Which lipoprotein contains the GREATEST proportion of protein?
a) VLDL
b) IDL
c) chylomicrons
d) LDL
e) HDL

39 What is the most important factor affecting metabolic rate?
a) muscular exertion
b) recent ingestion of food
c) high or low environmental temperature
d) height, weight and surface area
e) sex

40 Which of the following are NON ESSENTIAL amino acids?
a) valine
b) leucine
c) isoleucine
d) cysteine
e) methionine

41 Regarding plasma protein, all of the following are correct EXCEPT:
a) albumin, globulin and fibrinogen constitute the major plasma proteins in the plasma
b) the fibrinogen polymerises into long fibrin threads during blood coagulation
c) the principal function of albumin is to provide colloid osmotic pressure in the plasma
d) the majority of plasma proteins are formed in the lymphoid tissue
e) rapid loss of plasma proteins may occur during severe burns

42 Factors that predisposes to atherosclerosis includes all of the following EXCEPT:
a) diabetes
b) hypothyroidism
c) smoking
d) male sex
e) female sex hormone

43 Lipoproteins:
a) chylomicrons are themselves very large lipoproteins composed of cholesterol, phospholipids, triglycerides and proteins
b) VLDL contains a higher concentration of triglycerides and a moderate concentration of cholesterol and proteins
c) HDL contains a very higher concentration of cholesterol and a moderate concentration of phospholipids and triglycerides
d) the majority of the lipoproteins are synthesised in the liver
e) the primary function of the lipoproteins are to transport lipids in the blood from liver to adipose tissue

44 Glycogenolysis:
a) is a process of formation of glycogen in the cell
b) is a process of breakdown of glycogen to reform glucose
c) is the conversion of glucose into fructose
d) is the process of breakdown of galactose
e) is the formation of galactose from fructose

45 Regarding ATP:
a) ATP is a combination of adenine, ribose and 3 phosphate radicals
b) ATP are present everywhere in the cytoplasm and nucleoplasm
c) ATP is otherwise called the energy currency of the body
d) ATP becomes GTP after the loss of one phosphate radical
e) ATP is a labile chemical compound that is present in all cells

46 In the body, metabolism of 10gm protein would produce approximately:
a) 1 Kcal
b) 41 Kcal
c) 410 Kcal
d) 4100 Kcal
e) 41 Cal

47 Regarding 1,25 dihydroxycholecalciferol (calcitriol):
a) it is formed by the action of sunlight on pre vitamin D_3
b) it exerts its action via stimulation of adenylcyclase
c) it decreases calcium reabsorption from kidneys
d) its formation is increased with elevated plasma Ca^{++} levels
e) it causes increased formation of calbindin-D proteins

48 The following are active components in the peripheral circulation, EXCEPT:
a) T_3
b) T_4
c) DIT
d) RT_3
e) all of the above

49 Calitriol (1,25-dihydroxycholecalciferol)
a) inhibits Ca^{++} absorption from the gut
b) is formed in the proximal renal tubules from a less active precursor
c) levels rise in response to increase serum PO_4 levels
d) inhibits osteoclasts function
e) inhibits osteoblasts function

50 Stimuli that increase renin secretion include all EXCEPT:
a) hypotension
b) Na^+ depletion
c) cardiac failure
d) lying down
e) diuretics

51 Regarding parathyroid hormone, which is NOT true?
a) it decreases plasma phosphate
b) it is secreted by chief cells of he parathyroid glands
c) it is cleared by Kupffer cells of the liver
d) its secretion is regulated by the level of bound Ca^{++} in plasma
e) it increases bone reabsorption

52 Which of the following reduce insulin secretion?
a) acetylcholine
b) GIP
c) glucagon
d) adrenaline
e) β ketoacids

53 With regard to the effect of thyroid hormone on the cardiovascular system, which of the following are TRUE?
a) level of noradrenaline are increased
b) β adrenergic receptor affinity is decreased in heart muscle
c) circulating adrenaline levels are decreased
d) thyroid hormone levels alter the ratio of cardiac myosin isoform types
e) none of the above

54 Stimuli that increase aldosterone secretion and do not effect glucocorticoid secretion includes all EXCEPT:
a) low Na^+ intake
b) high K^+ intake
c) standing
d) secondary hyperaldosteronism
e) haemorrhage

