Physiology of Human Development (MCB 135E)

Midterm 2
November 7, 1997

Your Name: _____

I. (20 points) The physiological status of the newborn is measured according to several physiologic/pathologic endpoints. One of the most common measure is the APGAR Score. Fill in the blanks.

APGAR Scoring System

Parameters measured	Score		
	0	1	3

Maximum score is _____.

Minimum score compatible with survival is _____.

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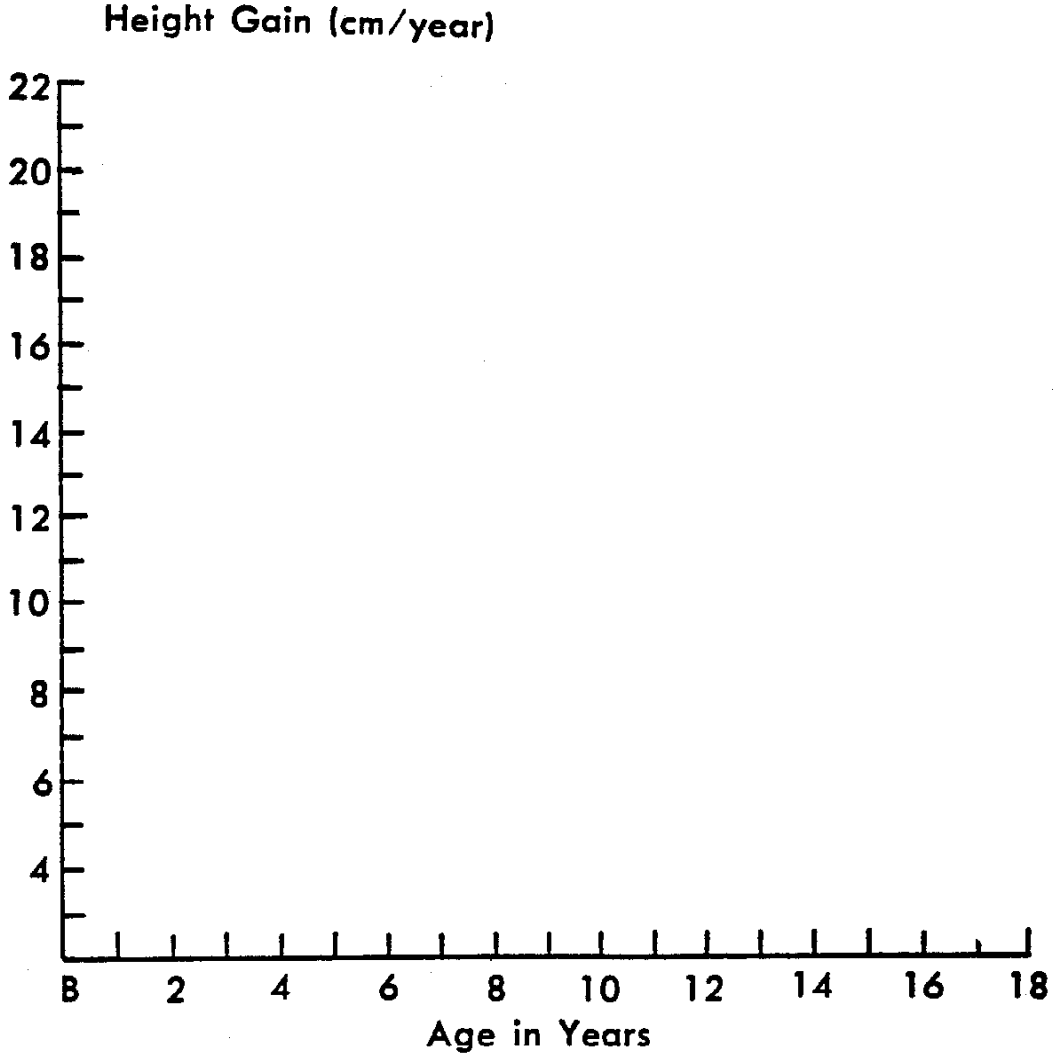
II (20) Draw a curve of human height gain from birth to 18 years of age Indicate and explain the periods of accelerated (with peak), moderate and decelerated growth.



