Mark schemes

1

(a) (i) pancreas

allow phonetic spelling

1

(ii) (increases movement of) glucose into cells / organs / named

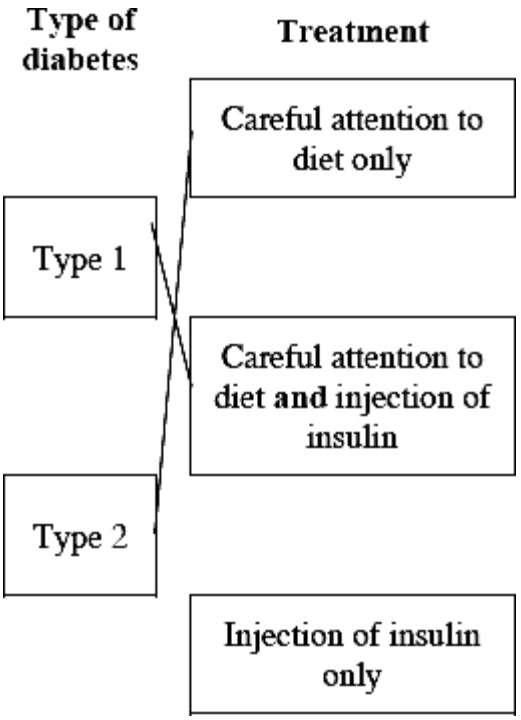
allow (glucose) converted to glycogen / fat

allow (glucose) used in (increased) respiration

*do **not** allow hybrid spellings of glycogen*

1

(b)



***1** mark per correct line*

extra line from a type of diabetes cancels the mark

2

(c) (i) protein

1

(ii) gene / allele

1

(iii) any **three** from:

*max **2** if any one process goes on in the wrong organ*

- (amino acids) broken down /converted
- (amino acids) form / into urea
- (break down / convert / urea formed) in liver
- (urea / broken down amino acids) removed / filtered by kidney
- (urea / broken down amino acids) in urine
- (urine / urea / broken down amino acids) stored / held in bladder

3

[9]

2 (a) (i) water

1

(ii) small

1

(iii) 3.15

1

(b) (i) 21 000

1

(ii) 2 years

1

(iii) prevent rejection

1

[6]

3 (a) (i) protein

1

(ii) (protein molecules too) large

1

cannot pass through filter **or** can't leave blood **or** can'it pass into kidney tubule / named part

*NB holes in the filter are too small = **2** marks*

1

(b) any **four** from:

- use of partially permeable membrane **or** only small molecules can pass through membrane
- dialysis fluid has 'ideal' concentrations of solutes
  allow correct named example
- diffusion of waste substances out of blood
  accept named example – eg urea

  or
  waste passes from high to low concentration
- reference to equilibrium (between plasma & dialysis fluid)
  accept reference to counterflow to maintain concentration gradient

4

[7]

4 (a) costs less

1

no / less equipment needed

1

(b) any **two** from:

- lower success rate / only 19.7% success rate
- not all cases can be treated
  or
  only 50% of cases can be treated
- embryo can't be seen until third day

2

[4]

5 only 24 students tested **or** only one test **or** reference to lack of controls eg gender / age

1

students could drink as much water as they wanted

or

some students drank more water than others

or

some students drank water and beer

1

differences only slight

ignore effects of beer or promotion of beer drinking

1

[3]

6 (a) FSH / follicle stimulating (hormone)

1

LH / luteinising (hormone)

either order

1

(b) any **three** from:

*max **2** if only advantages **or** only disadvantages discussed allow reverse arguments*

advantages of Invocell eg

- low(er) cost
- quick(er)
- laboratory / incubator / equipment not <u>needed</u>
- more convenient

ignore can be done in doctors surgery

3

disadvantages of Invocell eg

- low(er) success rate
- embryo development cannot be monitored
- can not be used where male is infertile
- only tested on 800 women
- (risk of) infection / pain in vagina

  ignore sedation

argued conclusion

*must include reference to **both** advantages and disadvantages and must be at end of answer*

