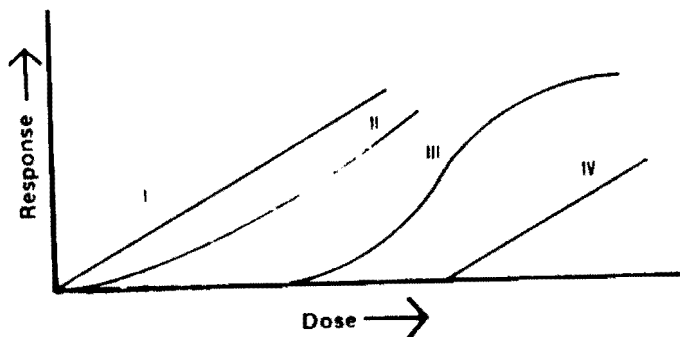


1. The ratio of absorbed doses from different types of ionizing radiation and their ability to produce the same biologic response is called: 21:31
  - A. Air kerma ratio
  - B. Relative biologic effect
  - C. Genetically significant dose
  - D. Linear energy transfer
2. The period of time after an acute exposure to radiation in which the effects of the exposure are seen is called the: 21:26
  - A. Latent period
  - B. Incident period
  - C. Manifest period
  - D. Exposure period
3. Which of the following has the LEAST radiosensitivity? 11:60
  - A. Bone marrow
  - B. Mature cartilage
  - C. Breast epithelium
  - D. Lymphoid tissue
4. The type of leukemia known to be induced in humans following irradiation is: 21:169
  1. Lymphatic
  2. Myeloid
  3. Monocytic
  - A. 1 & 2 only
  - B. 1 & 3 only
  - C. 2 & 3 only
  - D. 1, 2, & 3
5. A radiation-induced mutation that appears in the offspring of the exposed individual is termed a/an: 21:177
  - A. Acute mutation
  - B. Long term mutation
  - C. Genetic mutation
  - D. Somatic mutation
6. The acute radiation syndrome associated with damage to blood and blood-forming organs is called the: 21:142
  - A. Hemopoietic syndrome
  - B. CNS syndrome
  - C. GI syndrome
  - D. Prodromal syndrome
7. The most radiosensitive part of a normal human cell is the: 9:508
  - A. Cell membrane
  - B. Centriole
  - C. Golgi Body
  - D. Chromosome
8. A large radiation exposure to the lens of the eye will most likely result in the formation of: 17:58
  - A. Glaucoma
  - B. Scleroma
  - C. Retinitis
  - D. Cataracts
9. Death that follows an acute exposure to radiation of about 500 rems will generally occur in about: 4:496
  - A. 3 - 5 hours
  - B. 3 - 5 days
  - C. 3 - 5 weeks
  - D. None of the above
10. The majority of damage to the body from exposure to x rays or gamma rays results from the: 4:482
  - A. Direct effect
  - B. Indirect effect
  - C. Target effect
  - D. Threshold effect

11. The dose of radiation that allows the survival of 37% of a cell population is termed by: 4:487  
 A. LD<sub>37</sub> C. D<sub>37</sub>  
 B. TT<sub>37</sub> D. TT<sub>5/37</sub>
12. Which of the following conditions can be classified as a somatic effect of radiation exposure? 4:497  
 1. Nausea 2. Leukopenia 3. Low sperm count  
 A. 1 & 2 only C. 2 & 3 only  
 B. 1 & 3 only D. 1, 2, & 3
13. The dose of radiation at which a biological response can be noted is termed the: 4:490  
 A. Tolerance dose C. Congenital dose  
 B. Ambient dose D. Threshold dose
14. The loss of hair after exposure to large amounts of radiation is termed: 4:502  
 A. Epistaxis C. Bromidrosis  
 B. Epilation D. Erythema
15. The most radiosensitive tissue group listed below is the: 4:496  
 A. Central nervous tissue C. Muscular tissue  
 B. Alimentary tract tissue D. Cardiovascular tissue
16. The immediate symptoms that appear after an acute radiation exposure are termed the: 4:495  
 A. Latent syndrome C. Chronic syndrome  
 B. Proportional syndrome D. Prodromal syndrome

Using the following diagram, answer question 17 and 18.



