Semester 1 Examination Answer key, 2015

Section 1

1. d	11. B	21. c
2. d	12. c	22. b
3. c	13. b	23. b
4. c	14. b	24. d
5. d	15. b	25. b
6. c	16. a	
7. c	17. d	
8. c	18. c	
9. d	19. a	
10. a	20. d	

Section Two:

26.

a)
- epithelial

1 mark

b)
- To form a lining

1 mark

c)
- It is continuous with each cell being closely formed next to another so that material must mostly pass through the cells

1 mark

d)
- A_lungs
- B_lining of the intestines

2 marks

ei)
- Adenosine triphosphate

1 mark

eii)
- It carries an appropriately small amount of energy for cellular reactions
- It is recycled easily within the cell

2 marks

eiii)
- After fasting: by (facilitated) diffusion through transport channel proteins (passive)
- B. After a very sugary meal: by active transport through active transport proteins

2 marks

Q27

a)
- objective lens
- ocular lens

2 marks

b)

diam on photo = real diam × mag

100mm = 0.008 x mag

100/0.008 =

Mag = 12,500X

2 marks

bi).
- Mag = 4x5 = 20

1 mark

bii)
- low

1 mark

biii)

new HP mag = 4x 20 = 80x

diaFoVLP x mag LP = diam FoVHP x mag HP

2,400 microns x 20 = diam FoV HP x 80

2400 x 20/80 =
- 600micometres

1 mark for answer (1/2 off if wrong or no units) and 1 mark for formula

2 marks

biv.
- Diam of each cell = FoVdiam /no of cells

  = 600/10
- =60microns each

1 mark for answer (1/2 off if wrong or no units) and 1 mark for formula

2 marks

Q28

a)
- Co-factor 1 mark

b)
- on diagram 1 MARK

c)
- Substrate identified
- enzyme-substrate complex identified
- new product/s identified
- unchanged enzyme identified

4 marks

di)
- It unravels/changes shape, losing the necessary functioning shape of its active site

1 mark

dii)
- As the active site shape is changed the enzyme will no longer catalyse its specific reaction

1 mark

e)
- Adenosine diphosphate + phosphate

2 marks

Q29

a)
- two pairs of homologous chromosomes aligned in the centre of the cell 1 mark
- Mitosis ana: Labels_ centromere and chromatids -1 (1/2 each)

  Diagram : show the chromatids being pulled apart -1
- Meiosis ana: Labels – 1 mark (1/2 each)

  Diagram : show the homologous chromosomes being pulled apart – 1 mark

5 marks

b)
- The chromatids move apart

1 mark

c)
- Random assortment of chromosomes
- Crossing over

2 marks

d)
- They have genes for A,B and C at the same location/loci
- They are the same length and shape OR
- They have a centromere in the same relative position along the chromosome

Any 2 for 2 marks

30.

a)
- Correctly plots points and joins points to form a line/curve
- Labelling of axes with correct name and unit
- Uses a suitable scale
- Title appropriate with both variables included
- Key for lines/identify lines

b)
- The drug Sconol, reduced the asthma effects/restriction of the lungs, from exercise

2 marks

c)
- the volume of air inhaled per minute –as a measure of the restriction of the lungs

1 mark

d)
- So age related factors are not influencing the outcome and/or
- So the results can be generalised to describe the adult response to the drug sconol.

1 mark

e)
- The taking of a placebo controlled for the placebo effect of pill taking
- The double blind controlled for the influence of expected outcomes
- They all took tables – the same sort of input of the drug
- They all measured their breathing rate after the same sustained exercise
- In the same room
- At the same time

2 marks

f)
- The air would be less moist
- The air would be colder
- The air would have more dust particles etc

Any 2 of the above for 2 marks

g)
- Greater sample size
- Everyone was trained to breathe through their nose for the exercise
- Repeating the trial with a different group
- Any other reasonable….

2 marks

Q31.

a)
- <u>spermatogonium</u>

1 mark

b)
- seminiferous tubule

1 mark

c)
- vasectomy

1 mark

d)
- NO. You need the enzyme in the acrosome/head of the sperm, (from several 1,ooo) sperm
- to loosen the cells from the corona radiata allowing 1 sperm access to cell membrane 2 marks

Q32.

a)
- They are unspecialized

- They have not had any of their genes turned on or off

2 marks

b)

- Nerves
- muscle

2 marks

c)

- Endocrine- to provide hormones
- Excretory – to remove wastes
- Respiratory – to provide oxygen
- Immune – to provide protection from disease

3 marks

d)

- Oestrogen
- progesterone

2 marks

e)

- The afterbirth, placenta and amnion, are delivered from the mother.