55 Signs and effects of hyperparathyroidism include all EXCEPT:
a) renal stones
b) demineralization of bones
c) Chvostek's and Trousseau's signs
d) hypercalcaemia
e) hypophosphataemia

56 Glucagon levels are increased by:
a) secretin
b) somatostatin
c) cholecystokinin
d) free fatty acids
e) ketones

57 Insulin release:
a) is inhibited by raised cyclic AMP in pancreatic β cells
b) is not stimulated by blood glucose levels below 6mmol/l
c) is increased by β adrenergic stimulators
d) is inhibited by phosphor diesterase inhibitors
e) is increased by somatostatin

58 Trace elements believed essential to life include all EXCEPT:
a) arsenic
b) cyanide
c) cobalt
d) silicon
e) nickel

59 Mono-iodotyrosin (MIT) and diiodotyrosin (DIT) molecules:
a) are deiodinated before joining to form T_3 and T_4
b) are secreted into plasma alongside T_3 and T_4
c) are the inactive metabolites of T_3 and T_4
d) are cleaved from thyroglobulin by proteases in lysosomes
e) are usually excreted in the urine

60 Calcitonin secretion is stimulated by the following EXCEPT:
a) gastrin
b) somatostatin
c) oestrogen
d) cholecystokinin
e) glucagon

61 With regard to gastric acid secretion, all the following are true EXCEPT:
a) acetylcholine stimulates secretion
b) both G protein and direct calcium channels are involved
c) an H^+ - K^+ antiport transports H^+ into the gastric lumen
d) parietal cells have high levels of carbonic anhydrase
e) acid secretion is maintained at constant levels by local feedback mechanisms

62 Tissues in which insulin does NOT facilitate glucose uptake?
a) red blood cells
b) skeletal muscle
c) cardiac muscle
d) smooth muscle
e) aorta

63 Regarding the “iodide pump” in thyroid cells, which is NOT true?
a) it is stimulated by TSH
b) it depends on Na^+ / K^+ ATPase activity
c) it pumps iodide into the colloid, after entering the cell down an electrical gradient
d) it pumps iodide against an electrical gradient
e) its activity can be measured with trace doses of radioactive iodine

64 Which of the following enzymes are missing in the zona glomerulosa?
a) 17 α hydroxylase
b) 11 β hydroxylase
c) 21 β hydroxylase
d) cholesterol desmolase
e) 3 β hydroxysteroid

65 The effects of hyperthyroidism on the cardiovascular system include all of the following EXCEPT:
a) increased expression of α MHC isoforms in cardiac muscle
b) increased catecholamine plasma levels
c) increased number of β receptors
d) increased affinity of β receptors
e) vasodilation of peripheral vessels

66 Regarding the control of thyroid secretion:
a) free T_3 and T_4 exert feedback control on anterior pituitary
b) free T_3 and T_4 exert feedback control on hypothalamus
c) free T_3 and T_4 exert feedback control on anterior pituitary and hypothalamus
d) free T_3 and T_4 do not affect day to day control of their secretion
e) the basal metabolic rate is the most important determinant of thyroid secretion

67 The following are true of chylomicrons EXCEPT:
a) they are large lipoprotein complexes
b) they are part of the exogenous lipid transport system
c) they enter the circulation via the lymphatic ducts
d) they are cleared from the circulation by lipoprotein lipase on the surface of hepatocytes
e) chylomicron remnants are bound to LDL R and endocytosed

68 All of the following are true regarding chylomicrons EXCEPT:
a) they contain triglycerides, cholesterol and phospholipids
b) they are formed in the intestinal mucosa
c) they are cleared from the circulation by lipoprotein lipase
d) they are transported to the liver by the portal circulation
e) large numbers after a meal give the plasma a milky appearance

69 The tissue or organ with the greatest potential for increasing the metabolic rate of the body is:
a) liver
b) skin
c) adipose tissue
d) skeletal muscle
e) digestive system

70 Triglycerides are transported to cells via:
a) chylomicron remnants
b) HDL
c) LDL
d) VLDL
e) none of the above

71 Regarding vitamin B_{12}
a) it is a fat soluble vitamin
b) its absorption is inhibited by trypsin
c) it is mainly carried in plasma by attachment to albumin
d) it undergoes enterohepatic circulation
e) none of the above are true