1

[6]

7 (a) pancreas

1

(b) any **one** from

- (controlling / changing) diet

  accept descriptions as to how diet could be changed eg eat less sugar(y foods) ignore reference to fat / protein

- exercise

  accept example eg go for a run

- pancreas transplant

  accept named drug eg metformin

1

(c) (i) increase

ignore reference to women

1

then fall

1

relevant data quote (for male)

max at ages 65 - 74

*eg starts at 10 (per thousand) **or** max at 130 (per thousand) **or** ends at 120 (per thousand)*

accept a difference between any pairs of numbers in data set

quoting of scale or per thousand but not 'thousands' accuracy ± 2

1

(ii) *ignore numbers*

(between 0 and 64) more females (than males) / less males

allow eg females more diabetic than males

1

(over 65) more males (than females) / less females

1

[7]

8

(a) B

no mark for "B", alone

large(r) surface / area **or** large(r) membrane

accept reference to microvilli
accept reasonable descriptions of the surface
*do **not** accept wall / cell wall*
ignore villi / hairs / cilia

1

(b) (i) any **one** from:

- insulin / hormone
  if named hormone / enzyme must be correct for pancreas
- enzyme / named enzyme

1

(ii) <u>many</u> ribosomes

1

(ribosomes) produce protein

accept insulin / hormone / enzyme named is (made of) protein

or

allow <u>many</u> mitochondria (1)

provide energy to build protein **or** to make protein (1)

accept ATP for energy

1

[4]

9

(a) (i) liver

1

(ii) kidney

allow urethra / bladder

ignore ureter

1

(iii) (excess) protein / named / amino acids

accept amino / ammonia

1

(b) less / no sweating

allow ideas of how sweat glands change in order to reduce sweating

1

less heat lost / evaporation

1

(c) (i) become narrower / constrict

allow contract / get smaller etc

allow less blood flows through vessels

*do **not** allow capillaries become narrower **or** reference to movement of vessels*

1

(ii) reduced / no heat loss

allow heat gained from room

1

[7]

10 (a) (i) too large to pass through the filter

1

(ii) passed through the filter, then reabsorbed into blood

1

(iii) water is reabsorbed from the filtrate into the blood

1

(iv) water, urea and sodium ions

1

(b) (i) less urine

1

(ii) more concentrated

1

[6]

11 (a) (i) movement of atoms / molecules / ions

accept particles

allow dissolved substances

ignore reference to membranes

1

(substance) moves from high to low concentration

allow down the gradient ignore

across / along / with a gradient

1

(ii) any **two** from:

- movement of molecules / ions

  accept particles

  allow dissolved substances this point <u>once</u> only in (a)(i) and (a)(ii)

- from low to high concentration

  allow up / against the gradient

  ignore across / along / with a gradient

- requires energy / respiration

  accept requires ATP

2

(b) • **<u>filtration</u>** of blood **or**
described re small (molecules)through / large not

ignore diffusion

1

max **four** from:

- **<u>reabsorption</u>** / substances taken back into blood
- (reabsorption) of <u>all</u> of the sugar / glucose
- (reabsorption) of <u>some</u> of ions / of ions <u>as needed</u> by body
- (reabsorption) of <u>some</u> of water / of water <u>as needed</u> by the body
- urea present in urine

  accept urea not reabsorbed

- reabsorption of water by <u>osmosis</u> / <u>diffusion</u> **or** reabsorption of sugar / ions by <u>active transport</u>

4

[9]

12 (a) 21

1

(b) 1/26 or 8/208 or 4/104 or 2/52 **or** 3.8%

allow 'out of' in each case

(c) under 35

2

(d) any **two** from:

- low success rate **or** not always successful
- high number of multiple births
- expensive
- stressful / emotional
- side effects

2

[5]

13 (a) respiration

clear indication eg tick, underlining, others crossed out

1

(b) lungs

1

(c) liver

1

(d) amino acids

1

[4]

14 (a) (i) pancreas

allow phonetic spelling

1

(ii) glucose into cells / liver / muscles

allow any named organ / cell

allow turned into / stored as glycogen

but

*do **not** allow hybrid spellings for glycogen*

allow increases respiration

allow stored as / turned into fat

1

(b) (i) reference to "98.6% of all people who used Diacure reported an improvement in their condition".

