2016 RT

Q1. The percent depth dose at 5cm for 6MeV electron beam is approximately：

A)   100%

B)   80%t

C)   50%

D)   less than 5%

Q2. The position if the secondary collimators on a linac is importamt when treating with an electron a pplicator because it can affect：

A) output and flatness

B) output only

C) ability to attach the applicator

D) selection of the correct scattering foil

Q3. Choose the answer that does NOT considering the factor in IMRT Inverse planning

A) Dose Weight

B) Beam arrangements

C) Segments or Control points

D) Upper and Lower constraints

Q4. Output for electron cones depends on：

A) size of cut-out

B) size of cone

C) distance from the source

D) all of the above

Q5. Choose the correct answer that describe the FFF technique.

A) Outcome higher electron beam

B) Hard to describe dose distribution

C) Non flattering dose distribution

D) Takes longer time than general RT

Q6. Choose the answer that needs cooling devices in linear accelerator.

      1)   Klystron 2) Target 3) Waveguide 4) Focusing coil

  A) 1, 2

  B) 2, 3

  C) 3, 4

  D) 1, 3, 4

Q7. What us the approximate range of a 6MeV electron beam passing through 1cm tissue overlying the lung(density 0.25 g/cm^3)?

A) 1 cm

B) 2 cm

C) 9 cm

D) 12 cm

Q8. A radioactive sample is counted for a ten minute interval many times, yielding a mean count rate of 1000 cpm. The most probable distribution is ː

A) 68% of the measurements fall between 990 and 1010 cpm

B) 68% of the measurements fall between 936 and 1064 cpm

C) 95% of the measurements fall between 990 and 1010 cpm

D) 95% of the measurements fall between 936 and 1064 cpm

Q9. Choose the answer that does NOT correctly describes the dosimeter.

A) MOSFET is good for measuring absolute dose

B) TLD is an independent dosimeter from Energy

C) Film is moderated for relative dose measurement in electron beam.

D) Diode is an affective dosimeter to monitoring patient dose in real time

Q10. The exposure rate constant of a radionuclide is 12.9 $R\text{-}cm^2/mCi\text{-}hr$. How many HVLs are requied to reduce the exposure rate at 1 meter from a 10 mCi source to 2 mR/hr?

A) 1

B) 2

C) 3

D) 6

Q11. Ion-recombination can be a problem when using a ：

A) calorimeter

B) Geiger counter

C) ionization chamber

D) TLD

Q12. Choose the answer that correct electron field size for treatment 5cm width in reference depth.

A) 5cm

B) Less than 5cm

C) More than 5cm

D) All of the above

Q13. The dose rate for a 10x10 cm cobalt-60 field is 100 cGy/min in air, at 80 SAD. The dose rate(cGy/min) in air for a 30x30 cm field is about：

A) 90

B) 100

C) 107

D) 120

Q14. What is the most effective factor for radiation exposure in IMRT

A) Dose rate

B) Head Scatter

C) Leaf transmission

D) Leaf round edge transmission

Q15. Choose the correct answer that is a radiation detector for SRS.

A) No limitation of size

B) Spacial resolution

C) Small diode size and depend on Energy, direction

D) Chip type small size TLD, it depends on energy

Q16. An effective wedge angle of 15° could not be achived by ：

A) use of a 30° wedge and an open beam for equal numbers of monitor units

B) a universal wedge of 60°, combined with an open field by appropriate weighting on the treatment plan

C) a combination of 30° wedge and an open beam to deliver equal does on the axis

D) B and C only

Q17. Choose correct statement for correlation among OER, LET and RBE.

A) OER and LET is proportional

B) RBE goes up when high LET radiation is exposed

C) Huge hazard effect is expected with small amount dose if RBE is low

D) Low LTE radiation could destroy as much tumor cell with minimum dose

Q18. For a pair of adjacent fields (e.g., spinal fields) all of the following will help to impove dose un iformity in the field junction region except ：

A) calculating a gap between the fields

B) using a collimator angle for both beams

C) using a half-beam bloke on both fields

D) angling the gantry for both beams

Q19. Choose the answer that is directly connected with CT number

A) Density

B) Electron density

C) Linear attenuation coefficient

D) Effective atomic number

Q20. The depth of d_{max} is：

A) dependent on photon energy

B) dependent on field size

C) independent of SSD for the same field size

D) all of the above

Q21. . Choose the device for Calibration of linear accelerator.

