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**UNIVERSITY OF AGRICULTURE, ABEOKUTA**  
**COLLEGE OF ANIMAL SCIENCE & LIVESTOCK PRODUCTION**  
**Department of Animal Physiology**

2007/2008 SECOND SEMESTER EXAMINATION

**ANP 502: REPRODUCTIVE PHYSIOLOGY**

*Instruction: Answer ALL QUESTIONS*

*Time allowed: 2 hours*

- Which of the following processes is not involved in animal reproduction?  
a) Heterosexual mating b) Conception c) Gestation d) Lactation e) None of the above.
- Synchronization of various physiological processes essential for successful reproduction is achieved by means of a) Nervous impulses b) Homeostasis c) Oestrus synchronization d) Reproductive hormones e) Environmental factors
- Livestock products obtained directly or indirectly through reproductive processes are the following except a) Draught power b) Eggs c) Meat d) Milk e) Hides and Skin
- Embryo transfer is a technique that can be applied to improve selection differential in a) Males b) Females c) Offspring d) Crossbreeding e) *In vitro* fertilization
- The best way to increase selection pressure on the male side is through a) Multiple ovulation b) Oestrus synchronization c) Embryo transfer d) Artificial insemination e) Selective breeding
- According to the chromosomal theory of sex determination, sex of an individual is determined a) At birth b) At fertilization c) By the balance between X and Y chromosomes d) At puberty e) At sexual maturity
- The sex chromosome complement in Klinefelter's syndrome is a) XY b) XX c) YO d) XO e) XXY
- According to the theory of genic balance, a fruit fly with the genotype XXAA would be a a) Super male b) Super female c) Intersex d) Normal female e) Normal male
- Which of the following pairs of components of male and female reproductive systems are not homologous? a) Ductus deferens and Oviduct b) Prostate and Vestibule c) Testis and Ovary d) Urethra and Urethra e) Scrotum and Labia majora
- A freemartin has external genitalia like that of a a) Normal male b) Hermaphrodite c) Normal female d) Abnormal male e) Abnormal female
- The regression of the Wolffian ducts, resulting in female sexual development, occurs only in the absence of which of the following hormones?
  - Mullerian Inhibiting Substance (MIS)
  - Oestradiol
  - Testosterone
  - Progesterone
  - Oestrone
- Cryptorchidism is a state in which
  - The ovaries become the testes
  - The testes are retained in the scrotum
  - Non-descent or incomplete descent of the testes into the scrotum

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- d. The descent of the testes into the scrotum
  - e. The testes of the animal are fused
13. Which of the following structures in the male reproductive system is not involved in the formation the constituents of the semen?
- a. Testis
  - b. Seminal vesicle
  - c. Prostate
  - d. Glans penis
  - e. Cowper's gland
14. Which of the following structures is not classified as a sexual accessory organ in the male
- a. Ampulla
  - b. Testis
  - c. Seminal vesicle
  - d. Prostate
  - e. Glands of Littre
15. This structure in the testis is the origin of spermatozoa
- a. Sertoli cells
  - b. Seminiferous tubules
  - c. Tunica albuginea
  - d. Rete testis
  - e. Epididymis
16. Which of the following is the sequence of development of the spermatozoon
- a. Spermatocyte-spermatogonium-spermatid-spermatozoon
  - b. Spermatogonium-spermatocyte-spermatid-spermatozoon
  - c. Spermatogonium-spermatocyte-spermatid-spermatozoon
  - d. Spermatid-spermatocyte-spermatogonium-spermatozoon
  - e. Spermatocyte-spermatid-spermatogonium-spermatozoon
17. Semen consists of several non-cellular inclusions such as electrolytes ( $\text{Na}^+$ ,  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ ), citric acid, etc. Which of the following structures in the male reproductive system is a rich source of electrolytes?
- a. Seminal vesicle
  - b. Testis
  - c. Prostate
  - d. Ampulla
  - e. Mullerian duct
18. What is the major function of the Sertoli cells?
- a. Production of androgens
  - b. Production of oestrogens
  - c. Nourish the male gametes (spermatozoa, spermatids, etc.)
  - d. Serve as adhesive point for spermatozoa
  - e. Control movements of spermatozoa
19. Which of the following animals has only one ovary?
- a. Doe