*allow claim **1** / **1** / the first one*

1

(ii) (only) 30 patients **or** not enough / not many patients

*allow only one trial **or** only done once **or** not repeated*

ignore bias

1

(iii) little effect / difference

allow no effect

allow only drops by 4 (±1)

1

suggest drug is not effective (in long term)

allow wouldn't persuade people to take it

1

(iv) avoid bias / owtte

eg company could change / ignore results / might lie

ignore fair / accurate / reliable / valid

1

[7]

15 (a) 178

ignore working or lack of working

*correct working: 180 – 2 but no answer / wrong answer = **1** mark*

2

(b)

Man A	Man B
higher	lower
lower	higher
lower	higher

all 4 cells correct = **2** marks
2 or 3 cells correct = **1** mark
0 or 1 cells correct = **0** mark

2

[4]

16 (a) (i) **A**

1

(ii) (protein) molecule is large
ignore letters

1

cannot pass through filter
*(protein is) too big to get through the filter = **2** marks*

1

(b) **B** is taken back into the blood **or B** is reabsorbed

1

reabsorbed completely
or reabsorbed after filtration

1

(c) RBC is too big to pass through filter

1

Haemoglobin is inside red blood cells
or haemoglobin released when red blood cell bursts

1

Haemoglobin is small enough to pass through filter
or haemoglobin diameter < pore diameter

1

[8]

17 (a) any **three** from

*if oestrogen **or** progesterone <u>used</u> = max 2*

*if both oestrogen **and** progesterone <u>used</u> = max 1*

- FSH <u>used / given / injected</u>
- LH <u>used / given / injected</u>
- FSH causes eggs to mature
- LH stimulates egg release

ignore <u>effects</u> of oestrogen and progesterone

3

(b) max **two** pros for IVM / it from:

*allow max **two** cons for IVF*

- cheaper
- less hormones used
- ovarian hyperstimulation **or** the syndrome less likely

allow 'it's safer for the mother'
ignore 'more risks' unqualified

- IVM treatment shorter

2

con for IVM

*allow max **one** pro for IVF*

- small risk of abnormal sex chromosomes / birth defects / baby cancer

allow 'more risk to baby'
ignore 'more risks' unqualified

1

evaluation

eg IVM better because less risk to mother outweighs small risk to baby

or

IVF better because no risk to baby and a small risk to mother

must include an appreciation that there are two sides to the argument

1

[7]

18

(a) $\frac{1}{5}$ / 20% / 1 in 5 / 1 : 4 / 0.2 /

any correct proportion
ignore working
*do **not** allow 1 : 5*

$\frac{600}{3000}$ / 600 : 2400 / 600 in 3000

*award **1** mark for*
*selection of 3000 **and** 600*

2

(b) (i) sweat / sweating / perspiring

allow cooling / for cooling / to lose heat / to cool

1

(ii) the volume of water in the urine decreases.

1

the volume of water taken as food or drink increases.

