Reproduction

Mark Scheme 5

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Reproduction
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 5

Time Allowed: **57 minutes**

Score: **/47**

Percentage: **/100**

1 **(a)**	narrow leaves ; parallel / unbranched, <u>veins</u> on leaves ; sheath / no petiole ; flower parts in multiples of 3 ; one cotyledon (in the seed) ; fibrous roots ; scattered vascular bundles ; no, cambium / woody tissue ;	[max 2]	**Ignore** long and thin unqualified
(b) (i)	*pollination* pollen transferred, from anther, to stigma ; *fertilisation* gametes / sex cells / ova and pollen nuclei / sperm and egg, fuse / join / combine together ;	[max 2]	**Ignore** pollen unqualified **Ignore** meet / mix
(ii) **1** **2** **3** **4** **6** **7** **8**	less variation / reduced gene pool / uniform crop ; less chance, for evolution to occur / adaption to new environment ; more chance to pass on genetic disease ; well adapted to environment ; no external agent of pollination required / more chance of fertilisation ; single plant can reproduce ; whole crop would be susceptible to adverse factors e.g. drought / disease ;	[max 2]	**R** no variation **R** no evolution **R** clones / asexual reproduction inferred
(c) **1** **2** **3** **4** **5** **6** **7** **8**	zygote (is formed) ; divides by mitosis ; to form embryo ; formation of radicle and plumule ; formation of, cotyledons / seed leaf / food reserve ; formation of, testa / seed coat ; ref to endosperm ; seed formed from ovule ;	[max 4]	

1 **(d)** **1** **2** **3** **4** **5** **6**	energy is lost, between / within, trophic levels / along food chain **;** *either* animals are, at second trophic level / primary consumers *or* plants are, autotrophs / producers / first trophic level **;** (energy lost) in animal respiration / heat / (named) metabolic process / movement **;** ref to (more) material that is, inedible / not digestible (in longer food chains) **;** ref to 10% energy transfer / ORA **;** livestock require additional resources / cost for their maintenance **;**	[max 3]	
		[Total:13]	

2 **(a)**	pollen (grain) germinates / pollen (grain) grows pollen tube ; pollen tube grows down the style ; reaches the ovule ; (tip of) pollen tube breaks open ; male gamete(s) travels down the pollen tube ; male gamete(s) / (male) nucleus / nuclei, enter ovule ; (male gamete) fuses with female gamete / ovum ; zygote forms ;	max [3]	**A** pollen grain gametes / nucleus **A** fertilization / fusion, occurs inside the ovule
(b)	*protection* (amnion / uterus / amniotic fluid) 1 provides protection against, mechanical damage / 'knocks' ; 2 provides sterile environment / no entry of pathogens ; 3 backbone provides protection against, jolts / AW ; 4 placenta provides a barrier to (named) pathogen(s) / AW ; 5 placenta prevents mixing of blood between fetus and mother *constant temperature* 6 ref to blood flow to the, uterus / placenta / amnion ; 7 brings heat from elsewhere in mother's body ; 8 removes heat from amniotic fluid ; 9 fetus enclosed inside, any named structure / the mother's body ; 10 named structure(s), acts as insulators / reduces heat loss ; *nutrients* 11 across placenta / through placenta ; 12 diffusion / active transport ; 13 between mother's blood and fetal blood / into fetal blood; *excretion of metabolic waste* 14 across placenta / through placenta ; 15 diffusion of, urea / carbon dioxide ; 16 from fetal blood to mother's blood / into mother's blood ; *nutrients / excretion* **A** once only 17 umbilical cord transports, nutrients / excretory products ;	max [8]	**max 3** from each section **A** baby for fetus **R** amniotic sac as insulator **R** absorbed by placenta
		[Total:11]	