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- b. Ewe
  - c. Cow
  - d. Hen
  - e. Mare
20. In females, the Mullerian duct develops into which structure in the female urinogenital system?
- a. Ovary
  - b. Oviduct/uterus
  - c. Vagina
  - d. Cervix
  - e. Urethra
21. Which of the following uterine types belongs to a ruminant?
- a. Simplex
  - b. Bipartite
  - c. Duplex
  - d. Bicornuate
  - e. Vestigial
22. The onset of puberty is characterised by all of the following except
- a. Involution of the thymus
  - b. Desire for sexual activity
  - c. Reaching critical somatic development (body weight)
  - d. Gametogenesis
  - e. Attainment of specific height
23. Which of these is not a factor that regulates onset of puberty?
- a. Quality of nutrition
  - b. Quantity of feeding
  - c. Breed size
  - d. Season
  - e. Sexual activity
24. Puberty signifies all of the following except
- a. The onset of periodic hypothalamo-pituitary-gonad axis maturation
  - b. Hypothalamo-pituitary control is no more highly sensitive to oestrogen and inhibin feedback
  - c. Gonadotrophin secretion increase
  - d. GnRH secretion level increase
  - e. Complete shut-down of the hypothalamo-pituitary-adrenal axis
25. The word "menarche" is used to describe
- a. First appearance of menstruation
  - b. First appearance of progesterone on circulation
  - c. Development of the oviduct
  - d. Enlargement of the ovary
  - e. Attainment of body size at puberty
26. The hormones produced by the pituitary include the following except
- a. LH

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- b. FSH
  - c. Prolactin
  - d. Insulin
  - e. Growth Hormone
27. GnRH is produced in which of the following?
- a. Hypothalamus
  - b. Pituitary
  - c. Ovary
  - d. Testis
  - e. Liver
28. The major site of production of progesterone and oestrogen in the mammalian ovary is
- a. Theca cells
  - b. Granulosa cells
  - c. Leydig cells
  - d. Medullary cells
  - e. Interstitial cells
29. Which of the following hormones regulates follicle growth in the ovary and spermatogenesis?
- a. LH
  - b. FSH
  - c. GH
  - d. Progesterone
  - e. Prolactin
30. Ovulation occurs in females in response to endocrine surge of which of the following hormones?
- a. FSH
  - b. Prolactin
  - c. LH
  - d. GH
  - e. Progesterone
31. In mammals, oestrogen serves as ovarian feedback to regulate gonadotrophin surge for ovulation. In birds, which ovarian hormone serves a similar purpose?
- a. Testosterone
  - b. Androstenedione
  - c. Oestrone
  - d. Progesterone
  - e. Tri-iodothyronine
32. In primates and rodents, hyper-prolactinemia of lactation blocks which of the following hormones and thereby preventing the return of females to reproductive cycling after parturition?
- a. LH
  - b. GnRH
  - c. FSH
  - d. Prolactin
  - e. LH-inhibiting Factor (LHIF)

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33. Which major hormone is directly responsible for the growth of the penis, sex drive, growth of the mane and aggression?
- Testosterone
  - Dihydrotestosterone
  - Oestradiol-17 $\beta$
  - LH
  - FSH
34. Testicular descent occurs during foetal life in large animals (bull, ram) but in the rat, it occurs when?
- At foetal life
  - Just after birth
  - At puberty
  - At sexual activity
  - Does not descend
35. Which of the following hormones is the major regulator of progesterone production in the mammalian ovary?
- LH
  - FSH
  - Inhibin
  - GnRH
  - Prolactin
36. During foetal development in the male, the sex centre is rendered acyclic due to?
- Early secretion of androgen
  - late secretion of androgen
  - early secretion of testosterone
  - late secretion of testosterone
  - secretion of androgen
37. In females, length of the oestrous cycle depends on the following except
- Occurrence of conception
  - absence of conception
  - presence of definite breeding season
  - absence of definite breeding season
38. Time of ovulation in ewe is
- 24 – 30 hours from start of oestrus
  - 30 – 36 hours from start of oestrus
  - 35 – 45 hours from start of oestrus
  - 24 – 36 hours from start of oestrus
  - 10 – 11 hours after end of oestrus
39. Length of the oestrous cycle in cow is
- 16 – 17 days
  - 21 days
  - 19 – 20 days
  - 21 – 22 days
  - 19 – 25 days
40. Duration of oestrus in goats is
- 24 – 36 hours
  - 32 – 40 hours
  - 48 – 72 hours
  - 18 – 19 hours
  - 4 – 8 days
41. Metoestrus stage of the oestrous cycle is associated with
- Excitement
  - Standing for male
  - decreasing interest in male
  - Sexual rest
  - Sexual interest
42. Sloughing-off of the uterine endometrium during the menstrual cycle in primates is accompanied with
- Bleeding
  - ovulation
  - folliculogenesis
  - high body temperature
  - very low temperature
43. Follicular phase in primates lasts for about 2 weeks but lasts for
- 2 – 5 days in non-primates
  - 2 – 3 days in non-primates
  - 2 – 6 days in non-primates
  - 2 – 7 days in non-primates
  - 3 – 5 days in non-primates
44. In many animal species, full manifestation of oestrus requires
- Progesterone priming
  - Oestrogen priming
  - FSH priming
  - LH priming
  - Testosterone priming