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III. (2 points each) Multiple choice questions, the answer to be written on Scantron forms. Only one answer is correct:

1. Of the hormones of parturition, which one is not a steroid?
   a. progesterone
   b. estrogen
   c. relaxin
   d. pregnenolone
   e. cortisol

2. Uterine contractions at parturition depend on the presence of:
   a. oxytocin
   b. prostaglandins
   c. estrogen
   d. all of the above
   e. none of the above

3. Circle the correct sequence of events at parturition :
   a. increased uterine contractions, cervical dilation, descent of fetus in birth canal, expulsion of fetus, expulsion of placenta
   b. increased uterine contractions, descent of fetus in birth canal, cervical dilation, expulsion of fetus, expulsion of placenta
   c. cervical dilation, increased uterine contractions, descent of fetus in birth canal, expulsion of fetus, expulsion of placenta
   d. cervical dilation, increased uterine contractions, descent of fetus in birth canal, expulsion of placenta, expulsion of fetus
   e. descent of fetus in birth canal, cervical dilation, increased uterine contractions, expulsion of fetus, expulsion of placenta

4. The least developed of the organ systems at birth is :
   a. reproduction
   b. digestion
   c. circulation
   d. respiration
   e. nervous

5. Which of the following causes of congenital malformations is due to genetic factors:
   a. rubella
   b. folic acid deficiency
   c. mongolism or trisomy 21
   d. methotrexate
   e. none of the above

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6. Problems of prematurity include:
   a. stroke
   b. retinopathy,
   c. lack of surfactant
   d. apnea
   e. all of the above

7. Major cause of thermoregulatory difficulty in infants is:
   a. excess body fat
   b. increased shivering before 3 months of age
   c. increased heat loss
   d. increased insulation thickness
   e. abnormal heat gradient

8. Full-term newborns can not maintain body temperature if the environmental temperature is less than (in Celsius centigrades):
   a. 5
   b. 10
   c. 23
   d. 33
   e. 40

9. In a cold environment, an infant produces more heat/kilogram body weight and thereby compensate for the excess heat loss because of :
   a. presence of brown adipose tissue
   b. increased metabolic rate by increased levels of T3
   c. decreased muscle activity
   d. a, b and c
   e. a and b

10. In the newborn, with the first breath, all of these events occur except:
   a. fluid in alveoli is reabsorbed
   b. alveoli fill up with atmospheric air
   c. with the expansion of the alveoli, pulmonary capillaries unravel and fill up with blood
   d. pressure in right side of the heart increases
   e. pressure in left side of the heart increases

11. At birth and in the following days, respiratory rhythmicity must be established for an optimal respiratory function. This establishment is facilitated by lowering the threshold of the medullary respiratory center by:
   a. brain excitatory action of higher T3 levels
   b. sensory stimulation of the newborn by environmental light and sound
   c. sensory stimulation by touch and manual manipulations of the baby
   d. stimulation by colder (than in utero) environmental temperature
   e. all of the above

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12. The major functions of the liver are adequate for the infant well-being, normal growth and survival except:
a. storage and metabolism of carbohydrates
b. storage and metabolism of lipids
c. detoxification
d. storage and metabolism of proteins
e. bile formation

13. The kidney to reach its final structure passes through several preliminary stages, the last one already resembling the adult kidney. This last stage is:
a. holonephros
b. mesonephros
c. pronephros
d. metanephros
e. none of the above

14. Following administration of water by stomach, a newborn/infant rat:
a. will take longer than an adult animal to excrete excess water in urine.
b. will take less time than an adult animal to excrete excess water in urine.
c. will take the same time as an adult animal to excrete excess water in urine.
d. all of the above.
e. none of the above.

15. Major causes why urine concentrating ability is less efficient in newborn/infant/child are:
a. shorter length of loop of Henle.
b. decrease in medullary urea due to reduced production of urea in liver.
c. Increased glomerular filtration rate.
d. shorter proximal convoluted tubule.
e. a and b.