   1) Ion-chamber 2) TLD 3) Diode 4) Film

A) 1

B) 1, 2

C) 1, 2, 3

D) 1, 2, 3, 4

Q22. What SOBP (spread out bragg peak) is made of in proton therapy?

A) Pb

B) PMMA

C) Cerrobend

D) Sweeping magnet

Q23. The "horns" of an x-ray beam refer to the cross beam profile：

A) before the beam is flattened

B) for a large field at d_{max}

C) when the beam is asymmetric

D) at 10 cm depth in water

Q24. The "horns" of an x-ray beam refer to the cross beam profile：

A) before the beam is flattened

B) for a large field at d_{max}

C) when the beam is asymmetric

D) at 10 cm depth in water

Q25. Choose the answer that TMR excepted SMR with 10*10 field size

A) Scatter dose

B) TAR

C) TPR

D) Primary dose

Q26. Choose the correctly process (Increase volume) in ICRU

A) GTV - CTV - PTV - ITV - TV - IV

B) GTV - CTV - TV - PTV - ITV - IV

C) CTV - PTV - GTV - ITV - IV - TV

D) GTV - CTV - ITV - PTV - TV - IV

Q27. A permanent implant is performed with iodine-125 seeds, with a half-life of 60 days. The total dose at a point is 18,000cGy. The initial dose rate is _____ cGy/hr.

A) 8.7

B) 12.4

C) 18.0

D) 208.8

Q28. Which of the following is not true for CT images of the torso used directly for

computerized treatment planning?

A) the patient must be scanned in the treatment position

B) the CT image is a gray scale representation of the linear attenuation coefficient of each pixel

C) CT number must be converted into electron densities before pixel by pixel

D) triangulation points or surface markers are unnecessary since the isocenter can be related to internal organs.

Q.29 Linear attenuation coefficient by photoelectronic effect (a), Photo energy ↕ (b) ↕ Atomic number ↑
A) a - ↑b - -1/E^3

B) a - ↓b - -1/E^3

C) a - ↑b- E^3

D) a - ↓b - E^3

Q30. Choose the answer that is directly connected with CT number

A) Density

B) Electron density

C) Linear attenuation coefficient

D) Effective atomic number

Q31. Which of the following is not true regarding the gafchromic film used for dosimetry?

A) a disadvantage is low spatial resolution

B) a disadvantage is increase response to low energy scatter

C) some films have an almost linear dose vs. optical density region

D) film is almost tissue equivalent

Q32 The equivalent square of a 9x17 cm field size is：

A) 6.84

B) 10.00

C) 11.76

D) 13.32

Q33. Choose the answer that does NOT correctly describe the digital imaging and communications in medicine radiation therapy (DICOM RT)?

A) RT Plan

B) RT Algorithm

C) RT Structure set

D) RT Treatment Record

Q34. Which of the following srarement is false about TMR?

A) it is equal to TAR/BSF

B) it is approximately related to the percent depth dose by an inverse square factor

C) it is dependent on SSD

D) it is increases with increasing field size

Q35. What is the rate of loss of energy electron beam in the water?

A) O.5 MeV/cm

B) 1.0 Mev/cm

C) 2.0 MeV/cm

D) 3.0 Mev/cm

Q36. Which electron energy can be treated under 4cm on the skin?

A)   6Mev

B)   9Mev

C)   12Mev

D)   20Mev

Q37. Choose the index which is not used for radiation shielding

A)   Use factor

B)   Beam energy

C)   Occupancy factor

D)   Scatter-air ratio

Q38. Choose the reason why eyeball shielding device with wax coated is used?

A)   To clean

B)   To comfortatle

C)   To decrease scattered electron beam

D)   To decrease secondary scatter ray produced by Pb materials.

Q39. Choose all the physical properties in case of choose the source of ICR.