1 mark

Section Three: Extended answer

Q 33

a)

Name	Diffusion via a channel	Facilitated diffusion	Active transport
Description	The process where particles move from regions of high concentration to low(passive) down a channel created by a protein in the plasma membrane	Is diffusion (passive) down a concentration gradient that is assisted as the particles attach to the protein that changes form to assist the particles movement across the cell membrane attach to binding site on protein carriers, carrier changes shape	Is where energy is used, (ATP) to assist the movement of the molecule , via a protein transporter, that actively moves the molecule into the cell against the concentration gradient
Example	Water channel/aquaporin, sodium or calcium (ions) channel, lipds, alcohols, soluble drugs, steroids	Glucose transporter or amino acid (large molecules)	Glucose or sodium-potassium pump, amino acids

12 marks

aii)

- It is limited in size due to a limiting surface area to volume ratio as
- if the volume of the cell gets too big, the surface area will not be large enough to allow diffusion of enough substances
- to occur fast enough for the cells needs

3 marks

b)

- Ethical question: at what point is a fertilised egg considered a living human?
- Religious: is it ever alright to destroy the potential of life? Is it ever allright to act in a manner that is not 'natural' as God planned?
- Economic: is it everyone's right to have a child?
  - Who should bear the burden of the cost?
  - Relative costs (eg other children in the world die due to lack of resources?)

Or for research

- should be voluntary
- informed consent
- risk of harm should be clear
- confidentiality offered to protect participants
- anonymity should be offered, 5 marks

Q 34

a)

- cellular respiration is the chemical process by which energy is made available to the cell
- Glucose → 2 pyruvic acid
- in the cell cytoplasm
- Pyruvic acid→ lactic acid
- if no oxygen is available that is anaerobic
- and 2 ATP
- If oxygen is available then aerobic respiration will occur and
- the pyruvic acid will move to the mitochondria
- Where pyruvic acid +oxygen→ carbon dioxide and water – 1 mark
- releasing 36 ATP in the process **20% (40 Marks)**

10 marks

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b)

- Endoplasmic reticulum –extensive flattened parallel membranes that form a 3D network
- Mitochondria –double membrane and cristae
- Nucleus –double membrane and nuclear pores
- Lysosomes –a discrete spherical vesicle
- Golgi body –a series of flattened sacs with vesicles being pinched off the end AND
- ER- a network for distribution of material and the site where protein manufacture or fat manufacture occurs in the cell
- Mitochondria- the site where pyruvic acid is broken down completely in aerobic respiration to release ATP
- Golgi body – the site where proteins are modified and then packaged into vesicles for export from the cell
- Lysosome- the vesicle containing enzymes that will break down materials
- Nucleus – the organelle that contains the DNA, that controls cell function
- Ribosome accepted…

1 for description and 1 for function 10 marks

Q35

a)

- A section of DNA called a gene will code for a specific sequence of amino acids, to make a specific protein
- When the gene is turned on, RNA polymerase attaches to the start of the gene
- The RNA polymerase will move along the gene, separating the two strands and making a copy of one of them, the template strand
- The copy is made of nucleotides
- that are complementary to the sequence found in the DNA, but
- It will be single stranded and have uracil rather than thymine in its sequence
- This mRNA molecule will then move out of the nucleus
- into the cytoplasm
- There it will combine with a ribosome and
- By racheting through the ribosome,
- one set of three nucleotides, or one codon at a time,
- Will allow the tRNA
- with the matching anticodon
- to align the appropriate amino acid in the sequence
- which will be joined together into a growing polypeptide or protein

any 12 of the points above -12 marks

b)

- Period 1: FSH levels rising causing
- Increase in the follicles and thus
- Seeing increase in oestrogen
- LH levels rising causing
- Ripening of follicle / triggers
- Period 2: seeing increase in oestrogen
- and an increase in progesterone due to
- formation of corpus luteum

6 marks

c)

- difference in exposure to different support form the mother - eg better or worse oxidation of blood due to relative proximity to placenta (lots for others…)
- one may be born before the other and so the birth may result in different environmental inputs to each foetus eg speed of birth and thus quicker removal of dependence on a failing placenta…
- one may have been exposed to a disease causing pathogen that the other did not
- conjoined twins may have varied access to different body organs
- one may have exposure to a teratogen
- epigenetics (in-utero environment)

Any 2 for 2 marks

A self appraisal of my exam performance

My greatest strengths in content knowledge were…

Content areas I still need to work on are…

The style of question I handled really well include…

The style of question I still need to work on include…

Aspects of exam technique that I used really well include…

Aspects of exam technique I need to work on before my next exam are…