1

(c) (i) liver

apply list principle

1

(ii) kidney

apply list principle

1

(iii) bladder

apply list principle

1

[8]

19

(a) (i) 50

*award **2** marks for correct answer irrespective of working*
*award **1** mark for selection of 60 **and** 10*

2

(ii) any **two** from:

- increases
- (then) decreases
- highest at 65 – 74 (years old) **or** maximum 112 (per thousand)

allow peaks at 65 - 74

ignore comparisons with men

2

(b) (i) stomach

1

(ii) any sensible reference to diet **or** carbohydrate intake **or** pancreas / stem cell transplant

*eg eat less / no sugary food **or** eat more fibre **or** go on a diet **or** watch what you eat*
ignore eat more protein
*do **not** accept reduce salt*

1

[6]

20 (a) (i) (wholemeal bread)
any **two** from:

lower maximum / peak / less change

1

slower rise / change

*ignore references to rate of fall **or** first to peak*

need to take less insulin / less likely to hyper

*no mark for identifying the type of bread but max **1** mark if not identified*

1

(ii) any **four** from:

- amylase / carbohydrase
- starch to sugar
  allow starch to glucose
- (sugar) absorbed / diffused / passes into blood
- correct reference to pancreas
  allow once only as rise or fall
- insulin produced
- glucose (from blood) into cells / tissue / organ **or** named tissue / organ
  allow glucose to glycogen
- glucose used in respiration / for energy
  max 3 for explaining rise
  max 3 for explaining fall

4

(b) any **three** from:

advantages (compared to insulin injections):

- (may be) permanent / cure
- no / less need for self monitoring
- no / less need for insulin / injections
  ignore reference to cost
- no / less need for dietary control

disadvantages (compared to insulin injections):

- low success rate
- (may) still need insulin / dietary control
- operation hazards
- risk of infection from donor
- rejection / need for drugs to prevent rejection

*max **2** if only advantages **or** only disadvantages discussed*
can give converse if clear that it relates to insulin injections

3

[9]

21 (a) mineral ions

1

water

*each extra box ticked cancels **1** mark*

1

(b) (i) blood plasma

1

(ii) dialysis fluid

1

(iii) diffusion

1

(iv) partially permeable

1

(v) small

1

(c) drug treatment is needed to suppress the immune system

1

[8]

22 (a) (i) no effect / little effect

1

(ii) reduced

ignore reference to later increase

1

(b) (i) more (re)absorption

do not allow if extra incorrect reference to filtration made

1

or more (material) taken into blood

of water

*allow **only** if linked to reabsorption*
*do **not** accept water if in a list of substances*

1

(ii) ions in blood diluted

1

or concentration of ions decreases

increased water reabsorption

do not allow if extra incorrect reference to filtration made

or more water present in blood

accept sensible alternative suggestion
eg reabsorption of ions disrupted

1

[6]

23 (a) (i) lungs

1

(ii) skin

1

(iii) kidneys

1

(b) (i) (as sweat lost,) performance falls

1

(ii) drink water / sports drink

ignore antiperspirant

1

[5]

24 (a) 4000

*award **both** marks for correct answer, irrespective of working*

*1500 + 2000 + 500 gains **1** mark*

2

(b) day 2 (no mark)

any **two** from:

*max **1** mark if correct day not identified or if no day given*

- more (water in) breath / breathing
- more (water in) sweat / sweating

accept a lot of sweating

- less (water in) urine

*if no other marks awarded allow **1** mark for more water lost on day 2*

2

(c) (i) respiration

1

(ii) cools / removes heat owtte

ignore 'maintains body temperature' unqualified

1

(iii) osmosis

1

[7]

25 (a) any **two** from:

- amylase / carbohydrase
- protease

  allow trypsin
- lipase

2

(b) (i) high / above normal blood sugar
or cannot control blood sugar

allow other symptoms
*eg frequent / plentiful urination **or** sugar in urine **or** thirst **or** weight loss **or** coma*

ignore consequential effects eg blood pressure / circulation / glaucoma / tiredness

1

(ii) any **one** from:

- small / regular meals
- low sugar (meals) or low GI / GL **or** carbohydrates as starch

  allow high fibre

  ignore reference to low carbohydrate

1

(iii) any **one** from:

- keep constant(blood) sugar **or** prevent high (blood) sugar **or** reduces surge / rush of sugar into blood
- reduce the need for insulin

1

(iv) (take) insulin

allow pancreas transplant

1

(c) protein / hormone / enzyme synthesis **or** synthesis of named example
or combine amino acids