A. Specific Activity B. Half life C. Energy D. Atomic number

A) A, B

B) A, C

C) A, B, C

D) A, B, C, D

Q40. "Split field" tests performed to check the one of following QA items.

A) Laser lights

B) Spirit levels

C) Back pointers

D) Opposed fields

Q41. Choose the factor which is not influence on biological effect.

A) QF(quality factor)

B) RBE

C) LET

D) KERMA

Q42. Choose the merit of MV CBCT compared to KV CBCT.

A) Not depends on Z (Atomic number)

B) High image quality

C) Imaging soft tissue with low dose

D) All of them

Q43. A patient's skin dose is reduced in a megavoltage photon beam by :

A) adding a 1cm Lucite blocking tray

B) reduce beam energy

C) increasing the field size

D) none of the above

Q44. Adjacent pairs of parallel opposed AP/PA fields are to be matched at the patient's

midplane. If the fields are treated isocentrically at 100 cm SAD, the collimator settings are 20 cm and 24 cm respectively, and the patient's AP thickness at the junction is 18 cm,

the gap to be left on the skin is：

A) 1.0 cm

B) 1.98 cm

C) 2.5 cm

D) 4.0 cm

Q45. What is a physical characteristric of dose distribution in a ICR?

A) Absorbed in a body

B) Scattered in a body

C) Inverse squire a low of distance

D) Using a point source or dummy source

Q46. When photon beams are wedged, the 'Wedge angle' is:

A) The angle between the isodose curve at d= 10 cm and the beam axis.

B) The angle of the metal wedge itself.

C) The angle through which the isodose curve at d =10 cm is turned by the wedge

D) Half the hinge angle.

Q47. According to ICRU, HDR brachytherapy delivers the dose at (   ) or more.

A) 2 cGy/min or more

B) 10 cGy/min or more

C) 20 cGy/min or more

D) 40 cGy/min or more

Q48. Choose the answer that does NOT correctly describe the polarity effect.

A) Increased by electron energy

B) It depends on the draft of Ion chamber

C) In case of electron beam, it occurs often more than photon beam.

D) It occurred out of the ion cavity

Q49. Comparing 4 MV and 16 MV photon beams, which of the following is true?

A) the correction in MU due to 10 cm of lung will be less for the 16 MV beam

B) the penumbra will usually be smaller for the 16 MV beam

C) the beam flatness at 10 cm depth will usually be better for 4MV beam

D) all of the above

Q50. What is the deviation within range of the prescribed dose for target in ICRU?

A)   -3% ~ +5%

B)   -5% ~ +7%

C)   -7% ~ +10%

D)   -10% ~ +10%

Q51. Choose the answer that does not need cooling devices in linear accelerator.

A)   Target

B)   Klystron

C)   Electron gun

D)   Bending magnet

Q52. Which system (it has own operating system and setting mode) is operating as file server in network?

A) SAN(Storage Area Network)

B) LTO(Linear Tape-Open)

C) NAS(Network Attached Storage)

D) RAID(Redundant Array of Independent Disks)

Q53. Which one graph is describing corrected the output measurement of Ir-192?

Chamber Reading
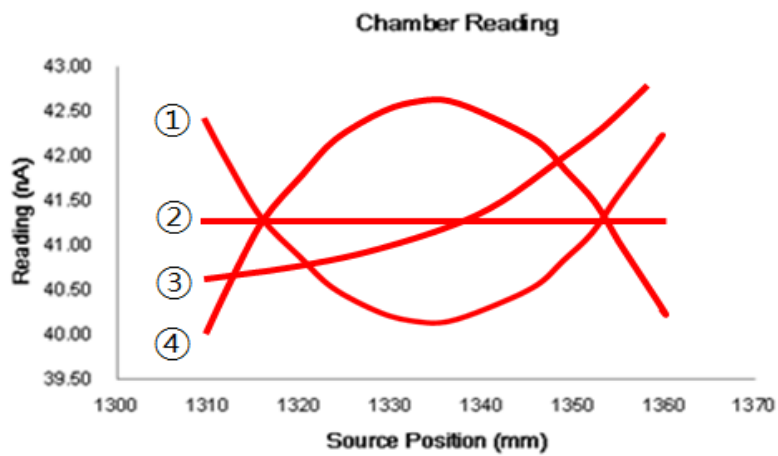
A) ①

B) ②

C) ③

D) ④

Q54. Which of the following statements regarding penumbra is correct?

