HUMAN REPRODUCTION

Q.No	Question			
	Multiple Choice Question			
Q.39	Two statements are given below - one labelled Assertion (A) and the other labelled Reason (R).	1		
	Assertion (A): Only one sperm can fertilise an ovum.			
	Reasoning (R): During fertilisation, a sperm comes in contact with zona pellucida layer of the ovum.			
	Which of the following is correct?			
	 A. Both A and R are true, and R is a correct explanation of A. B. Both A and R are true, but R is not a correct explanation of A. C. A is true, but R is false. D. A is false, but R is true. 			
Q.40	Organisms possessing identical sex chromosomes are referred to as the homogametic sex. Organisms with different sex chromosomes are known as the heterogametic sex.	1		
	Which of the following is CORRECT about humans?			
	A. Both males and females are homogametic.B. Both males and females are heterogametic.C. Males are homogametic while females are heterogametic.D. Males are heterogametic while females are homogametic.			
Q.41	Which of these cells of the human male reproductive system is haploid?	1		
	A. SpermatidB. Sertoli cellC. Leydig cellD. Spermatogonium			
Q.42	Globozoospermia is a condition where sperms have a characteristic round head lacking the acrosome.	1		
	Which of the following functions will a sperm NOT be able to do because of the above condition?			
	A. Enter the cervixB. Penetrate the ovum			



	C. Leave the ejaculatory duct			
	D. Swim to the Fallopian tube			
Q.43	Which of these statements about the female reproductive system is FALSE?	1		
	A. Menarche marks the initiation of oogenesis.			
	B. The germ layers start forming after implantation.			
	C. The oocyte completes meiosis after the entry of sperm.			
	D. Ovulation and menstruation stop permanently after menopause.			
Q.44	Which of these hormones would be detected in both a pregnant female and a	1		
	female who is not pregnant?			
	A. Relaxin			
	B. Prolactin			
	C. Progesterone			
	D. Human chorionic gonadotropin			
Q.45	Which of the following statements describes the difference between placenta	1		
	and umbilical cord?			
	A. The placenta secretes hormones whereas the umbilical cord does not.			
	B. The placenta persists after pregnancy while the umbilical cord is expelled.			
	C. The placenta is lined with veins and arteries while the umbilical cord is not.			
	D. The placenta interlocks with foetal tissues whereas the umbilical cord			
	interlocks with the uterine tissue.			
Q.46	Some events of pregnancy in humans are written below in a sequence.	1		
	(i) complete development of foetus			
	(ii) uterine contraction			
	(iii) dilation of cervix			
	(iv) delivery of the baby			
	(v) lactation			
	Between which of the following events does the shedding of the placenta			
	happen?			
	A. (i) and (ii)			
	B. (ii) and (iii)			
	C. (iii) and (iv)			
	D. (iv) and (v)			
	Free Response Questions/Subjective Questions			



Q.47	 (a) Hormones play a crucial role in maintaining balance in living systems through feedback loops. This means that release of a hormone regulates (increases/decreases) its further release in the body. One such example is oxytocin in the female reproductive system. Explain the feedback loop for oxytocin by answering the following questions. (i) From where is oxytocin released? (ii) At what stage of pregnancy do oxytocin levels peak? (b) Is the feedback mechanism for oxytocin positive or negative in nature? 	2
	Justify.	
Q.48	Spermatozoa are the mature male gametes in many sexually reproducing organisms. Thus, spermatogenesis is the male version of gametogenesis, of which the female equivalent is oogenesis.	2
	The cells in the germline that undergo meiosis, primary spermatocytes or primary oocytes, are derived from the zygote by a long series of mitoses before the onset of meiosis. Male and female gametes have different histories, marked by different patterns of gene expression that reflect their developmental origin as XY or XX embryos.	
	Source: https://www.sciencedirect.com/topics/biochemistry-genetics-and- molecular-biology/gametogenesis	
	The spermatozoa fuses with the egg cell to create a viable embryo. The ovum is released by the action of gonadotropins in the female body.	
	(a) Does ovulation happen during the period of pregnancy? Give a reason for your answer.	
	(b) Why are contraceptive pills able to inhibit ovulation?	
Q.49	The image below shows the levels of various hormones measured in a human female throughout the course of her pregnancy.	5













