

QUESTIONSHEET 1

- (a) phase of mitosis in spermatogenesis is continuous from puberty but in oögenesis it occurs in fetus/
before birth (to produce enough oögonia for life);
phase of growth in spermatogenesis is slight but in oögenesis the oögonium/oöcyte grows large (due to accumulation of yolk);
meiosis I in oögenesis needs trigger of ovulation but in spermatogenesis it just occurs continuously;
meiosis II in oögenesis needs the stimulus of sperm entry but in spermatogenesis it occurs continuously;
oögenesis ceases at the menopause but spermatogenesis goes on until death (humans); **max 4**
- (b) primary sexual characteristics are the possession of testes and a penis in males;
and ovaries, uterus and vagina in females;
male secondary sexual characteristics are a deep voice/facial hair/narrow hips/muscular body;
female secondary sexual characteristics are broad pelvis/breast development/more rounded body; **4**
- (c) umbilical vein has a higher oxygen tension than umbilical arteries;
umbilical vein has a higher glucose/amino acid concentration than umbilical arteries;
umbilical vein has a lower carbon dioxide tension than umbilical arteries;
umbilical vein has a lower urea concentration than umbilical arteries; (accept converses) **4**
- TOTAL 12**
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QUESTIONSHEET 2

- (a) (i) A = acrosome; B = (haploid) nucleus; C = centriole; D = mitochondria; E = axial/tail filament; **5**
- (ii) A contains enzymes/hyaluronidase to digest a way through the (vitelline) membrane of the egg;
B provides a haploid set of chromosomes/the male genetic contribution;
D provides ATP/energy to allow the sperm to swim/move; **3**
- (b) (i) internal fertilisation is when the sperm fuses with the egg inside the body (of the organism);
external fertilisation is when the sperm fuses with the egg outside the body/
gametes are shed into the external environment before fusion; **2**
- (ii) Any two of: fish/amphibia/cnidarians/any other correct example;; **2**
- (iii) (water is essential) as a medium in which the sperm can swim or be washed towards the egg; **1**
- (iv) provided by the seminal fluid;
secreted by the testes/prostate gland/seminal vesicles/bulbo-urethral glands; **2**
- TOTAL 15**
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QUESTIONSHEET 3

- (a) (i) A = ovarian/Graafian follicle; B = primary follicle; C = secondary oocyte; D = developing follicle/cavity/antrum/
follicular fluid; E = corpus luteum; F = ovarian/germinal epithelium; G = corpus albicans; H = stroma/(dense) connective tissue; **8**
- (ii) F B D A C E G; **1**
- (b) (i) A = oestrogen; E = oestrogen and progesterone; **2**
- (ii) oestrogen stimulates repair of the endometrium (after menstruation);
stimulates development of female secondary sexual characteristics;
progesterone maintains thickness of endometrium (in state suitable to support pregnancy);
also inhibits contractions of uterine smooth muscle during pregnancy; **4**

TOTAL 15

QUESTIONSHEET 4

Name of hormone	Site of secretion	Target organ	Function
	<u>anterior</u> pituitary;		stimulates ovarian follicle development/oestrogen release;
oestrogen;		endometrium; (Reject uterus)	
	corpus luteum/placenta;		maintains endometrium/pregnancy;
	<u>posterior</u> pituitary;		stimulates birth contractions/milk <u>release</u> ;
	<u>anterior</u> pituitary;	milk secretory cells;	stimulates milk <u>production</u> ;

11**TOTAL 11****QUESTIONSHEET 5**

pre-ovulatory; follicle stimulating hormone/FSH; luteinising hormone/LH; anterior pituitary; oestrogen; menstruation;
 follicle stimulating hormone/FSH; luteinising hormone/LH; ovulation; corpus luteum; progesterone; implantation/pregnancy;

TOTAL 12**QUESTIONSHEET 6**

- (a) (i) A=placenta; B=umbilical cord; C=amniotic cavity/fluid; D=uterine cavity; E= cervix; **5**
- (ii) carbon dioxide/hydrogen carbonate ions;
urea/any named nitrogenous waste; **2**
- (iii) oxygen;
glucose/amino acids/any other named nutrient/antibodies; **2**
- (iv) the umbilical vein and (two) umbilical arteries;
vein from placenta to fetal liver/fetus;
arteries from fetal aorta/iliac arteries/fetus to placenta; **3**
- (b) amniotic fluid;
dilutes/receives fetal urine/fetal secretions;
provides room for fetal movements/cushioning effect; **3**

TOTAL 15**QUESTIONSHEET 7**

1=E; 2=J; 3=A; 4=H; 5=G/F; 6=C; 7=F; 8=D; 9=B; 10=I;