A) penumbra depends on source or focal size

B) the penumbra decreases as the block-skin distance decrease, all other factors being equal

C) all other things being equal, penumbra increase as the distance from the source increases

D) all of the above

Q55. Choose the answer that does NOT best correctly treatment method for below CTV.
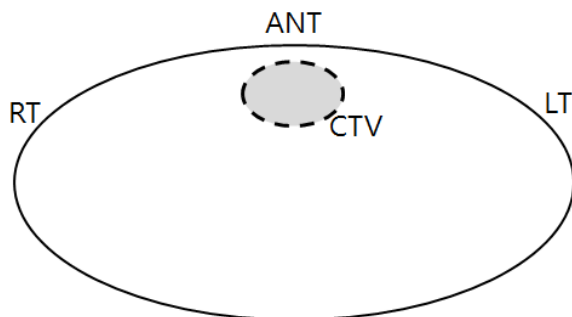
A) anterior 180° arc at the center of the CTV

B) two anterior oblique wedged fields

C) anterior open field and wedged both lateral fields

D) anterior split into two 90° arcs with wedges

Q56. Choose the answer that correctly describes whole body hyperthermia.

A) Effective temperature range is at 43~45 degrees.

B) Easier to get successful effect than local hyperthermia

C) Possible to applied the case of moderate severity in lung and heart

D) Possible to applied the case such as hematogeneous metastasis, lymphnode metastasis, cytotoxic chemotherapy.

Q57. In electron beam treatment, the main factor cause x-ray contamination is:

A) Patient Body

B) Electron Cone

C) Scattering foil

D) Collimator jaw

Q58. Choose the answer that correctly describes radiation treatment.

A)   In case of CCRT, after 1 hour radiation treatment injection 5FU

B)   BID(delay 8 hours), TID(delay 4 hours)

C)   Sensitizer agent is able to influence for treatment period or total dose

D)   OER is no matter with Oxygen pressure.

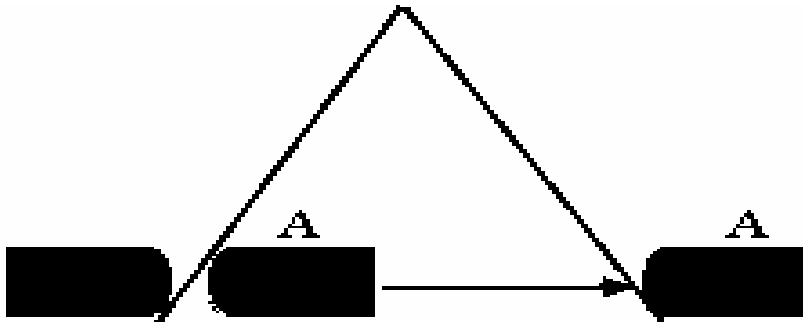Q59. The purpose of a "beam spoler" is to：

A) reduce the energy of a photon beam

B) reduce the depth of penetration of an electron beam

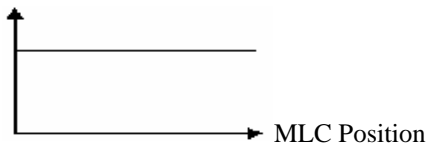C) increase dose in the build-up region of a photon beam

D) filter out scattered electrons from a photon beam, to reduce skin dose

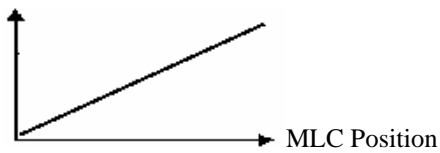Q60. Choose the correct dose distribution graph with sliding window technique in IMRT
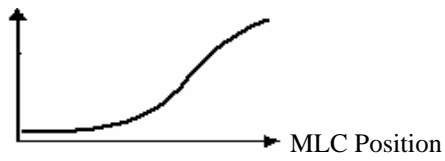
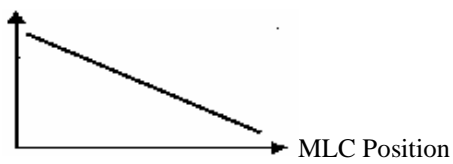(Equal Dose rate and MLC speed)

A)   Intensity

→ MLC Position

B)   Intensity

→ MLC Position

C)   Intensity

→ MLC Position

D)   Intensity

→ MLC Position

Q61. Choose the index which is ineffective for VMAT.