1

[7]

26

(a) (i) bladder

1

(ii) glucose

1

protein

extras – CANCEL

1

(b) (i) any **two** from:

- kidney functions all the time / not just 3 × 8 h sessions a week
  allow direct quotation of correct points from the list
- can eat high-protein foods / high salt foods
  allow can eat anything
- cheaper
- waste of time

2

(ii) have to take (immunosuppressant) drugs / consequence of this
eg catch infections / may suffer brain damage / possible rejection of kidney **or** become ill more easily

or

risk of brain damage (due to anaesthetic)

allow direct quotation of correct points from the list

1

(c) (i) urea

1

(ii) 4.2

1

[8]

27 (a) any **three** from:

- glucose enters blood from gut / liver / glycogen
- glucose is filtered out of the blood
  ignore 'diffusion'
- glucose is (a) small (molecule)
- taken / etc back into the blood / reabsorbed
  *allow absorbed into the blood but **not** absorbed unqualified*
- by active transport
  ignore diffusion

3

(b) (i) in a healthy person

protein not present because proteins are large (molecules)
or because cannot pass through (filter)

1

in person with disease

lets protein through (filter) owtte

1

(ii) advantages:
up to any **three** from:

- no build-up of toxins / keeps blood conc. ± constant
  ignore 'kidney works all the time'
- prevent high blood pressure
- don't need restricted diet / restricted fluid intake
  or time wasted on dialysis
- blood clots may result from dialysis
- infection may result from dialysis
- with dialysis, blood may not clot properly
  due to anti-clotting drugs
- cost issues (ie transplant cheaper)

3

disadvantages: **at least one** from:

- rejection / problem finding tissue match
- use of immuno-suppressant drugs → other infections
- dangers during operation / example described

must have at least one advantage and at least one disadvantage for full marks

1

[9]

28 (a) A sperm

1

B egg

1

C fertilised egg

1

D embryo

1

(b) insert into mother

ignore fertilise / check fertilisation / check viability

1

womb / uterus

1

(c) (i) one quarter

1

(ii) no / little chance of success over 42

*the statement 'only 2 out of 53 became pregnant / had babies' gains **2** marks*

1

reference to table of only 2 women became pregnant

1

(iii) so fewer twins / multiple births

or

multiple births more dangerous

1

[10]

29

(a) (i) 1400

*award **2** marks for correct answer if no working shown*
*2400 – (300 + 600 + 100) or equivalent for **1** mark*

2

(ii) $\frac{1}{3}$

1

(b) **A**: chemical reactions

B: food

C: drinking

*all **three** required for **1** mark*

1

(c) cools / reduces temperature

allow 'maintaining body temperature' owtte
*do **not** allow regulate unqualified*
ignore reference to urea
numerical references to temperature should be correct

1

(d) more sweat produced

1

less urine produced

1

[7]

30

(a) pancreas

1

(b) protease

allow proteinase

1

(c) (i) (same) enzymes / named enzymes produced in other parts / named parts of digestive system

if named, enzymes and part must be correct

1

(ii) diet / activity varies / amount of glucose in blood varies

accept too much insulin leads to coma / hypo / low blood sugar

accept too little insulin leads to coma / hyper / high blood sugar

1

(d) any **two** from:

pros

- less / no experimentation on humans
- dogs (more) similar to humans (than lower / named organisms)
- it allows us to find a treatment **or** improves medical understanding

accept allows us to find a cure

cons

- harmful / cruel to dogs

accept kills dogs

- dogs may not be (metabolically) like humans

2

conclusion justified by argument

1

[7]

31

(a)

glucose	☑
urea	☑
water	☑
sodium ions	☑
protein	☐

*all 3 correct = **2** marks*
*2 correct = **1** mark*
*0 or 1 correct = **0** marks*

max 2

(b) (i) protein cannot pass through filter

or

protein (too) large

or

protein stays in the blood

1

(ii) reabsorbed

1

(c) (i) less

1

(ii) more

1

[6]