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45. In primates, corpus luteum regression is not under the influence of  
a. PGF<sub>2</sub> $\alpha$     b. oestrogen    c. progesterone    d. FSH    e. LH
46. Vagina pH is more alkaline in  
a. Dioestrus    b. anoestrus    c. oestrus    d. metoestrus    e. proestrus
47. The following is correct about physico-chemical changes that occur during oestrus except  
a. it facilitates transport of spermatozoa    b. it facilitates survival of spermatozoa  
c. it facilitates non-fertilization of the ovum    d. it facilitates capacitation of spermatozoa  
e. it facilitates implantation of embryo
48. In women, breastfeeding creates  
a. Anovulatory condition    b. ovulatory condition    c. silent heat    d. split oestrus  
e. folliculogenesis
49. One aspect of fertilization is embryologic and the other is  
a. Physiologic    b. biologic    c. genetic    d. therapeutic    e. endocrine
50. Morula stage of embryonic development consists of  
a. 8 – 16 cells    b. 16 – 32 cells    c. 8 – 32 cells    d. 16 – 32 cells    e. 32 – 64 cells
51. The fluid-filled interstitial spaces in the blastocyst is called  
a. Blastocoele    b. Blastoceole    c. Blastocele    d. Blastosoele    e. Blastocoel
52. Inner cell mass of the blastocyst gives rise to  
a. Adult organism    b. placenta    c. foetal membranes    d. skin    e. ligaments
53. Time of embryo implantation in sheep is  
a. 10 – 22 days of pregnancy    b. 11 – 40 days of pregnancy    c. 11 – 22 days of pregnancy  
d. 6 – 8 days of pregnancy    e. 13 – 25 days of pregnancy
54. Hemotrophic mode of nutrition of the embryo commences  
a. Before implantation    b. after implantation    c. Before placentation    d. after placentation  
e. during implantation
55. During early differentiation, cells at the generative pole of the blastocyst give rise to  
a. 2 layers of cells    b. 4 layers of cells    c. 3 layers of cells    d. 5 layers of cells  
e. 6 layers of cells
56. During foetal development, heartbeat and blood circulation commence in cattle at  
a. 21 days of pregnancy    b. 22 days of pregnancy    c. 24 days of pregnancy  
d. 16 days of pregnancy    e. 26 days of pregnancy
57. After 40 – 60 days of pregnancy in sheep, pregnancy is maintained by  
a. Placental progesterone    b. ovarian progesterone    c. uterine progesterone  
d. Endometrial progesterone    e. Maternal progesterone
58. Oxytocin released during parturition plays a significant role in second stage of labour while relaxin causes  
a. Expansion of the birth canal    b. Contraction of uterus    c. Expansion of the uterus  
d. Contraction of the birth canal    e. dilation of the vulva
59. Uterine involution is completed in cows within  
a. 45 days of parturition    b. 55 days of parturition    c. 35 days of parturition  
d. 25 days of parturition    e. 40 days of parturition
60. Milk yield in goats is affected by udder size while milk flow rate is influenced by  
a. teat size    b. teat length    c. teat circumference    d. teat width    e. teat perimeter
61. Milk ejection reflex is controlled by  
a. Hormonal mechanism    b. Nervous mechanism    c. Neuro-endocrine mechanism  
d. Stimulation mechanism    e. Suckling mechanism
62. The ..... is used by male poultry to deposit spermatozoa in the hen's cloacal wall  
(a.) Penis    (b.) Papilla    (c.) clitoris    (d.) oviduct    (e.) none of the above

