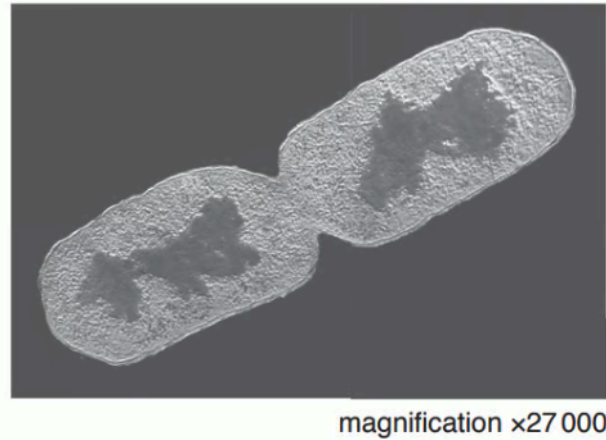


1.

Fig. 1 shows a photomicrograph of a bacterium.



**State the name of the process taking place in this figure**

Asexual reproduction/ binary fission

Bacterial cells consist of a single, circular DNA chromosome; Mitosis is unnecessary because there is no nucleus or multiple chromosomes. The type of cell division in bacteria is called binary fission.

**2. Compare the development of a foetus in the early stages of pregnancy to its development in the late stages of pregnancy.**

- growth in all stages ;
- development during all stages ;
- (more) increase in complexity in early stages ;
- (more) increased in size in later stages ;

**3. Functions of amniotic fluid and the amniotic sac**

- maintains temperature
- (mechanical) protection ;
- provides support (of the fetus) ;
- provides a sterile environment / prevents infections ;
- allows movement (of the fetus) ;
- (movement) allows for development of bones and muscles ;
- ref. to swallowing (of fluid) ;
- lubrication / AW ;

**4. Why self pollination is advantageous to plants**

- Higher chance of pollination
- Higher chance of fertilisation

- Does not rely on pollinators
- Useful when plants are isolated from each other
- Parent plants are adapted to environment/ pass on alleles to offspring
- Pollination is part of sexual reproduction, which provides greater genetic variation than asexual
- Prevents extinction of species

**5. Explain the disadvantages of cross-pollination compared with self-pollination.**

- reliant on (named) pollinators / wind ;
- idea of wastage of pollen / less chance of pollination ;
- idea of more energy required ;
- need to produce, more pollen / flowers / nectar ;
- needs more than one plant ;
- risk of less, fertilisation / reproduction ;

**6. Describe changes that occur in uterus lining during one menstrual cycle**

- loss / thinning, of lining (of uterus), at the beginning of the cycle / during first week / between day 1–7 ;
- 2 regrowth / thickening of, lining (of uterus), during second week / after loss (of lining) / before ovulation ;
- 3 thickness of lining remains constant, in the last two weeks / at the end of the cycle / after ovulation / if no fertilisation ;
- ref. to blood vessels / glands ;

**7. State how infection with HIV affects the lymphocytes if untreated.**

Destroys lymphocytes/ decreases lymphocyte count

**8. Outline the consequences of the changes in the number of lymphocytes for the health of the person infected with HIV.**

- fewer antibodies (produced by lymphocytes)
- decrease in immunity / inefficient immune system
- fewer memory cells
- any role of antibodies or lymphocytes (that will be impacted by fewer lymphocytes)
- develop AIDS
- example of (secondary) infection / disease / pathogen that may result from reduced number of lymphocytes

**9. Why egg cell contains stores of protein and fat**

- ref. to making new cells after fertilisation ;
- making membranes ;

- (protein for) making enzymes ;
- making new, (named) cell structures / cytoplasm ;
- (fat / protein) provide / source of, energy ;
- energy for, cell division / mitosis / growth (of cell) / metabolism / AW