72 Regarding HDL:
a) HDL transports ingested cholesterol from the intestine
b) HDL transports triglycerides from peripheral tissues
c) HDL receptors on macrophages are called scavenger receptors
d) elevated HDL levels are associated with increased risk of atherosclerosis
e) none of the above are correct

73 Regarding free fatty acids in plasma, which of the following is NOT true?
a) they account for less than 10% of total fatty acids in plasma
b) they are complexed with a protein carrier
c) they can be metabolised to CO_2 and water in skeletal and cardiac muscle
d) their level in plasma decreases as plasma adrenaline increases
e) they are converted to energy by the citric acid cycle

74 Ubiquitin is:
a) an essential amino acid
b) a polypeptide that tags proteins for degradation
c) a cell membrane glycoprotein
d) a precursor or uric acid
e) none of the above

75 In a fasting adult at rest:
a) skeletal muscle metabolises mainly glucose
b) the brain accounts for approximately 40% of glucose utilised
c) blood glucose concentrations are higher in women than in men
d) blood glucose levels are maintained initially by hepatic glycogenolysis
e) ketones are absent from plasma

76 Uric acid handling by the kidneys involves:
a) filtration only
b) secretion by tubules only
c) filtration and secretion
d) filtration and reabsorption
e) filtration, reabsorption and secretion

77 The following vitamin is fat soluble:
a) niacin
b) B_6
c) K
d) pantothenic acid
e) biotin

78 With regard to the metabolism of carbohydrates:
a) in the absence of liver glycogen stores, glycogen administration does not cause hyperglycaemia
b) glucocorticoids have a minor effect on gluconeogenesis
c) growth hormone causes increased use of glucose for energy
d) glucose is absorbed by most cells by active sodium glucose co-transport
e) during starvation, stores last for less than 24 hours

79 With regard to lipid metabolism:
a) only HDL is formed in the liver
b) fatty acids in the plasma form 1:1 complexes with albumin
c) plasma cholesterol levels rise considerably with an increase in daily ingestion
d) free fatty acids are metabolised in preference to glucose in a non-exercising individual
e) utilisation of fatty acids is stimulated by glucocorticoids

80 With regard to carbohydrate metabolism:
a) the normal fasting glucose is from 3.9 to 11.0mmol/L
b) glucose is phosphylated in cells to glucose-6-phosphate by phosphoenol-pyrunate carboxykinase
c) glycogen, the storage form of glucose, is only in the liver and skeletal muscle
d) glucose can be converted to fats through acetyl CoA which is irreversible
e) none of the above

81 Which statement regarding glucagon is INCORRECT?
a) it is used as an antidote in symptomatic beta blocker overdosage
b) it is synthesised in the A cells of the pancreatic islets and in small intestinal mucosal cells
c) its major site of metabolism is in the plasma
d) it is synthesised in common with glicentin
e) the exogenous glucagon is associated with nausea and vomiting

82 Which of the following is NOT an action of somatostatin?
a) it inhibits glucagon secretion
b) it is a synaptic transmitter in the retina
c) it inhibits insulin secretion
d) it increases contraction of the gallbladder
e) it inhibits pancreatic polypeptide secretion

83 Glucagon increases the secretion of all of the following EXCEPT:
a) catecholamines from a phaeochromocytoma
b) atrial natriuretic peptide
c) growth hormone
d) insulin
e) calcitonin from a medullary carcinoma of the thyroid

84 Regarding the actions of glucagon, which of the following is INCORRECT?
a) it increases blood lactate level
b) it activates hormone-sensitive lipase
c) it has a positive inotropic effect on myocardium
d) large amounts cause intestinal relaxation
e) it decreases renal tubular sodium reabsorption

85 Which of the following does NOT increase pancreatic polypeptide secretion?
a) protein ingestion
b) fasting
c) exercise
d) acute hypoglycaemia
e) intravenous glucose

86 Which iodinated compound is present in GREATEST amounts in the adult thyroid gland?
a) T_4
b) DIT
c) MIT
d) T_3
e) RT_3