A) Dose rate

B) MLC speed

C) RTP software

D) Couch rotation

Q62. Which imaging modality is the best for explaining soft-tissue in radiation treatment plan?

A) CT

B) MRI

C) SPECT

D) X-rays

Q63. What does "Virtual source" mean in clinical electron beam?

A) Same the photon measurement distance

B) Located in measured distance with examination

C) Depends on the location of Scattering foil

D) Depends on the location of flattering filter

Q64. A 10 x 10 cm field is treated at 80 cm SSD. The field size at a depth of 7 cm is _ cm：

A) 9.2 X 9.2 cm

B) 10.9 X 10.9 cm

C) 11.3 X 11.3 cm

D) 12.1 X 12.1 cm

Q65. Choose the answer that correctly describes the Collimator scatter factor (Sc)?

A) No concern with SSD

B) The value of Sc is decreasing if inserting protective barrier.

C) No concern with field size.

D) Inverse proportion with reference field size

Q66. A build-up cap for an ionization chamber：

A) is used to protect the chamber from mechanical damage

B) should be made of a high-Z material

C) prevents stem leakage

D) must be thick enough to provide, along with the chamber wall, electronic equilibrium

Q67. All of the following are independent of SSD except：

A) PDD

B) TMR

C) TAP

D) BSF

Q68. Choose the answer that dose NOT correctly describe the merits of tomotherapy

A) Improvement of Setup accuracy with Cone-Beam CT

B) Applied to complicated target volume

C) Applied to large target volume

D) Applied to total lymphatic irradiation

Q69. Two x-ray films, each with optical density of 1.5, are placed on top of one another. The fraction of incident light transmitted through the :sandwich" is：

A)   0.03

B)   0.015

C)   0.001

D)   0.0225

Q70. A radioactive sample is counted for a ten minute interval many times, yielding a mean count rate of 1000 cpm. The most probable distribution is：

A) 68% of the measurements fall between 990 and 1010 cpm

B) 68% of the measurements fall between 936 and 1064 cpm

C) 95% of the measurements fall between 990 and 1010 cpm

D) 95% of the measurements fall between 936 and 1064 cpm

Q71. Choose the answer that does correctly target type of high energy linear accelerator.

A) Reflection Type
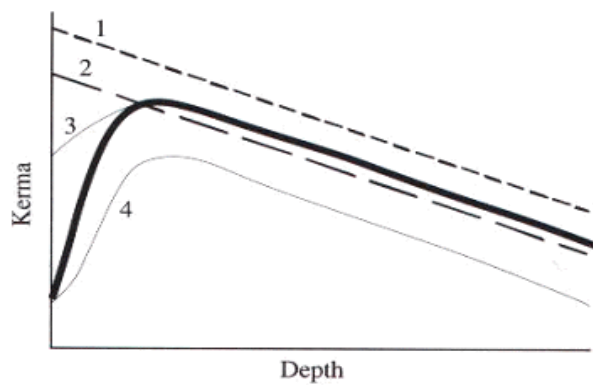
B) Transmission Type

C) Refraction Type

D) Rotation Type

Q72. Choose the answer that does NOT correctly description about Monte Carlo program.