	Head Nucleus Middle piece Collar (containing many mitochondria)	
	(a) What is the ploidy of the nucleus?	
	(b) Why does the middle piece have a lot of mitochondria?	
	(c) What is the role of the acrosome?	
	(d) Only one sperm is able to fertilise the egg. How is this ensured?	
Q.52	A period tracking app is a mobile application that maintains information such as date of onset of menstruation, ovulation, duration of menstrual cycle, etc.	2
	A female who got her period on January 22 is using the period tracking app. Based on your understanding of the menstrual cycle, what will be the tentative date of ovulation estimated by the app? Provide a reason.	
Q.53	Polyspermy is an extremely rare condition in which an ovum is fertilised by more than one sperm.	2
	(a) How many chromosomes will a zygote contain if 2 sperms fertilised an ovum?	
	(b) How is polyspermy prevented in humans?	
Q.54	Answer the following questions:	2
	(i) For a human male, out of the two sex chromosomes, we can tell which sex chromosome is from which parent. Can we assume the same for a human female? Give a reason for your answer.	
	(ii) What is the probability of fertilisation between an ovum and a sperm containing the Y chromosome? Give a reason.	
Q.55	Answer the following questions about the human female reproductive system.	2
	(a) Name the part where the secondary oocyte completes meiosis.	

	(b) Complete this statement. The completion of the second meiotic division of secondary oocyte is triggered by the (rupture of the Graafian follicle in the ovary, penetration of zona pellucida by the sperm)	
	(c) The ploidy of the secondary oocyte before reaching (a) is and after (b) is	
Q.56	Read the two statements below and answer the questions that follow.	3
	Statement I: Pregnancy is characterised by the lack of menstruation.	
	Statement II: Lack of menstruation definitely indicates pregnancy.	
	(a) Mark each of statements as true or false.	
	(b) Give reason for to support your answer in (a).	
Q.57	Read the information below and answer the questions that follow.	3
	A scientist harvested an embryo from the womb of a sheep just after implantation for the purpose of cloning.	
	(Note: Assume that the female reproductive system and development stages of sheep are the same as humans.)	
	Draw the stage of the embryo at which the scientist harvested it and label the part which:	
	(a) attaches to the endometrium	
	(b) is capable of giving rise to a clone	
Q.58	(a) Highlight one aspect by which meiosis during oogenesis differs from regular meiosis.	3
	(b) Name two hormones that are common to spermatogenesis and oogenesis.	
	(c) State the function of hormone identified in (b) in both human male and female.	
Q.59	Read the two statements below and answer the questions that follow:	2
	Statement I: Female P has been a surrogate mother once.	
	Statement II: Female Q is a national-level swimmer.	
	(a) Is it correct to say that the hymen is DEFINITELY broken in both females P and Q?	
	(b) Give a reason to support your answers to (a).	
Q.60	Refer to the diagram below.	5
	P R	



	where, the first circl system that support that support pregnan	e (P) include conception cy.	es parts of the hum and the second c	nan female reprodu Eircle (R) includes	uctive parts	
	(a) Name two parts ea	ach that belor	ng to			
	(i) P					
	(ii) R					
	(b) Name two parts th	nat support be	oth contraception ar	nd pregnancy.		
	(c) Name two parts th belong to P or R.	at function as	s endocrine glands a	nd indicate whether	⁻ they	
	(d) Which part from (c) is tempora	-γ?			
Q.61	Observe the diagram some of its parts mar	of the human ked P, Q, R, S,	male reproductive s and T.	ystem shown below	/ with	5
	Q Seminal vesicle Prostate Bulbourethral gland T Testicular lobules					
	(a) For each of the fo and name the parts b	ollowing state etween which	ments pertaining to n sperm transfer is o	male infertility, ide bstructed.	entify	
	(i) The obstruction of the vas deferens leads to low sperm count.					
	(ii) Epididymitis is the	inflammatior	n of the epididymis.			
	(b) Fill in the blank us	ing one of the	e options enclosed in	the brackets.		
	Retrograde ejaculations possible because of system, i.e., the urinary bladder open bladder).	n occurs whe of the existing s into the vas	n the semen enters anatomy of the he (vas defere deferens, urethra e	the urinary bladder uman male reprodu ens merges with un merges from the un	This active reter, rinary	
Q.62	For each of the following parameters, compare the processes of oogenesis and spermatogenesis and comment if they are similar or different. Enter your answer in the format as shown:					3
	Parameter	Oogenesis	Spermatogenesis	Similar/Different		
	Number of gametes					