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63. Reproduction in poultry is similar in some ways to reproduction in mammals except :
- (a.) The young are not carried in the hen's body
  - (b.) Fertilized eggs develop outside the hen's body
  - (c.) The testes of the cock are located within the body cavity
  - (d.) The hen suckles her chicks
  - (e.) All of the above
64. The process by which the number of oocytes is continuously reduced, starting from immediately after their formation is called:
- (a) Ovulation (b) Folliculogenesis (c) Ovulation (d) Atresia (e) Oogenesis
65. Four phases are noted in the developmental process of spermiogenesis except
- (a.) Golgi phase (b.) Ovulatory phase (c.) Cap phase (d.) Acrosomal phase (e.) Maturation phase
66. Spermatozoa
- (a.) are formed within the seminiferous tubules
  - (b.) are elongated cells consisting of a flattened head and tail
  - (c.) are each covered by a membrane (plasmalemma or plasma membrane)
  - (d.) a-c are correct
  - (e.) none of the above
67. Sperm cells are stored in the:
- (a.) Corpus epididymis (b.) Caudal epididymis (c.) Caput epididymis (d.) Sertoli (e.) prostate gland
68. Follicular components include:
- (a.) Oocyte (b.) Granulosa (c.) Theca (d.) a-c (e.) Oestradiol
69. Functions of follicular fluid include all the following except
- (a.) Regulation of the functions of the granulosa cells
  - (b.) Oocyte maturation, ovulation and egg transport
  - (c.) Preparation of the follicle for the formation of the subsequent corpus luteum
  - (d.) The stimulatory and inhibitory factors in the fluid regulate the follicular cycle
  - (e.) Stimulation of spermatocytogenesis and spermiogenesis
70. Follicular and luteal phases are phases in a process referred to as:
- (a.) Ovulation (b.) Oestrus (c.) Oestrous cycle (d.) Folliculogenesis (e.) Egg maturation
71. The major changes which follicles undergo during the ovulatory process include:
- (a.) Cytoplasmic and nuclear maturation of the oocyte
  - (b.) Disruption of cumulus cell cohesiveness among cells of the granulosa layer
  - (c.) Thinning and rupture of the external follicular wall
  - (d.) None of the above
  - (e.) a-c are correct
72. Artificial insemination is
- (a.) Timing of oestrus in female animals (b.) The rate of genetic progress per year
  - (c.) Introduction of semen into female reproductive tract (d.) a & c are correct (e.) b & c are correct
73. Advantages of Ai include the following except:
- (a.) Enhances the rate of genetic progress in a herd or flock
  - (b.) Solves time and space constraints in breeding programmes
  - (c.) Reduces cost of service