### 10. Describe how embryo is formed from zygote

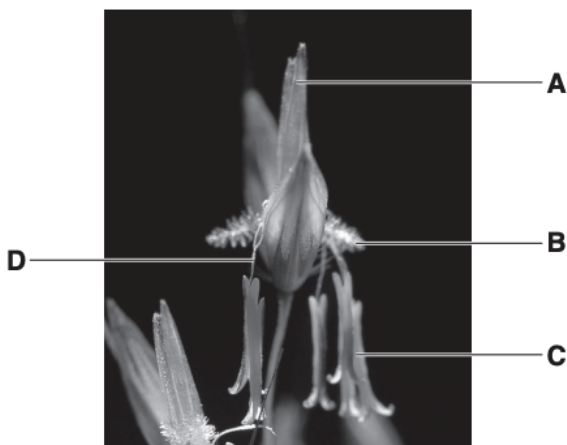
- chromosomes / DNA, duplicate(s) / replicate(s) ;
- chromosomes separate ;
- mitosis / nuclear division ;
- (zygote / fertilised egg) divides / splits (into two) ;
- (nuclear / cell) division / mitosis, repeated / AW ;
- forming a, ball / cluster, of cells ;
- cells are genetically identical ;
- AVP ; e.g. cell, specialisation / differentiation / ref. to stem cells

### 11. Role of oestrogen in menstrual cycle

- stimulates repair / thickening, of uterus lining
- inhibits FSH secretion
- stimulates secretion of LH

### 12. Structural adaptations of insect-pollinated flowers

- Large & colourful petals
- Anthers/stamens within flower
- Stigma/style/carpel within flower
- Sticky stigma
- Sticky pollen grains
- Has nectaries



**13. Describe and explain how the features of the flower shown are adaptations for wind-pollination.**

- anthers / stamens / filaments / stigma hang outside the flower
- large anthers (C) produce large quantities of pollen
- anthers (C) easily release pollen
- Feathery stigma (B)
- Stigma (B) has large surface area to catch pollen
- Bracts (A) are small / inconspicuous

**14. One letter in the figure that identifies a structure where meiosis occurs**

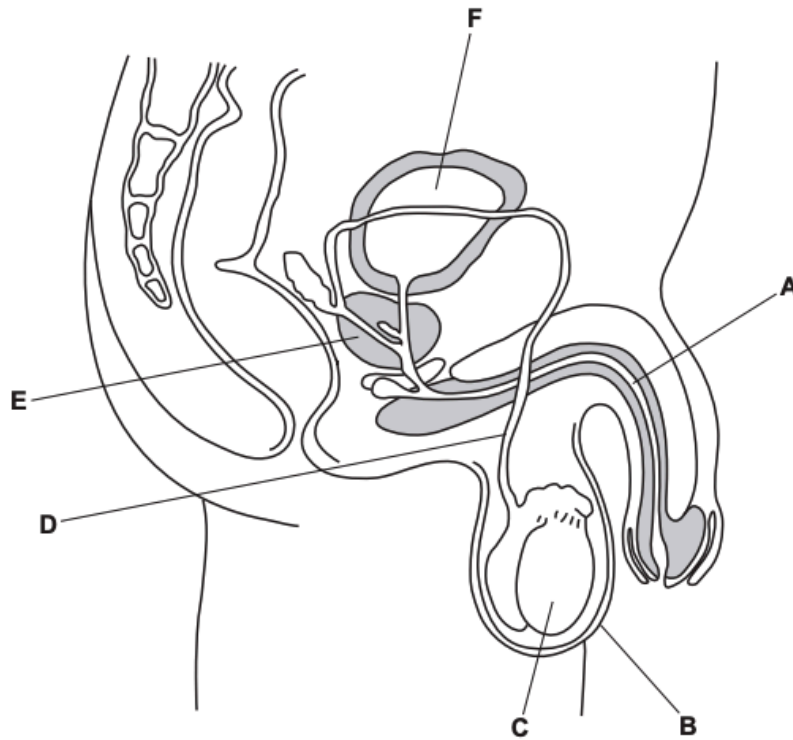
C

**15. Consequences of self-pollination for a population of plants.**

- pollination / fertilisation always going to happen / high rate of success
- no agent of pollination needed
- little wastage of pollen
- reduced/little variation/diversity
- increase chance of genetic / inherited disease
- an infectious disease can kill all of the population / all plants more susceptible to the same disease
- increased competition between plants (as they have the same adaptation)
- all plants adapted to same conditions/environment
- little ability to adapt to changing conditions/little ability to evolve
- risk of extinction