	produced from one oocyte or primary spermatocyte						
	Onset						
Q.63	The table below outlin	nes some	e mile	estones of pregnanc	у.		2
		Day 1	fer	tilisation			
		Day 2	mo	rula is formed			
		Day 5	inn	er cell mass is forme	d		
		Day 7	imp	olantation			
	Pregnancy tests detec in blood or urine to co	t the pre onfirm.	senc	e of the human chor	ionic gonadotropin (hCG)	
	(a) A pregnancy test d	one afte	r wh	ich day is likely to yi	eld a positive result?	þ	
	(b) Give reason for yo	ur answe	er to	(a).			
Q.64	(a) Cryptorchidism is a from the abdomen.	conditio	n in '	which one or both of	the testes fail to des	cend	3
	(i) If cryptorchidism infertility? Give reaso	of bot n.	h te	estes is left untrea	ated, would it lea	d to	
	(ii) Can a male with reason.	cryptorc	hidis	sm of only one test	is produce sperm?	Give	
	(b) Orchidopexy is a s	urgical pi	roce	dure for treating cry	otorchidism.		
	(i) Name the part to w	hich the	test	es are moved outsid	e the abdomen.		
0.65	Mark the following st			rue or false and pro	vido a roason for oa	ch	2
Q.05	(a) The Graafian follic	e persist	s as t	the absence of fertili	sation.		C
	(b) The corpus luteum	is detec	ted o	only in pregnant wor	nen.		
	(c) The urethra serve unfertilised egg, and r	es as the nenstrua	cor l blo	nmon opening for t	he elimination of ι	urine,	
Q.66	Mark the following st each.	atement	s as	true or false and pr	ovide an explanatio	n for	5
	(a) The umbilical cor mother's heart.	d contaiı	ns b	lood vessels that co	nnect the foetus to	o the	



	(b) The mitotic differentiation of immature male and female germ cells begins at puberty.	
	(c) The meiotic divisions in oogenesis are unequal.	
	(d) Sexual intercourse between a healthy male and female might not always lead to fertilisation.	
	(e) The sex of the child depends on the sex chromosome contributed by the ovum.	
Q.67	Answer the following questions about the human female reproductive system:	5
	(a) The consumption of alcohol during pregnancy causes birth defects in the foetus. What is the function of placenta due to which alcohol should be avoided during pregnancy?	
	(b) Indu gave birth to a pair of female twins. How many egg/s were released at the start of her pregnancy?	
	(c) C-section is a surgical procedure performed when there are complications during the delivery. The baby is safely delivered through an incision in the abdominal wall and uterus. Which two parts of the female reproductive tract does the baby NOT pass through?	
	(d) To delay menstruation, a synthetic form of progesterone called progestin is commonly prescribed. This is administered by a medical professional for managing heavy or painful periods or preventing menstrual symptoms during important events or vacations. What could be the possible role of progesterone here?	
	(e) Infants suffer from the risk of infection if they are not breastfed within few hours of birth. What could be the reason?	