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- (d.) Reduces in venereal disease transmission  
(e.) None of the above
74. A teaser animal or dummy is  
(a.) Artificial vagina (b.) Cycling female (c.) male animal (d.) a & c are correct (e.) b & c are correct
75. A lounging movement by the male signals ejaculation has taken place less than ..... seconds in ram and bull  
(a.) 40 (b.) 35 (c.) 55 (d.) 30 (e.) 25
76. The boar semen is released in distinct fractions sequentially as  
(a.) Peri-sperm, rich sperm, sperm-post fractions  
(b.) Pre-sperm, sperm-poor, sperm-rich fractions  
(c.) Preputial, sperm-rich and poor-sperm fractions  
(d.) Pre-sperm, sperm-rich and post-sperm fractions  
(e.) Sperm-clear, sperm-white and sperm-cream fractions
77. Ejaculation in the boar lasts from ..... to ..... minutes  
(a.) 20-30 (b.) 10-15 (c.) 10-20 (d.) 15-30 (e.) 10-30
78. Age, species and ..... are factors determining output during semen collection  
(a.) Breed (b.) Frequency of collection (c.) Method of collection (d.) Individual differences and degree of sexual preparation (e.) All of the above
79. Semen evaluation parameters are  
(a.) Colour and pH (b.) Volume and concentration (c.) Motility and live-dead ratio  
(d.) Morphology and (a-c) (e.) only a & b
80. Egg yolk citrate extender includes the following except:  
(a.) Citric acid (b.) Tri-sodium citrate (c.) Egg yolk (d.) Distilled water (e.) Sodium penicillin G
81. The properties of a good semen extender include the following except:  
(a.) Osmotic pressure over 330 mOsm (b.) pH of 7.0 or slightly higher (c.) Buffering ability  
(d.) Contains an energy source (e.) Free of detrimental substances
82. The major factors affecting spermatozoa survival during storage include the following except:  
(a.) Initial semen quality (b.) diluent composition (c.) length of storage (d.) Processing and storage method (e.) none of the above
83. Which of the following is not a maturation change of epididymal sperm? (a) Elongation of spermatid (b) Acquisition of motility (c) Stabilization of nuclear chromatin (d) Increase in fertilizing capacity (e) Movement of cytoplasmic droplet to distal end of sperm
84. Ovulation is  
(a.) Oestrus (b.) Oestrous cycle (c.) release of the egg cell from the ovary (d.) all of the above  
(e.) none of the above
85. The following is a sequential arrangement of ovarian follicles: 1. Primary 2. Secondary 3. Primordial 4. Tertiary follicle  
(a.) 1,2,3,4 (b.) 4,3,2,1 (c.) 3,1,2,4 (d.) 1,3,4,2 (e.) 2,1,4,3
86. Which of the following follicles is gonadotrophin independent  
(a.) Primordial (b.) Primary (c.) Secondary (d.) Tertiary (e.) a and b
87. Which of the following statements is correct? (a) Ovulation comes before oestrus (b) The follicular phase in cattle is longer than the luteal phase (c) Sexual stimulation in the ewe increases variability in ovulation time (d) Dioestrus is the period of sexual rest (e) Oestrus cannot occur without ovulation

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88. Follicles can be classified based on oocyte size, stage of growth and  
(a.) Number of animals (b.) Number of cells (c.) Number of follicles (d.) a & c (e.) None of the above
89. Spermatozoa are formed within the  
(a.) Epididymis (b.) Semen (c.) Seminiferous tubules (d.) Oviduct (e.) Tunica albuginea
90. The ejaculate volume of the bull is about 5-8 ml, ram is 0.8-1.2, cock is 0.2-0.5 ml while that of pig is  
(a.) 60-100 ml (b.) 40-55 ml (c.) 100-150 ml (d.) 700 ml (e.) 150-200 ml
91. Semen is ..... (a.) spermatozoa and seminal plasma (b.) ejaculate (c.) spermatozoa and ovarian secretion (d.) testicular extracts (e.) all of the above
92. Aberrations of genetic sex may arise from any of the following except (a) Fertilization (b) Mutation (c) Non-disjunction (d) Deletion (e) Translocation
93. The primary sex ratio is the proportion of males in a population at (a) Birth (b) Puberty (c) Fertilization (d) Sexual maturity (e) None of the above
94. Which of the following has nothing to do with thermoregulation of the testis? (a) Testicular descent (b) Pampiniform plexus (c) Cremaster muscle (d) Tunica dartos (e) None of the above
95. Which of the following is false about the mammalian ovary?  
(a) Its shape varies with species (b) It has exocrine and endocrine functions (c) It consists of cortex, medulla and germinal epithelium (d) It remains within the abdominal cavity (e) None of the above
96. The glandular portion of the uterus is the (a) Endometrium (b) Myometrium (c) Stratum vasculare (d) Serosa (e) Vesicular gland
97. Which of the following is not true? In old male mammals, reproductive efficiency declines, due to:  
(a) Decline in testosterone secretion (b) Decline in spermatogenic efficiency  
(c) Total loss of libido (d) Increasing fibrosis of the testis (e) Normal loss of body vigour due to aging
98. Mixed sex rearing of farm animals results in: (a) Early puberty (b) Late puberty (c) No effect on puberty (d) Delayed sexual maturity (e) Precocious puberty
99. Which of the following is not a male accessory sex organ?  
(a) Prostate (b) Vestibular glands (c) Ampulla (d) Cowper's gland (e) Epididymis
100. The uterine end of the oviduct is called the (a) Uterine horn (b) Isthmus (c) Infundibulum (d) Cervix (e) Myometrium