16. From the first postnatal year to puberty, the major hormone regulating growth is:
a. growth hormone
b. thyroid hormones
c. insulin
d. androgens
e. estrogens

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17. In Pygmies, the cause of short stature has been found to be due to:
    a. low GH levels
    b. high androgen levels
    c. high T3 levels
    d. low IGF1 levels
    e. all of the above

18. Growth hormone acts by :
    a. stimulating growth of cartilage cells
    b. stimulating the hepatic production of IGF1
    c. its effects on bone are potentiated by T3
    d. its release from the anterior pituitary is stimulated by the hypothalamic growth hormone releasing hormone (GHRH)
    e. all of the above

19. In this country, the most frequent cause of dwarfism is:
    a. hormonal deficiency
    b. malnutrition
    c. genetic
    d. psychological
    e. none of the above

20. Growth charts are useful to:
    a. determine the position of a child growth (i.e. in which percentile he/she fits) among a group of children of the same age
    b. predict what will be - approximately- his/her adult height
    c. identify causes of abnormal growth
    d. implement treatment procedures to correct any alteration in growth pattern
    e. all of the above

21. The following organs/tissues have a growth curve paralleling that of whole-body growth:
    a. nervous
    b. reproductive
    c. muscle, viscera
    d. gonad
    e. thymus

22. Catch-up growth:
    a. represents an acceleration of growth after an illness
    b. occurs after transitory loss or slowing down of growth
    c. means that growth pattern and normalcy in terms of chronological age is restored
    d. involves both height and weight
    e. all of the above

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23. Optimal action of growth hormone in the long bones:
    a. stimulates growth of the epiphyses.
    b. stimulates proliferation of cartilage cells.
    c. with sex hormones, stimulates closure of epiphyseal growth at puberty
    d. depends on nutritional and general health status of the child.
    e. all of the above.

24. Body proportions change with age. Head length is:
    a. 1/4 of total body lenght in the newborn
    b. 1/4 of total body lenght in the 2-year old child
    c. 1/6 of total body lenght in the adult
    d. 1/8 of total body lenght in the adult
    e. a and d

25. Each part of a growing organism :
    a. has its own rate of growth
    b. matures at its own rate
    c. follows the allometric principle, i.e. linearly related to the logarithm of whole body size
    d. is responsible for the polymorphism of a population
    e. all of the above

26. Regarding development of the mammary glands, which of the following statements is LEAST accurate?
    a. The mammary glands develop from the mammary ridges in the embryo.
    b. Primitive ducts can be found in the mammary glands of both males and females at birth.
    c. Females develop the capacity to produce milk at puberty, but do not actually secrete it due to low prolactin levels.
    d. Estrogen is responsible for growth and branching of the ducts and deposition of fat and connective tissue in the breasts.

27. Regarding milk production, which of the following statements is LEAST accurate?
    a. Milk production involves secretion of proteins and extrusion of lipid droplets into the lumen of the alveolus.
    b. Fertility in the lactating women is increased by high prolactin levels.
    c. Milk production during pregnancy is suppressed by high estrogen levels, even in the presence of high prolactin levels.
    d. Milk production after birth is sustained by prolactin secretion each time the infant suckles.

28. Regarding milk ejection, which of the following statements is LEAST accurate?
    a. Milk ejection occurs immediately as it is secreted into the ducts.
    b. Milk ejection depends on oxytocin released by the posterior pituitary.
    c. Milk ejection is susceptible to maternal depression and stress.
    d. Milk ejection involves contraction of smooth muscle cells surrounding the ducts.

29. Regarding the nutritional and immunologic advantages of human breast milk, which of the following statements is LEAST accurate?
    a. Breast milk contains secretory IgA antibodies, which help prevent entry of pathogens through the gut of the infant.
    b. Absorption of vitamins and minerals, such as iron, is enhanced by substances in the breast milk.
    c. Breast milk contains primarily glucose, which is easier to absorb than the lactose found in cow's milk.
    d. Breast milk is high in essential fatty acids necessary for optimum development of the brain and retina.

30. Regarding benefits and complications to breast feeding to the infant, which statement is MOST accurate?
    a. Breast feeding is absolutely contraindicated in the presence of any viral infection in the mother.
    b. Breast-fed infants have a lower rate of infection than formula-fed infants.
    c. Studies have failed to demonstrate any benefit of breastfeeding to mental development.
    d. Breast milk without supplementation is adequate for the nutritional needs of both premature and full term infants.