Answer key and Marking Scheme

Q.No	Answers	Marks
Q.39	A. Both A and R are true, and R is a correct explanation of A.	1
Q.40	D. Males are heterogametic while females are homogametic.	1
Q.41	A. spermatid	1
Q.42	B. penetrate the ovum	1
Q.43	A. Menarche marks the initiation of oogenesis.	1
Q.44	C. progesterone	1
Q.45	A. The placenta secretes hormones whereas the umbilical cord does not.	1
Q.46	D. (iv) and (v)	1
Q.47	(a) 0.5 marks for each correct answer:	2
	(i) pituitary	
	(ii) initiation of parturition	
	(b) positive	
	- because the secretion of oxytocin stimulates the release of further oxytocin	
Q.48	(a)	2
	- no	
	- because levels of luteinizing hormone (LH) drop very low during pregnancy	
	[o.5 marks for each correct answer]	
	(b)- because high levels of progesterone inhibit the production of follicles	
Q.49	(a) week 10	5
	(b) 0.5 mark for each of the following:	
	- hCG or human chorionic gonadotropin	
	- placenta	
	(c) 0.5 mark for each of the following:	



	- progesterone	
	- oestrogen	
	- relaxin	
	(d) 0.5 mark each for naming and describing role:	
	- oxytocin	
	- It stimulates contractions of the uterus and leads to childbirth	
	(e) 0.5 mark for each of the following:	
	(i) hCG	
	(ii) relaxin	
Q.50	(a) 0.5 mark for each of the following:	3
	(i) cervix	
	(ii) vagina	
	(b) (i) 0.5 mark for each of the following:	
	- endometrium	
	- prepare the uterus for implantation or protecting the embryo	
	(b) (ii) 0.5 mark for each of the following:	
	- myometrium	
	- exhibits strong contractions	
Q.51	(a) haploid	2
	(b) to provide energy to the sperm to swim	
	(c) contains enzymes that help in the process of fertilization	
	(d) The first sperm induces changes in the ovum membrane to block the entry of other sperms.	
Q.52	1 mark for each of the following:	2
	-Tentative date: between February 4 and February 6	
	- Reason: Ovulation happens between 14th-16th day from the onset of latest or previous menstruation/period	
1		



Q.53	1 mark for each of the following:	2
	(a) 69 chromosomes	
	(b) Contact between a sperm and ovum causes changes in the zona pellucida that block the entry of other sperms.	
Q.54	(i) 0.5 mark for each of the following:	2
	- No	
	- Reason: Unlike males, a human female contains of a pair of the same sex chromosome 'X', one from each parent.	
	(ii) 0.5 mark for each of the following:	
	- 50%	
	- Reason: Half of the sperms (50%) carry X chromosome and the other half (50%) carry Y chromosome .	
Q.55	(a) Fallopian tube or oviduct	2
	(b) penetration of zona pellucida by sperm	
	(c) 0.5 marks for each of the following:	
	first blank - n	
	second blank - n	
Q.56	(a) 0.5 mark for each of the following:	3
	- l is true.	
	- II is false.	
	(b) 1 mark for each of the following reasons:	
	I - The level of estrogen and progesterone is high during pregnancy to maintain the endometrium which in turn suppresses gonadotropins needed for development of the follicle.	
	II - Lack of menstruation could also be due to stress, poor health, etc.	
	[Accept any other valid reason.]	
Q.57	1 mark for drawing and 1 mark each for the correct label as follows:	3
	(a) trophoblast	

	(b) inner cell mass	
	Trophoblast	
Q.58	(a) 1 mark for the following:	3
	 oogenesis results in a one gamete and some polar bodies, while meiosis results in the production of four haploid gametes. 	
	(b) 0.5 mark each for any two of the following:	
	- FSH or follicle-stimulating hormone	
	- LH or Luteinizing hormone	
	- GnRH or Gonadotropin-releasing hormone	
	[Accept any other relevant answer.]	
	(c) 0.5 mark for each of the following:	
	- In females, FSH stimulates the development of follicles in ovary.	
	- In males, LH stimulates the production of testosterone hormone by Leydig cells.	
	OR	
	- In females, LH triggers ovulation.	
	- In males, FSH acts on the Sertoli cells and stimulates them to secrete some factors which help in spermiogenesis.	
	[Accept any other relevant answer.]	
Q.59	(a) 0.5 marks for each of the following:	2
	- Female P - No	
	- Female Q - No	
	(b) 1 mark for any of the following:	
	Hymen can persist after childbirth or coitus or even after intense physical activity.	