17. In the diagram, the linear non-threshold dose-response curve is represented by Roman numeral: 4:473  
 A. I C. III  
 B. II D. IV
18. The curve represented by Roman numeral III is a: 4:473  
 A. Linear threshold curve C. Linear non-threshold curve  
 B. Non-linear threshold curve D. Non-linear non-threshold curve
19. A common form of cancer that appears to follow a threshold dose relationship is: 4:525  
 A. Lung cancer C. Leukemia  
 B. Skin cancer D. Hodgkin disease
20. The first biological effects of radiation in man to doses of approximately 25 cGy are changes seen in the: 21:115  
 A. Blood count C. Sperm count  
 B. Skin D. Eyes

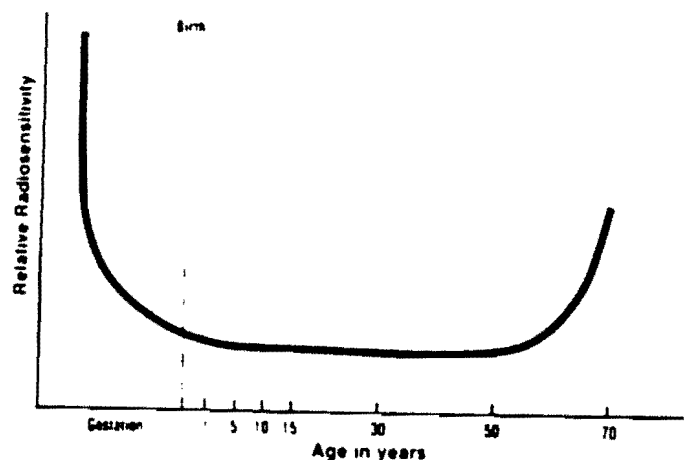
21. A noticeable skin reaction due to radiation exposures of above 6 Gy is called: 4:502  
 A. Hemodema C. Erythema  
 B. Leukogenesis D. Sponditis
22. In general, radiation damage increases with increases in the: 4:471  
 1. Oxygen enhancement ratio 2. Quality factor of the radiation 3. Linear energy transfer  
 A. 1 only C. 3 only  
 B. 2 only D. 1, 2, & 3
23. The laws of Bergonie and Tribondeau state that the radiation sensitivity of a cell is related to: 21:269  
 1. Differentiation 2. Mitotic activity 3. Size and weight  
 A. 1 & 2 only C. 2 & 3 only  
 B. 1 & 3 only D. 1, 2, & 3
24. The human fetus is most sensitive to radiation in the: 4:528  
 A. First trimester C. Third trimester  
 B. Second trimester D. Equally in all trimesters
25. The radiation syndrome of the central nervous system is associated with: 4:499  
 1. Death within 72 hours 2. Spinal cord compression 3. Intercranial pressure  
 A. 1 only C. 3 only  
 B. 2 only D. 1, 2, & 3
26. The first sign of the acute radiation syndrome following a large exposure of radiation is usually: 21:140  
 A. Diarrhea C. Nausea  
 B. Incontinence D. Excessive bleeding
27. The most radiosensitive cell of the body listed below is the: 4:505  
 A. Neuron C. Lymphocyte  
 B. Chondrocyte D. Osteocyte
28. Which of the following effects may be observed in the fetus of a pregnant woman exposed to radiation? 4:528  
 1. Mental retardation 2. Stunted growth 3. Cancer  
 A. 1 & 2 only C. 2 & 3 only  
 B. 1 & 3 only D. 1, 2, & 3
29. The property of x-rays that accounts for their effect on biological systems is that they: 4:455  
 A. Have different energies C. Cause ionization in matter  
 B. Have no electric charge D. Travel at the speed of light
30. The production of free radicals in a living tissue most often occurs from the irradiation of: 4:483  
 A. Water C. Proteins  
 B. RNA D. Salt
31. An x-ray photon passes into a cell and strikes a chromosome, causing a point mutation in a DNA molecule. This is classified as a/an: 21:26  
 A. Direct effect C. Pinhole effect  
 B. Indirect effect D. Threshold effect