87 Regarding the action of glucagon on the liver, which of the following is INCORRECT?
a) it causes glycogenolysis via activation of adenylate cyclase
b) it decreases metabolism of glucose-6-phosphate
c) it causes glycogenolysis via activation of phospholipase C
d) it increases gluconeogenesis from available amino acids
e) it decreases ketone body formation

88 Regarding the synthesis of thyroid hormones, which statement is INCORRECT?
a) iodine undergoes rapid oxidation following entry to thyroid cells
b) the “iodine pump” is the major source of iodine for hormone synthesis
c) TSH increases iodine uptake by the thyroid gland
d) thiocyanate and ouabain decrease iodine uptake by the thyroid gland
e) it involves iodination of thyrosine residues in thyroglobulin

89 Which of the following does NOT inhibit secretion of glucagon?
a) ketones
b) α adrenoceptor agonists
c) secretin
d) amino acids
e) somatostatin

90 Which plasma protein has the greatest thyroxine binding capacity?
a) α 1-acid glycoprotein
b) thyroxine-binding pre-albumin
c) albumin
d) thyroxine-binding globulin
e) orosomucoid

91 Which of the following does NOT increase secretion of glucagon?
a) diabetes mellitus
b) β adrenoceptor agonists
c) GABA
d) starvation
e) exercise

92 Which plasma protein has the greatest thyroxine-binding affinity?
a) α 1-acid glycoprotein
b) thyroxine-binding pre-albumin
c) albumin
d) thyroxine-binding globulin
e) orosomucoid

93 Regarding insulin, which statement is INCORRECT?
a) it consists of two polypeptide chains linked by two disulphide bridges
b) the majority of exogenous insulin is metabolised by the liver
c) it is not the only molecule responsible for insulin-like activity in the blood
d) it increases intracellular potassium concentration
e) exercise increases the affinity of its receptors for insulin

94 Which iodinated compound is present in the SMALLEST amounts in the adult thyroid gland?
a) T_4
b) DIT
c) MIT
d) T_3
e) RT_3

95 Which of the following hormones does NOT increase the hepatic output of glucose?
a) growth hormone
b) adrenaline
c) glucagon
d) noradrenaline
e) cortisol

96 Which thyroid hormone has the longest plasma half-life?
a) T_4
b) DIT
c) MIT
d) T_3
e) RT_3

97 Regarding the action of insulin on adipose tissue, which of the following is INCORRECT?
a) it induces lipoprotein lipase which actively hydrolyses triglyceride from circulating lipoproteins
b) it reduces circulating free fatty acids
c) it promotes triglyceride storage in adipocytes
d) it directly inhibits intracellular lipase
e) its effects appear to involve phosphorylation of lipases

98 Which of the following tissues possess FEW thyroid hormone receptors?
a) liver
b) testis
c) kidney
d) heart
e) skeletal muscle

99 Which glucose transporter is responsible for insulin-mediated glucose uptake in striated muscle and adipose tissue?
a) glut 1
b) glut 2
c) glut 3
d) glut 4
e) glut 5

100 Where are the receptors located by which thyroid hormones mediate most of their effects?
a) cell membrane
b) outer mitochondrial membrane
c) nuclear chromatin
d) inner mitochondrial membrane
e) cytoplasm

101 Regarding the action of insulin in skeletal muscle, which of the following is INCORRECT?
a) it decreases protein catabolism
b) it induces glucogen synthase
c) it decreases ketone uptake
d) it increases amino acid uptake
e) it decreases the release of gluconeogenic amino acids

102 Which thyroid hormone possesses the GREATEST biological activity?
a) T_4
b) DIT
c) MIT
d) T_3
e) RT_3

103 Which glucose transporter is responsible for the facilitated diffusion of glucose into pancreatic B cells?
a) glut 1
b) glut 2
c) glut 3
d) glut 4
e) glut 5

104 Regarding the effects of thyroid hormones, which of the following does NOT occur?
a) it increases metabolic rate
b) it directly stimulates sodium-potassium ATPase
c) it increases protein and fat catabolism
d) it increases body temperature
e) it increases cerebral oxygen consumption