Q.60	(a) 0.5 mark each for naming any two of the following:					
	(i) P: vagina, oviducts, ovaries, uterus					
	(ii) R: uterus, cervix, placenta					
	(b) 0.5 mark each for any two of the following:					
	- oviducts					
	- ovaries					
	- uterus					
	(c) 0.5 marks each for identifying the following organs and indicating the category					
	- ovaries (P)					
	- placenta (R)					
	(d) placenta					
Q.61	(a) (i) 0.5 marks each for indicating the parts from the diagram and 0.5 marks each for naming them					
	- R (epididymis)					
	- T (urethra)					
	(a) (ii) 0.5 marks each for indicating the parts from the diagram and 0.5 marks each for naming them					
	- S (rete testes)					
	- Q (vas deferens)					
	(b) urethra emerges from the urinary bladder					
Q.62	52 0.5 mark for each blank cell				3	
	Parameter	Oogenesis	Spermatogenesis	Similar/Different		
	Number of gametes produced from	1	4	Different		
	one oocyte or primary spermatocyte					



	Onset	fetal development	puberty	Different		
Q.63	(a) after day 7 OR after implantation					
	(b) Placenta is formed after implantation and it secretes hCG.					
Q.64	(a) (i) 0.5 each mark for answering and giving reason:				3	
	- Cryptorchidism of both testes means infertility.					
	- Spermatogenesis cannot happen at the normal internal body temperature.					
	(a) (ii) 0.5 each mark for answering and giving reason:					
	- A male with cryptorchidism of one testes might be able to produce sperm.					
	- Spermatogenesis can occur in the descended testis as its temperature will be lower than the normal internal body temperature.					
	(b) 0.5 mark for each of the following:					
	(i) scrotum					
	(ii) 34.5 °C - 35 °C					
Q.65	(a) 0.5 mark for stating and giving reason.				3	
	- false					
	- The Graafian follicle releases the ovum and transforms into the corpus luteum.					
	(b) 0.5 mark for stating and giving reason.					
	- false					
	- The corpus luteum is detected in both pregnant and non-pregnant women. It formed after ovulation.					
	(c) 0.5 mark for stating and giving reason.					
	- false					
	- The urethra is the passage for urination only OR					
	- The unfertilised egg a	and menstrual bl	lood pass through th	ne vagina.		
Q.66	(a) 0.5 mark for each o	f the following:			5	



	- false		
	- The umbilical cord contains blood vessels that connect the foetus to the placenta. The placenta serves as an interface between maternal and foetal circulation.		
	(b) 0.5 mark for each of the following:		
	- false		
	- The female germ cells (oogonia) undergo mitotic differentiation during fetal life to form primary oocytes.		
	(c) 0.5 mark for each of the following:		
	- true		
	- A meiotic division in oogenesis give rise to oocyte and polar body, instead of two oocytes.		
	[Accept any other relevant answer.]		
	(d) 0.5 mark for each of the following:		
	- true		
	- Fertilisation occurs when ovum and sperms are transported simultaneously to the ampulla of the oviduct.		
	[Accept any other relevant answer.]		
	(e) 0.5 mark for each of the following:		
	- false		
	- The sex of the child depends on the sex chromosome contributed by the sperm. 50% of sperms carry the X chromosome while the other 50% carry the Y chromosome.		
	[Accept any other relevant answer.]		
Q.67	(a) The placenta facilitates the supply of nutrients from the mother to the foetus.	5	
	(b) 0.5 mark for each of the following:		
	- 1 egg in the case of identical twins		
	- 2 eggs in the case of fraternal twins		
	(c) 0.5 mark for each of the following:		
	- cervix		
L			

- vagina	
(d) 1 mark for any of the following:	
- Progesterone prevents the shedding of endometrium.	
OR	
- Progesterone prevents ovulation.	
(e) 1 mark for the following:	
- Breast milk contains antibodies which provide resistance to the newborn baby.	
[Accept any other relevant answer.]	