Question			E Answers	Marks	Additional Guidance
3	(a)		transfer, of (named) pathogen/disease, from (infected) to (uninfected) person/animal/organism ; a (named) medication/substance, taken into the body that, modifies/affects/influences, (chemical reactions in) the body ;	[2]	**A** (harmful) microorganism/bacteria/virus/fungus for pathogen **A** infected by/passed down for 'transfer' **R** named non-human organisms
	(b)	**1** **2** **3** **4** **5** **6** **7** **8** **9** **10** **11**	(named) pathogens of water/(formula) milk ; (named) water-borne diseases ; (new born) babies have, weak/no, immune systems ; AW few(er) antibodies from mother (as no breast milk) ; ref to HIV infects lymphocytes/white blood cells/weakens immune system ; no/few, lymphocytes/white blood cells ; few/no, antibodies produced ; then phagocytes are less effective ; stomachs do not produce much acid ; diarrhoea/vomiting ; dehydration/loss of, water/ions ;	[max 4]	*for* **MP1** **A** contamination of, water/bottle **A** (harmful) microorganism/bacteria/virus/fungus for pathogen ***ignore*** germs *for* **MP3** ***ignore*** children

3	(c)	**1** **2** **3** **4** **5** **6** **7** **8** **9** **10** **11** **12**	bonding with mother **;** it's free/'cheap' **;** sterile/no risk of infection from, formula milk/bottled milk **;** is at, body/correct, temperature **;** no preparation/easily available **;** provides, best/complete/most suitable/AW, food **;** easier to digest **;** contains antibodies/ref to colostrum/provides passive immunity **;** provides protection against, pathogens/diseases/microorganisms **;** reduce risk of allergies **;** contraceptive effect **;** AVP **;**	[max 4]	*examples of AVPs for* **MP12** no additives further antibody detail, e.g. diseases that the mother has had/common diseases **;** composition/quantity, of breast milk changes to match development of baby **;** protects against, <u>breast</u> cancer/<u>ovarian</u> cancer **;** helps the body to return to 'normal' e.g. weight loss/restores uterus **;**

3	(d)	**1** **2** **3**	(unprotected/AW) sexual intercourse/from semen/vaginal fluids **;** sharing, needles/syringes **;** blood/blood product, for transfusion/transplants/blood to blood contact **;** ***ignore*** blood unqualified	[max 2]	**A** 'sex' **R** saliva/tears/sweat/urine **R** donating blood **R** skin contact **R** kissing **R** (genetically) inherited ***ignore*** other sharps, e.g. tattoo needles/razors unless qualified by blood contact ***ignore*** unqualified body fluids/breast milk/placenta
				[Total: 12]	

4 **(a) (i)**	<table><tr><th>circulatory system</th><th>blood vessels that carry oxygenated blood</th></tr><tr><td>maternal</td><td>;</td></tr><tr><td>fetal</td><td>Y / Y **and** X ;</td></tr></table>	[2]
(ii)	umbilical cord ; *Any one of the following:* tied / clamped ; cut ; (part attached to mother) comes away with placenta ; (part attached to baby) drops off ;	[2]
(iii)	oxygen, from maternal / to fetal ; **MP2** carbon dioxide, from fetal / to maternal ; **MP3** named nutrients from maternal / to fetal ; **MP4** water, either direction or both ; **MP5** antibodies, from maternal / to fetal ; **MP6** urea / nitrogenous waste, from fetal / to maternal ; **MP7** passage of hormones, from maternal / to fetal / both directions ; **MP8** diffusion in correct context ; **MP9** active transport in correct context ; (amino acids)	[max 4]
(b)	*oestrogen and progesterone* **MP1** develops, (lining of) uterus / endometrium ; **MP2** prevent, shedding of lining / menstruation ; **MP3** inhibit (release of) FSH ; **MP4** by pituitary gland ; **MP5** prevent egg cells / follicles, developing (in ovary) / ovulation ; **MP6** promote development / growth, of mammary glands ;	[max 3]
		[Total: 11]