105 Regarding the action of insulin on the liver, which of the following is INCORRECT?
a) it increases gluconeogenesis
b) it decreases glycogenolysis
c) it increases synthesis of triglyceride and VLDL
d) it decreases cyclic AMP
e) it increases phosphate uptake

106 Which statement regarding the thyroid gland and its hormones is INCORRECT?
a) thyroid hyperactivity is associated with an increase in plasma catecholamines
b) iodide trapping by thyroid cells is an active process
c) thyroid hormones enter cells by diffusion across the cell membrane
d) thyroid hormones cause an increase in 2,3 - DPG
e) thyroid hormones increase growth hormone secretion

107 Regarding the secretion of insulin, which statement is INCORRECT?
a) insulin is not required for glucose to enter pancreatic B cells
b) it involves closure of ATP-sensitive potassium channels
c) it is a biphasic process involving two pools of insulin
d) it involves opening of voltage-sensitive calcium channels
e) glucose enters pancreatic B cells by combining with glut 4

108 Which of the following do NOT increase TSH secretion?
a) TRH
b) glucocorticoids
c) infants exposed to cold temperature
d) acute psychosis
e) night time

109 Which of the following does NOT inhibit insulin secretion?
a) somatostatin
b) atropine
c) propranolol
d) gastrin
e) phenytoin

110 Which of the following does NOT increase intestinal calcium absorption?
a) hypocalcaemia
b) parathyroid hormone (PTH)
c) glucocorticoids
d) hypervitaminosis D
e) protein in diet

111 Which of the following does NOT stimulate insulin secretion?
a) acetoacetate
b) glucagon
c) hypokalaemia
d) acetylcholine
e) theophylline

112 Which of the following does NOT decrease intestinal calcium absorption?
a) hypercalcaemia
b) decreased PTH
c) hypovitaminosis D
d) growth hormone
e) phytic acid and oxalate in intestine

113 Regarding the insulin receptor, which statement is INCORRECT?
a) it is present even in cells which do not increase their glucose intake in response to insulin
b) insulin binds to the β subunit on the outer surface of the cell membrane
c) it is a tetramer of two α and two β subunits
d) the binding of insulin decreases the activity of tyrosine kinase on the intracellular end of the receptor
e) the complex of insulin and receptor become internalised by the cell

114 Which of the following does NOT increase plasma calcium?
a) parathyroid hormone
b) vitamin D
c) growth hormone
d) thyroxine
e) calcitonin

115 Which of the following is NOT associated with an increase in erythropoietin secretion?
a) aminophylline
b) renal cell carcinoma
c) cobalt salts
d) thyroxine
e) adenosine

116 Which of the following does NOT increase parathyroid hormone secretion?
a) high plasma magnesium
b) low plasma calcium
c) high plasma phosphate
d) β-adrenergic discharge
e) cyclic AMP

117 Regarding erythropoietin, which statement is INCORRECT?
a) its secretion increases within minutes to hours in response to hypoxia
b) it causes pro-erythroblasts to mature more rapidly into erythrocytes
c) the spleen and salivary glands secrete, but don't synthesise it
d) it inhibits apoptosis in erythroid stem cells
e) the adult liver is able to synthesise enough for normal erythropoiesis in the absence of both kidneys

118 Which statement regarding parathyroid hormone (PTH) is INCORRECT?
a) it is continuously secreted by the parathyroid glands
b) it is synthesised and secreted by the oxyntic cells
c) it is rapidly cleaved in the Kupffer cells of the liver
d) it increases osteoclasts activity in bone
e) it increases formation of 1,25-dihydroxycholecalciferol

119 Regarding endothelins, which statement is INCORRECT?
a) they can cause dose-dependent vasoconstriction in most vascular beds
b) they activate phospholipase C
c) they are structurally similar to vasoactive intestinal contractor
d) they have negative inotropic effect
e) there are low concentrations present in blood

120 Which statement regarding calcitonin is INCORRECT?
a) it is secreted by parafollicular cells of the thyroid gland
b) it inhibits osteoclastic bone resorption
c) total thyroidectomy is usually associated with hypercalcaemia
d) it decreases renal tubular calcium and phosphate reabsorption
e) it is only secreted when plasma calcium concentration exceeds 9.5mg/100ml