NOTE: consequences refer to both positive and negative

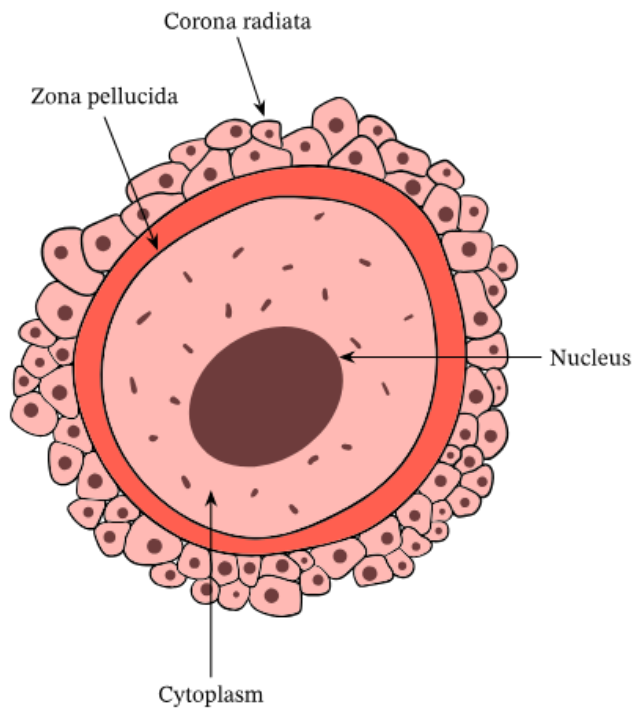
**16.**



name of structure	function	letter on Fig. 4.1
testis	production of sperm / produces or releases testosterone	<b>C ;</b>
sperm duct	transports sperm but not urine	<b>D ;</b>
<u>urethra</u>	passage for urine and seminal fluid through the penis	<b>A ;</b>
prostate gland	secretes / produces, seminal fluid / nutrient-rich fluid / alkaline fluid / AW	<b>E ;</b>
scrotum / scrotal sac	contains testes	<b>B ;</b>

**17. Draw & label a human egg cell. Include labelled feature that is not found in a sperm cell.**

- additional drawing detail / any drawn and labelled common cell structure e.g. nucleus, cytoplasm, cell membrane,
- mitochondria / DNA / ribosome / (r)ER ;
- drawn and labelled unique cell structure ; e.g. jelly (coat) / energy store / protein-rich layer / yolk / large volume of cytoplasm

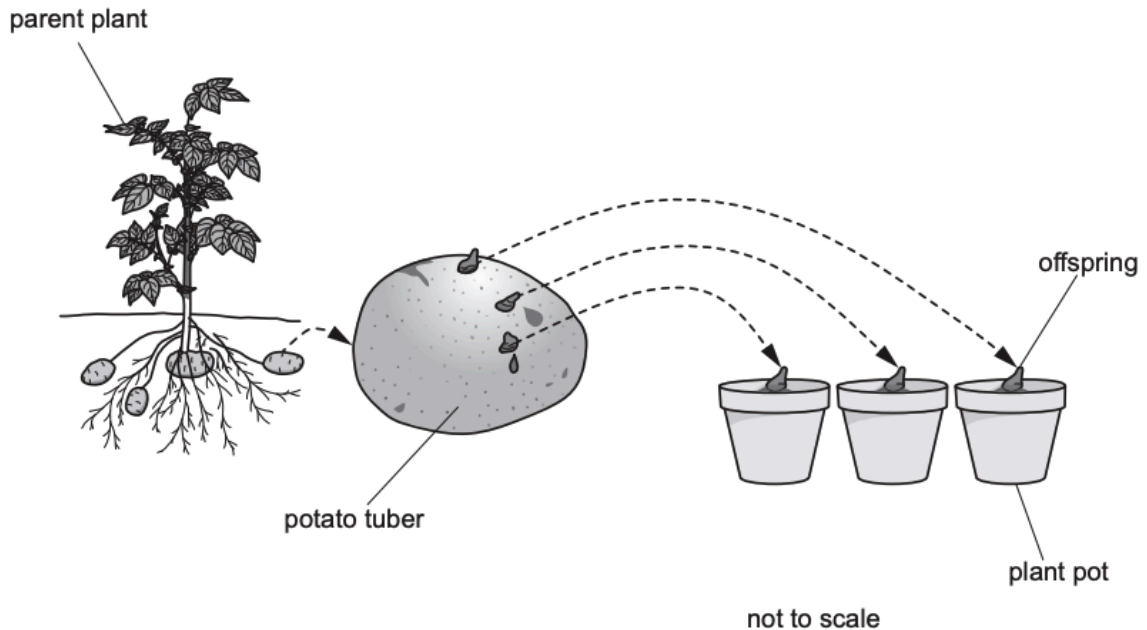


**18. What happens to a fertilised egg cell before implantation in the uterus.**

- jelly coat (of fertilised egg) hardens
- reference to zygote
- mitosis / cell division
- embryo forms
- moves down oviduct

**19.**

(b) Fig. 6.2 shows a method of reproduction that some potato farmers use to produce more potato plants.