32. The LD<sub>50</sub> for embryonic death following a radiation exposure is seen at a dose equivalent of approximately: 21:159
- A. 1 cGy (1 rem) C. 12 cGy (12 rem)
- B. 5 cGy (5 rem) D. 60 cGy (60 rem)
33. The latent period for most types of radiation induced leukemias is approximately: 4:522
- A. 6-12 months C. 4-7 years
- B. 1-2 years D. 20-22 years
34. An adverse effect on the production of white blood cells is most likely after radiation exposure to the: 21:117
- A. Central nervous system C. Biliary system
- B. Urinary system D. Skeletal system
35. The linear (non-threshold) curve of radiation dose-response relationships states that radiation damage is directly proportional to radiation dose, and that: 4:473
- A. Only high doses cause damage C. Damage occurs only after minimum dose
- B. Any dose may cause damage D. None of the above
36. The dehydration that accompanies the gastrointestinal syndrome is the direct result of radiation damage to the: 4:506
- A. Blood cells C. Nerve cells
- B. Stem cells D. Muscle cells
37. Which type of human blood cells has the lowest radiosensitivity? 4:505
- A. Mature erythrocyte C. Immature leukocyte
- B. Mature leukocyte D. Immature thrombocyte
38. The R's of radiobiology include which of the following? 21:240
1. *Redistribution* 2. *Repopulation* 3. *Repair*
- A. 1 & 2 only C. 2 & 3 only
- B. 1 & 3 only D. 1, 2, & 3
39. Which of the following macro-molecules has the greatest sensitivity to radiation? 4:480
- A. Proteins C. Deoxyribonucleic Acid
- B. Mitochondria D. Adenosinetriphosphate
40. Radiation-induced malformations of the CNS are most common following radiation exposures during: 21:161
- A. Pre-implantation C. Fetal stage
- B. Organogenesis D. Post-natal stage
41. In the expression "LD 50/30", the fifty represents the: 21:18
- A. Number of days of the exposure C. Amount of exposure in roentgens
- B. Percentage of population that will die D. Number of days following the exposure
42. The process by which energy from ionizing radiation is transferred from a directly ionized molecule to another molecule that is not directly ionized is called the: 4:482
- A. Direct hit theory C. Potential free radical theory
- B. Random interaction theory D. Indirect hit theory
43. The most radiosensitive structure of the eye is the: 1:95
- A. Cornea C. Iris
- B. Lens D. Conjunctiva

44. The central nervous system syndrome that causes death in a matter of hours is only apparent at doses of radiation of approximately: 21:148  
 A. 300 rad (300 cGy) C. 1000 rad (1000 cGy)  
 B. 500 rad (500 cGy) D. 5000 rad (5000 cGy)
45. The study of a response to radiation or other stimulus occurring to tissues outside of the body; eg., test tube, is termed an \_\_\_\_\_ response. 4:477  
 A. In vino C. In vitro  
 B. In vento D. In vivo
46. Experimental finding indicates that cells are most radiosensitive when irradiated in the: 21:103  
 A. G<sub>1</sub> and S periods C. E<sub>5</sub>-LS periods  
 B. G<sub>2</sub> and M periods D. All of the above equally
47. With large radiation exposures to the hemopoietic system, the following symptom is likely to occur:  
 1. Lowered blood count 2. Increased susceptibility to infection 3. Longer coagulation time  
 A. 1 only C. 3 only 4:505  
 B. 2 only D. 1, 2, & 3
48. A highly reactive atom that is characterized by unpaired orbital electron is termed a: 21:265  
 A. Free radical C. Bound radical  
 B. Spin radical D. None of the above
49. The average time between a lethal radiation exposure and death is termed: 4:508  
 A. Mean survival time C. Mean recovery ratio  
 B. Mean threshold time D. Latent-manifest ratio
50. Which of the following is the most sensitive cell of the body to radiation exposure? 4:468  
 A. Chondrocytes C. Spermatogonia  
 B. Mature red blood cells D. Nerve cells

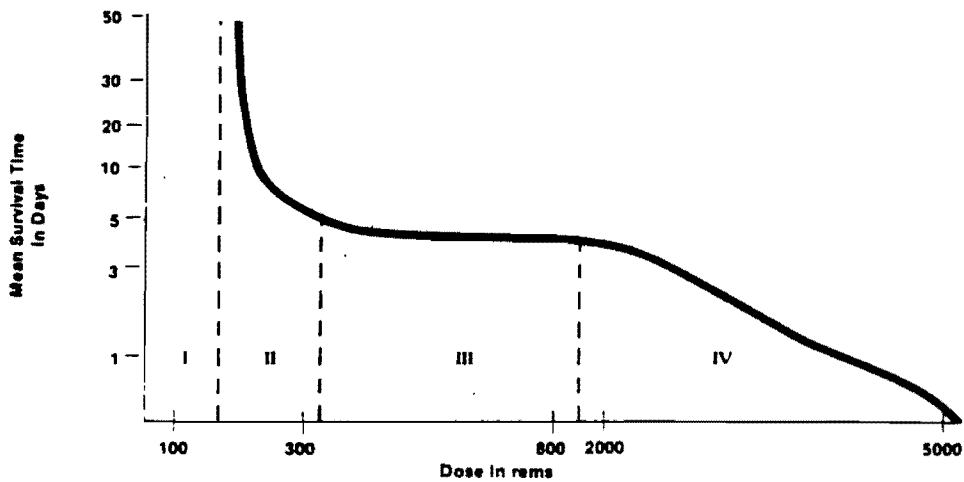
Pertaining to the following diagram, answer questions 51 and 52.