121 Regarding atrial natriuretic peptide, which statement is INCORRECT?
a) cardiac innervation is not required for secretion to occur
b) its action is terminated by receptor-mediated endocytosis
c) its filtration fraction is decreased
d) it is secreted by heart, lung and brain
e) glucocorticoids increase its secretion

122 Regarding the role of vitamin D in calcium metabolism, which of the following is INCORRECT?
a) it increases renal tubular calcium and phosphate reabsorption
b) it causes an increase in synthesis of calcium-binding protein
c) it increases bone resorption
d) it decreases bone formation
e) it increases intestinal calcium and phosphate absorption

123 Atrial natriuretic peptide decreases formation of all of the following EXCEPT:
a) aldosterone
b) cyclic GMP
c) renin
d) vasopressin
e) angiotensin III

124 Which of the following does NOT increase aldosterone secretion?
a) constriction of the IVC in the thorax
b) ACTH
c) surgery
d) hyperkalaemia
e) lying supine from the standing position

125 Which of the following does NOT increase secretion of atrial natriuretic peptide?
a) β-adrenoceptor agonists
b) immersion in water up to the neck
c) exercise
d) endothelin
e) changing from erect position to supine

126 Regarding aldosterone, which statement is INCORRECT?
a) it responds to changes in plasma sodium more strongly than changes in plasma potassium
b) it is only synthesised in the zona glomerulosa of the adrenal cortex
c) its main action is to increase the synthesis of sodium-potassium pumps
d) angiotensins II and III have about equal mineralocorticoid stimulating activity
e) it acts via a cytoplasmic receptor that has equal affinity for cortisol

127 A 15-year-old girl suffers from a malabsorption syndrome characterised by the malabsorption of fat. In which vitamin is she MOST likely to be deficient?
a) niacin
b) B_6
c) K
d) pantothenic acid
e) biotin

128 Thyroxine (T_4):
a) secretion is regulated by positive feedback at the hypothalamus
b) is transported principally by albumin in the blood
c) causes increased LDLD in plasma
d) is physiologically more active than T_3
e) increases β receptors in the cardiovascular system

129 Regarding insulin:
a) it increases amino acid uptake
b) its absorption is not affected by the site of injection
c) it causes reduced K^+ uptake by cells
d) it increases protein catabolism
e) it is secreted by the α cells in the islets of Langerhan

130 The content of chylomicrons includes:
a) aproprotein E and aproprotein A
b) cholesterol 30%, protein 20%, triglyceride 50%
c) lethicin 10%, cholesterol 25%, triglyceride 65%
d) protein 2%, cholesterol 5%, triglyceride 90%
e) the enzyme protein phospholipase

131 Regarding calcium metabolism:
a) the adult human body contains 15% of its body mass as calcium
b) calcium is passively absorbed from the intestinal brush border
c) oestrogen inhibits osteoclasts
d) TNF inhibits osteoclasts
e) corticosteroids stimulate osteoblasts

Section 3 - Answers

1	C	45	D	89	D
2	C	46	B	90	C
3	B	47	E	91	C
4	A	48	C	92	D
5	E	49	B	93	B
6	E	50	D	94	E
7	B	51	D	95	A
8	C	52	D	96	A
9	E	53	D	97	E
10	A	54	E	98	B
11	B	55	C	99	D
12	C	56	C	100	C
13	A	57	C	101	C
14	C	58	B	102	D
15	D	59	D	103	B
16	C	60	B	104	E
17	E	61	E	105	A
18	A	62	A	106	A
19	B	63	C	107	E
20	A	64	A	108	B
21	B	65	B	109	D
22	E	66	C	110	C
23	C	67	D	111	C
24	D	68	D	112	D
25	D	69	D	113	B
26	C	70	D	114	E
27	E	71	D	115	A
28	B	72	C	116	A
29	A	73	D	117	E
30	A	74	B	118	B
31	E	75	D	119	D
32	B	76	E	120	C
33	D	77	C	121	C
34	C	78	E	122	D
35	C	79	E	123	B
36	D	80	D	124	E
37	B	81	C	125	A
38	E	82	D	126	A
39	A	83	B	127	C
40	D	84	A	128	E
41	D	85	E	129	A
42	E	86	A	130	D
43	C	87	E	131	C
44	B	88	B		