**Describe the advantages of the type of reproduction shown for crop production**

- Doesn't depend on agents for pollination; higher rate of success
- Much faster process
- Offspring are genetically identical to each other and to parent
- Favourable characteristics in parent are transferred to offspring
- Can reproduce even if variety is sterile

## 20. Adaptations of sperm & egg cell for sexual reproduction

### sperm

- presence of acrosome (containing enzymes)
- enzymes, digest / breakdown, egg membrane / jelly coat ;
- many mitochondria ;
- for respiration / to release energy (for swimming) ;
- flagellum / streamlined shape ;
- for, swimming / movement / locomotion ;

### egg

- energy / (named) nutrient, stores ;
- energy / (named) nutrients for, development of embryo / mitosis / cell division ;
- jelly coat ;
- (hardens) to prevent other sperm from entering (after fertilisation) ;

### both

- haploid (nuclei) / half the normal number of chromosomes or 23 chromosomes in sperm / egg ;

- gametes are haploid so, correct number of chromosomes in / 46 chromosomes in / diploid, zygote ;

**21. Describe the role of progesterone in pregnancy.**

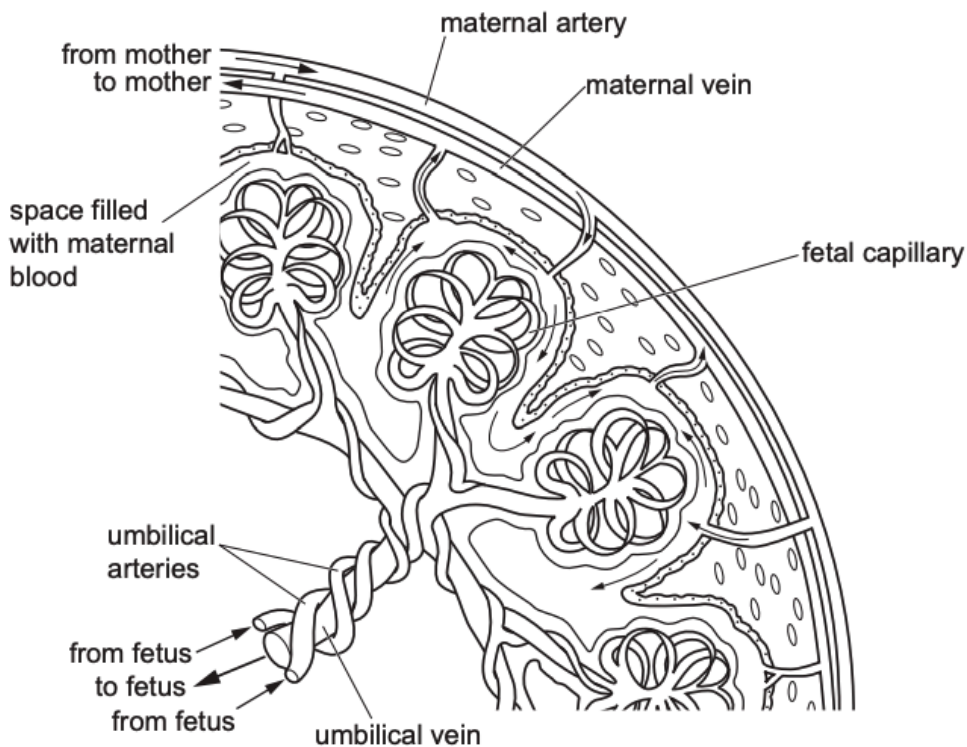
- maintains pregnancy ;
- prevents the menstrual cycle continuing during pregnancy / prevents menstruation ;
- maintains the (thickness of) lining of the uterus ;
- inhibits contraction of the muscular wall of the uterus ;
- prevents secretion of FSH / LH ;
- prevents more follicles developing / ovulation ;

**22. useful substances that move from the blood of the mother to the blood of the fetus across placenta**

- Glucose
- Oxygen
- Amino acids
- Antibodies

**23.**

Fig. 5.1 shows a drawing of a section of a human placenta. The arrows show the direction of blood flow.



Using the figure, suggest how the placenta is adapted for efficient diffusion.

- large surface area ;



- short diffusion distance ;
- concentration gradient is maintained / good blood supply ;