32

(a) (i) protein is large (molecule) / too big to pass through filter

1

(ii) glucose is present in the filtrate

ignore units

1

or

0.8 in filtrate

no glucose is present in the urine

or

0 in urine

1

(iii) active transport – up / against (concentration) gradient

it = active transport throughout

1

or

from low to high (concentration)

uses energy / ATP

accept needs specific carrier / specific protein (in cell membrane)
*for **1** mark*

1

(b) water reabsorption / taken out

other substances cancel mark

or

water taken into blood / body

1

[6]

33 any **two** from:

- more or most ions / sodium / chloride **or** replaces ions / sodium / chloride
  *do **not** accept more ions / sodium / chloride for energy*
- lost in sweat
- to keep blood concentration constant
- less sugar therefore less chance of 'sugar rush'

[2]

34 (a) have identical genes / chromosomes / genetic material **1**

since asexual reproduction
accept mitosis **1**

(b) mixture of genes / chromosomes / genetic material from two parents
accept meiosis **1**

sexual reproduction / fusion of gametes **1**

(c) public misunderstand technique as cloning **or** worried about large numbers of clones **or** moral / ethical / religious issues **or** unnatural process **or** scientists must not play god **or** technique may lead to embryo death
*do **not** allow mark for embryos lost* **1**

[5]

35 (a) inhibits FSH (production / secretion) **1**

(therefore) no eggs <u>mature</u> / <u>released**</u>
if no other marks gained allow 1 mark for no eggs produced **1**

or

effect of FSH on ovary described
references to LH are neutral

(b)

maximum 4 marks if no conclusion

Pros max 2marks from 4 marks e.g.

- large scale trial gave better results
- chose uneducated women so that if these women could use it correctly, women elsewhere would be able to cons max 3 marks from 4 marks e.g.
- used pill with high dose of hormone – **either** so results not valid for general use of hormone **or** dangerous
- side effects ignored
- women not told pill was experimental / pill might have side effects
- no placebo
- should have tried a range of doses
- should have done pre-trial to check for side effects

4

conclusion 1 mark e.g.
trials flawed therefore cons outweigh pros

accept reverse e.g. trials flawed but pros outweigh cons

1

[7]

36 (a) any **three** from:

- water
  allow breathing / oxygen / carbon dioxide
- ions / minerals / salts
  allow sodium / chloride, other ions neutral
- temperature
  allow heat
- blood sugar
- heart rate
- blood pressure
  ignore urea

3

(b) contraceptive drug

1

fertility drug

1

(c) (i) eg nicotine, alcohol, cocaine, heroin, painkillers, tranquilisers, LSD

allow cannabis / weed or other alternative names

allow tobacco

ignore smoking / ecstasy

1

(ii) alters body chemistry **or** craving / needing / dependence

allow psychological dependence

1

withdrawal symptoms on stopping

allow withdrawal described

allow 'feel ill without it'

1

[8]

37 (a) ovary or ovaries

1

(b) (hormone) implant

1

(c) do not have to remember to take

1

(d) does not involve hormone

allow coil may be dislodged

or

it is a mechanical method

allow egg <u>is</u> fertilised / released

allow not preventing egg fertilisation / release

1

(e) involves death of fertilised egg

allow embryo / baby for fertilised egg

or

(regard) fertilised egg as human

ignore against religion only

allow fertilised egg is alive

or

stops fertilised egg developing

ignore side effects

1

(f) (i) inhibit FSH (production)

allow inhibits LH

1

so no eggs mature / develop / are produced

allow (LH) <u>stimulates</u> egg release

ignore progesterone

1

(ii) contains FSH

allow contain LH

1

which causes egg to mature / develop / be produced

allow (LH) <u>stimulates</u> egg release

or

in women whose FSH is low

1

[9]