TOTAL 10

QUESTIONSHEET 8

(a)	Hormone	Secreted by corpus luteum	Secreted by anterior pituitary	Reaches greatest concentration in blood before ovulation	
	Oestrogen	✓	✗	✓	;
	Luteinising hormone (LH)	✗	✓	✓	;
	Progesterone	✓	✗	✗	;
	Follicle stimulating hormone (FSH)	✗	✓	✓	;

(b) (i) gonadotropin releasing factor is (a hormone) released from the hypothalamus; stimulates anterior pituitary to release gonadotropic hormones/gonadotropins; for example, follicle stimulating hormone; and luteinising hormone; **max 3**

(ii) prolactin is released from anterior pituitary (during lactation); stimulates the production of milk in the mammary glands; oxytocin is released (by neurosecretion) from the posterior pituitary; stimulates birth contractions/milk release; **max 3**

(iii) chorionic gonadotropin is secreted by the trophoblast/chorion cells; maintains the corpus luteum/secretion of oestrogen and progesterone; stimulates testosterone secretion in fetal testis; human placental lactogen is secreted by the placenta; stimulates mammary gland development (for lactation); **max 3**

TOTAL 13**QUESTIONSHEET 9**

- (a) (i) A = placenta; B = umbilical cord; C = cervix; **3**
- (ii) human chorionic gonadotropin; maintains corpus luteum/stimulates corpus luteum to secrete oestrogen/progesterone (for first 12 weeks of pregnancy);
oestrogen;
stimulates/maintains further development of endometrium; (any three hormones and a specific function)
progesterone;
maintains endometrium/inhibits contraction of uterine muscle;
relaxin;
relaxes pubic symphysis/pelvic joint/relaxes cervix; **max 6**
- (b) (i) maternal blood is released into a space to (directly) bathe fetal vessels/capillaries; large surface area of fetal vessels/looped vessels in contact with maternal blood; only a thin capillary wall separates the two bloods; **max 2**
- (ii) fetal haemoglobin has a higher affinity for oxygen than maternal haemoglobin/ onloads oxygen in placenta at tensions when maternal haemoglobin offloads it; **1**
- (c) (i) thalidomide/Rubella virus; **1**
- (ii) Any two of: ref fetal alcohol syndrome/slow growth/small head/narrow eye slits/ sunken nasal bridge/mental retardation/any other correct defect;; **2**
- (iii) Any two of: nicotine/cocaine/heroin/any other correct example;; **2**

TOTAL 17

QUESTIONSHEET 10

- (a)
- | Level of secretion | Effect | |
|---------------------|--|----------|
| Increased prolactin | promotes growth/development of breasts/milk secretory tissue; | |
| Decreased FSH | prevents development of further follicles (and possible ovulation); | |
| Decreased LH | no need to maintain corpus luteum which degenerates (by week 12);
(10 - 12) | 3 |
- (b) (i) increases gas exchange/to remove more CO₂;
increase in blood hydrogen carbonate ions [HCO₃⁻] stimulates respiratory centre;
mother needs to remove her CO₂ as well as the baby's; **max 2**
- (ii) reduces risk of placental/fetal rejection; **1**
- TOTAL 6**
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QUESTIONSHEET 11

- (a) transfer oxygen/nutrients to fetus from maternal blood/mother;
remove waste products from fetal to maternal blood/mother;
hormone/hCG/progesterone/oestrogen/relaxin synthesis;
heat transfer; **max 3**
- (b) carries oxygen/oxygenated blood to the fetus from the placenta;
carries glucose/amino-acids/hormones/salts/any other example, from placenta to fetus; **2**
- (c) large surface area of fetal capillaries;
maternal blood released into blood sinus/space;
maternal blood directly bathes fetal capillaries;
thus a very short diffusion/transport distance;
counter flow of fetal with maternal blood enhances exchange;
chorion cells/trophoblast cells secrete hormones of pregnancy; **max 4**
- (d) secretes progesterone/oestrogen;
during first twelve weeks/3 months of pregnancy;
to maintain and develop uterine wall in a suitable state/progesterone inhibits uterine contractions; **max 2**
- TOTAL 11**

QUESTIONSHEET 12

- (a) (i) hCG is secreted by the trophoblast/developing placenta;
excreted in mother's urine/not normally present in mother's urine; 2
- (ii) hCG maintains corpus luteum;
corpus luteum no longer needed after week 12;
since placenta has taken over its functions; **max 2**
- (b) (i) weeks 1-12 (allow 10)/3 months from corpus luteum;
thereafter, from placenta; 2
- (ii) Any two of:
relaxes uterus/relaxes smooth muscle/
inhibits prostaglandins which would initiate birth/
prevents expulsion of fetus/inhibits lactation/stimulates appetite;; 2
- (c) Any two of:
increases blood flow to uterus/
stimulates growth of myometrium/
softens cervix/stimulates breast growth/
increases water retention/
stimulates development of oxytocin receptors/
inhibits lactation;; 2

TOTAL 10