

## 16 Human reproduction - answers

- 1 Fertilisation occurs when the nucleus (A) of a sperm cell fuses with the nucleus (B) of the ovum (C).
- 2 (a) The sperm (male gamete) is much smaller than the ovum (female gamete).  
(b) The ovum is spherical and contains more cytoplasm than the sperm, which is elongated with a 'tail'.  
(c) Sperms are produced in much greater numbers than the ova.
- 3 Before fertilisation can occur, the sperms must pass through the sperm duct, urethra, vagina, cervix, uterus and oviduct.
- 4 (a) Ovulation is the release of an ovum from a mature follicle in the ovary.  
(b) Ovulation occurs approximately once every 28 days.
- 5 Sperms can fertilise an ovum for up to about three days after entering the female reproductive system, and the ovum survives for about one day.
- 6 (A) vagina, (B) cervix, (C) amnion, (D) uterus, (E) placenta, (F) oviduct, (G) fetus.  
(i) Ovum matures in ovary, (ii) ovum released from follicle, (iii) sperms deposited at top of vagina, (iv) ovum enters oviduct, (v) sperm fertilises ovum, (vi) embryo implants in lining of uterus.
- 7 (a) (i) oxygen and digested food (glucose, amino acids) pass from maternal to fetal blood,  
(ii) carbon dioxide and nitrogenous waste (urea) pass from fetal to maternal blood.  
(b) The fetus's own heart pumps blood through the fetal vessels in the placenta.
- 8 The umbilical cord contains blood vessels which convey blood between the fetus and the placenta.
- 9 (a) Smoking during pregnancy can lead to an underweight fetus.  
(b) If a pregnant woman catches rubella in the first 4 months of pregnancy, the fetal ears, eyes and nervous system may be damaged.
- 10 (a) Identical twins are derived from the products of a single zygote which divides into two at an early stage of development.  
(b) Fraternal twins result from the simultaneous fertilisation of two ova.
- 11 (a) Blood tests can reveal the mother's Rhesus blood group and show whether she is anaemic.  
(b) Urine tests can confirm the pregnancy and show if she is diabetic. Later in pregnancy, the presence of proteins in the urine implies restricted circulation in the placenta.

**Human reproduction - answers (continued)**

**12** Contractions of the uterus begin, amnion breaks, amniotic fluid escapes, cervix dilates, abdominal contractions begin, baby's head emerges from vagina, baby's feet emerge from vagina, placenta expelled from uterus.

Note: The amnion may break earlier or later, but prior to emergence.

**13** (a) Human milk is the correct composition for human babies and it contains antibodies to some diseases.

(b) The milk is free from bacteria and at the right temperature. Breast-feeding helps to establish a psychological bond between mother and baby.

**14** (a) testosterone, (b) oestrogen(s).

**15** (a) After ovulation, the follicle is replaced by the corpus luteum.

(b) The corpus luteum produces the hormone progesterone.