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

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

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| 2 (a) | <p>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 ;</p> | max [3] | <p>A pollen grain gametes / nucleus A fertilization / fusion, occurs inside the ovule</p> |
| (b) | <p><i>protection</i> (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</p> <p><i>constant temperature</i> 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 ;</p> <p><i>nutrients</i> 11 across placenta / through placenta ; 12 diffusion / active transport ; 13 between mother’s blood and fetal blood / into fetal blood;</p> <p><i>excretion of metabolic waste</i> 14 across placenta / through placenta ; 15 diffusion of, urea / carbon dioxide ; 16 from fetal blood to mother’s blood / into mother’s blood ;</p> <p><i>nutrients / excretion</i> A once only 17 umbilical cord transports, nutrients / excretory products ;</p> | max [8] | <p>max 3 from each section</p> <p>A baby for fetus</p> <p>R amniotic sac as insulator</p> <p>R absorbed by placenta</p> |
| [Total:11] | | | |

| Question | | E | Answers | Marks | Additional Guidance |
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| 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 | (named) pathogens of water/(formula) milk ; | | <i>for MP1</i> |
| | | 2 | (named) water-borne diseases ; | | A contamination of, water/bottle |
| | | 3 | (new born) babies have, weak/no, immune systems ; AW | | A (harmful) microorganism/bacteria/virus/fungus for pathogen |
| | | 4 | few(er) antibodies from mother (as no breast milk) ; | | ignore germs |
| | | 5 | ref to HIV infects lymphocytes/white blood cells/weakens immune system ; | | <i>for MP3 ignore</i> children |
| | | 6 | no/few, lymphocytes/white blood cells ; | | |
| | | 7 | few/no, antibodies produced ; | | |
| | | 8 | then phagocytes are less effective ; | | |
| | | 9 | stomachs do not produce much acid ; | | |
| | | 10 | diarrhoea/vomiting ; | | |
| | | 11 | dehydration/loss of, water/ions ; | [max 4] | |

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| 3 | (c) | <ol style="list-style-type: none"> 1 bonding with mother ; 2 it's free/'cheap' ; 3 sterile/no risk of infection from, formula milk/bottled milk ; 4 is at, body/correct, temperature ; 5 no preparation/easily available ; 6 provides, best/complete/most suitable/AW, food ; 7 easier to digest ; 8 contains antibodies/ref to colostrum/provides passive immunity ; 9 provides protection against, pathogens/diseases/microorganisms ; 10 reduce risk of allergies ; 11 contraceptive effect ; 12 AVP ; | | [max 4] | <p><i>examples of AVPs for MP12</i></p> <p>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 cancer</u>/<u>ovarian cancer</u> ; helps the body to return to 'normal' e.g. weight loss/restores uterus ;</p> |
| 3 | (d) | <ol style="list-style-type: none"> 1 (unprotected/AW) sexual intercourse/from semen/vaginal fluids ; 2 sharing, needles/syringes ; 3 blood/blood product, for transfusion/transplants/blood to blood contact ; ignore blood unqualified | | [max 2] | <p>A 'sex' R saliva/tears/sweat/urine R donating blood R skin contact R kissing R (genetically) inherited</p> <p>ignore other sharps, e.g. tattoo needles/razors unless qualified by blood contact ignore unqualified body fluids/breast milk/placenta</p> |
| [Total: 12] | | | | | |

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| 4 (a) (i) | circulatory system | blood vessels that carry oxygenated blood | [2] |
| | maternal | ; | |
| | fetal | Y / Y and X ; | |
| (ii) | umbilical cord ; <i>Any one of the following:</i> 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) | <i>oestrogen and progesterone</i> 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] |