51. According to the diagram, the greatest sensitivity to radiation after a person is born is at the approximate age of: 4:472  
 A. 1 year C. 30 years  
 B. 10 years D. 70 years
52. In general, from ages 5-50 it can be said that radiosensitivity: 4:472  
 A. Increases with age  
 B. Decreases with age  
 C. Remains relatively constant with age  
 D. Varies greatly with age



53. Death resulting from an acute radiation exposure to the gastrointestinal tract will generally occur in about: 21:145
- A. 5 hours C. 5 weeks  
 B. 1 week D. 5 months
54. During the embryonic stage of development, much of the tissue differentiation takes place during the process called: 21:152
- A. Organogenesis C. Hemostasis  
 B. Osmosis D. Oogenesis
55. A large (5 gray) exposure to the hematologic system will result in the reduction of \_\_\_\_\_ in the circulating blood. 4:506
1. Leukocytes 2. Platelets 3. Erythrocytes
- A. 1 & 2 only C. 2 & 3 only  
 B. 1 & 3 only D. 1, 2, & 3
56. The biologic response to radiation can be reduced by the use of: 21:101
- A. Oxygen C. Nitrofurans  
 B. Sulfhydryls D. All of the above
57. The natural rate of childhood malignancies will be expected to double with an absorbed dose of approximately \_\_\_\_\_ to the fetus. 4:531
- A. .1 cGy C. .6 cGy  
 B. .4 cGy D. 2 cGy
58. Which of the following stages of the cell cycle is most related to DNA synthesis? 22:103
- A. S C. Q  
 B. M D. N
59. The manifestations of radiation exposure to the DNA molecule may be: 21:34
1. Nitrogenous base damage 2. Cross linkage of DNA strands 3. Cleavage of the DNA chains
- A. 1 only C. 3 only  
 B. 2 only D. 1, 2, & 3
60. The frequency of radiation-induced genetic mutations is highly dependent upon the \_\_\_\_\_. 21:88
1. Dose rate 2. Cell's oxygen level 3. Cell cycle
- A. 1 & 2 only C. 2 & 3 only  
 B. 1 & 3 only D. 1, 2, & 3
61. A person that has received an acute radiation exposure and survives the initial few weeks may die as a result of: 4:497
1. Secondary infections 2. Dehydration 3. Hemorrhage
- A. 1 only C. 3 only  
 B. 2 only D. 1, 2, & 3
62. The irradiation of water often results in the development of a poison termed: 2:483
1. Heavy water 2. Hydrogen peroxide 3. Ozone
- A. 1 only C. 3 only  
 B. 2 only D. 1, 2, & 3

Pertaining to the following diagram, answer questions 63 and 64.



63. In the dose survival curve, the Roman numeral which corresponds to death from the hemopoietic system is:
- A. I  
B. II  
C. III  
D. IV
- 2:500
64. According to the diagram, at dose levels above 200 rem, death is most likely to occur in about: 2:500
- A. 20-50 days  
B. 10-20 days  
C. 5-10 days  
D. None of the above
65. The amount of radiation exposure that causes twice the normal incidence of a particular response is termed:
- A. Doubling dose  
B. Threshold dose  
C. D 1/2  
D. LD2
- 21:178
66. A decrease in lymphocyte count may be seen after exposure radiations at levels as low as: 21:115
- A. 10 cGy  
B. 50 cGy  
C. 100 cGy  
D. 1000 cGy
67. Which of the following may occur after cellular irradiation: 21:48
1. Cell division delays      2. Interphase death      3. Reproductive failure
- A. 1 only  
B. 2 only  
C. 3 only  
D. 1, 2, & 3
68. Which area of gastrointestinal mucosa poses the greatest radiosensitivity: 1:85
- A. Esophagus  
B. Rectum  
C. Stomach  
D. Colon
69. Radiation damage in radioresistant organs is usually caused by: 7:59
- A. Vasculature damage (indirectly)  
B. Loss of cells from circulating blood  
C. Destroyed parenchymal cells  
D. Lysosome invasion
70. The most radiosensitive of the major components of bone are the: 1:92
- A. Osteoclasts  
B. Megakaryocytes  
C. Osteoblasts  
D. Chondrocytes