38 (a) 94.8

1

(b) (i) to cool (the body) / maintain (body) temperature

*do **not** accept let out heat*

1

(ii) water **and** ions

1

(iii) water ignore CO_2, and vapour

1

(c) any **two** from:

used in respiration

provides energy

(energy) needed for movement / running / muscle action

2

[6]

39 (i) dialysis (machine) or kidney machine

1

(ii) (specially chosen kidney) similar tissue type

accept same blood group

1

(irradiation of bone marrow) to stop white cell <u>production</u>

allow any named white blood cell

1

(treated with drugs) suppress immune system

1

(sterile conditions) avoid exposure to pathogens / infection

1

[5]

40 (a) (i) 6

1

(ii) 4

1

(b) (i) pancreas

ignore islets of langerhans

1

(ii) 'X' anywhere between >1 and ≤ 2 hours

anywhere in that column

1

(c) any **four** from:

<u>water</u> movement

*do **not** accept solution*

out of cells

dilute to concentrated solution

accept reference to correct gradient -
high Ψ to low Ψ ***or*** *high to low 'water concentration'*
must be unambiguous – i.e. ***not*** *'high to low concentration'*
accept low to high concentration

reference to partially / selectively
permeable membranes **or** described

cells shrink / get smaller

allow crenated
ignore plasmolysed / flaccid / floppy
etc

4

[8]

41 (a) pituitary (gland / body)

1

(b) oestrogen inhibits the release of FSH

ignore references to LH

1

FSH stimulates follicle development / causes egg to develop
or no follicle / egg development if high oestrogen

accept growth / maturing / ripening for development

1

no ovulation / no egg release

do ***not*** *accept no egg to be fertilised*

1

[4]

42 (a) (i) glucose passes through the filter / from plasma to filtrate

ignore diffuses

1

(ii) glucose is reabsorbed or glucose taken back into the blood

ignore filtered

1

(b) protein (molecules) are (too) large (to pass through the filter)

1

(c) any **three** from:

blood becomes more concentrated / too salty / has lower water potential **or** too little water in the blood

hypothalamus detects this

release of ADH

by pituitary

increased **re**absorption of water

3

[6]

43 (a) urea

1

(b) any **four** from:

- suitable for short term
  accept reverse arguments with respect to transplants
- no long term drug treatment
- no rejection chance
- no / less risk during surgery
  accept risk of anaesthetic
- operations unsuitable / risky for weakness / old age
- risk of infection
- no (suitable) kidneys available for transplant / long waiting list /
- ess painful

4

[5]

44 (a) (i) any **one** from:

- chemical messenger
- chemical / substance released in one part to have effect elsewhere in body
- chemical / substance which affects another / target organ / tissues / cells

allow chemical from endocrine gland

1

(ii) in blood / circulatory system / any named part including plasma

extra wrong answer would cancel example

***not** red blood cells*

1

(b) **Quality of written communication**:
correct use of at least two relevant scientific term**s** spelt phonetically

e.g. pregnancy, ovulation, FSH, oestrogen, progesterone, ovary, follicle, circulation, thrombosis, feminisation, sperm count, STD

Q ✓ or Q ✗

1

any **three** from:

Oral contraceptives:

(benefit)

- prevent (unwanted) pregnancy **or** prevent egg release
- regulate menstrual cycle / periods

(problems)

- prolonged use may prevent later ovulation / cause infertility
- named side-effect on female body
  e.g. circulatory problems / weight gain / nausea / headache / breast cancer / mood swings
- increased promiscuity / increase in STD's / STI's
- named side-effect on environment
  e.g. feminisation of fish **or** lowered sperm count in human males

Fertility drugs:

(benefit)

- can enable woman to have children **or** to become pregnant **or** stimulates egg release

(problem)

- multiple births

*for full marks must score at least **one** re contraceptives **and** at least **one** re fertility drugs*

*if unclear which type of hormone maximum **2** marks from 3*

3

[6]

45 (a) aerobic

1

respiration

*'anaerobic respiration' = **1** mark*

1

(b) any **five** from:

- glucose is a small molecule
- glucose passes through filter **or** glucose is filtered out of blood **or** glucose enters the capsule / kidney tubule / Q
- glucose reabsorption **or** glucose taken (back) into blood

  *do **not** accept 'filtered' into blood / out of tubule*
- cells lining tubule have microvilli / shape described **or** cells lining tubule have large surface area
- active transport
- up concentration gradient
- use of energy / ATP
- long tubule for more reabsorption

5

[7]

46 any **three** from:

FSH stimulates growth / maturing of follicle(s) / eggs

FSH stimulates oestrogen release

oestrogen stimulates development of uterus lining

oestrogen stimulates LH release / production

LH stimulates ovulation / egg release

[3]

47 (a) semi / selectively / partially / differentially permeable

1

separates blood and dialysis fluid

1

(b) any **four** from:

blood cells cannot pass through membrane

glucose retained in blood

to stop water passing into blood / osmosis

no (net) diffusion

urea removed from blood by diffusion
accept excreted

4

(c) problem may be temporary **or** has minor infection **or** problem could be cured by other means

1

operation / transplants carry risk
accept rejection

1

(d) (i) no antigens

1

on (the surface) of red blood cells

1

(ii) would cause agglutination / clumping if different
ignore clotting and coagulation

1

[11]

48 (a) water content (within the body/blood) is kept constant/ regulated/within very narrow limits/kept right
*do **not** accept general definition of homeostasis*

1

(b) because optimum conditions are needed for processes within the body / enzyme reactions
or
because there is a need to maintain a steady internal environment

1

(c) excretion is the removal from the body of waste **products**

n.b. faeces is not an excretory product but may be neutral

1

because waste products would (build up and) **become** toxic/poisonous/harmful

*do **not** accept makes us ill*
*do **not** accept block up system*
*do **not** accept unwanted products*

1

[4]

49

(a) (i) endocrine glands **or** endocrine system

allow a specific named gland

1

(ii) (dissolved) in the blood(stream) **or** plasma

1

(b) (i) pancreas **or** islets of Langerhans

1

(ii) (it **or** insulin) lowers blood sugar level [1]

(by) (speeding up **or** increasing)
conversion of glucose to glycogen [1]

in the liver [1]

(and) speeding up **or** increasing uptake of glucose by body cells [1]

4

[7]

50

(a) any **three** from

increased thickness **or** build up for
attachment of zygote **or** so zygote can
implant;

allow gives more room for blood vessels

3

increased blood vessels to provide nutrients for zygote;

*allow embryo **or** fetus **or** baby **or** egg for zygote*

becomes thicker to form placenta;

increased surface area for attachment of zygote;

increased glands for secretion;

(b) (i) rise in hormone corresponds with rise in temperature;

*allow peak of hormone at same time as increased temperature **or** when hormone high, temperature is high*

*allow change in hormone concentration followed by change in temperature **or** when hormone rises followed shortly by rise in temperature **or** graphs follow same pattern **or** graphs are nearly the same*

1

(ii) maximum 36.90 °C

1

minimum 36.55 °C;

0.35 °C;

*allow **both** marks for correct answer **or one** mark for 0.35 if clearly round up **or** round down allow one mark for working if correct*

1

[6]

51 (i) liver

1

(ii) liver **or** B stores glycogen **or** pancreas **or** D makes insulin

1

clear description of link

1

[3]

52 (a) (i) increased shortly after ingestion then drops;

(ii) decreased shortly after ingestion then rises;

(iii) decreased shortly after ingestion then rises

each for 1 mark

3

(b) 8 of:
ingestion of ice cools blood flowing in (gut wall);
brain temperature lowered;
reduced blood temperature detected by brain;
impulses sent to sweat glands;
sweat production decreased/sweat pores close;
evaporation of sweat reduced;
it is evaporation of sweat which cools skin/heat loss is less;
therefore skin temperature rises;
because external temperature greater than body temperature;
sensibly linked example;

each for 1 mark

8

[11]