A) Take short time to calculation

B) Advantage between different density tissues

C) Accuracy of dose distribution

D) Accuracy of dose calculation

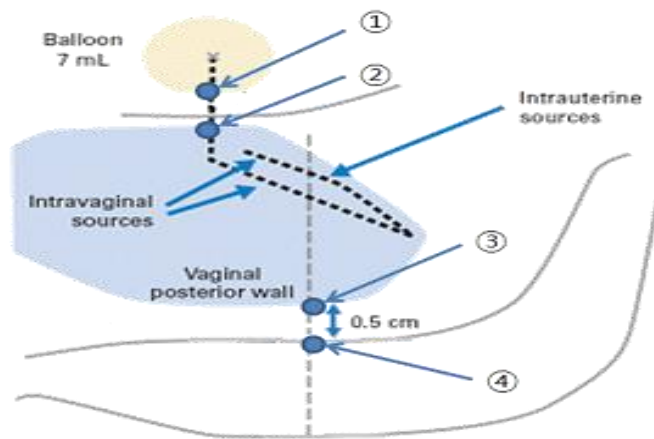Q73. Which frequency of the following operates the linear accelerator?

A) 2856 MHz

B) 3856 MHz

C) 4856 Mhz

D) 5856 MHz

Q74. Choose the KERMA line that coincide dose distribution curve.

A)   1

B)   2

C)   3

D)   4

Q75. Choose the correct bladder point and rectal point in ICRU 38

Balloon 7 mL

Intravaginal sources

Intrauterine sources

Vaginal posterior wall

0.5 cm

A) 1, 3

B) 1, 4

C) 2, 3

D) 2, 4

Q76. In prostate cancer, which the treatment type has the largest irradiation volume?

A) AP & PA

B) 4 oblique technique

C) BOX technique

D) 360 arc rotation

Q77. When treating with high energy electron beams one of the problems in using bolus over part of the field is :

A) induce pair production

B) finfing an appropriate material

C) dose inhomogeneity at the edge of the bolus

D) the production of bremsstrahlung

Q78. . Choose the answer that does NOT correctly describe PDD.

A) Inverse proportion to field size

B) Direct proportion to beam energy

C) Direct proportion to SSD

D) Decreased with increasing depth

Q79. Choose the device for Calibration of linear accelerator.

                1)   Ion-chamber   2) TLD   3) Diode   4) Film

A) 1

B) 1, 2

C) 1, 2, 3

D) 1, 2, 3, 4

Q80. How much dose is delivered at the 90% PDD level from an electron beam in 100 MU?

The output factor is 1.11 cGy/MU ：

A) 111 cGy

B) 90 cGy

C) 110 cGy

D) 100 cGy

Q81. Choose the answer that does NOT correct conception of increasing build-up in photon.

A) It occurred by secondary electron when photon beam collision

B) D-max point is getting deeper with increasing photon energy

C) Electron is occurred by collimation, it makes D-max point is getting depper

D) Appearing of skin sparing effect

Q82. Arrange the component of Gantry head in linear accelerator for Photon Radiation Therapy (Distance from patient).

 1) Primary Collimator 2) Secondary Collimator 3) Flattening Filter

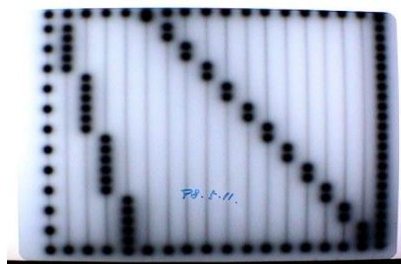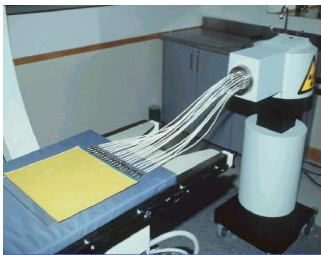 4) Ion chamber 5) X-ray target

A)   5, 3, 1, 4, 2

B)   5, 1, 3, 4, 2

C)   1, 5, 4, 3, 2

D)   1, 5, 3, 4, 2

Q83. Which of following word is meaning 5% major complication within 5 years in Radiation Therapy.

A) TD 50/5

B) TCD_{90}

C) TD 5/5

D) TCD_{95}

Q84. Choose the answer that does NOT associated with below QA & QC figure in ICR.

A) Source Dwell Position Check

B) PDD & TMR

C) Symmetry, Flatness

D) Collimator cross hair line

Q85. The position if the secondary collimators on a linac is importamt when treating with an electron applicator because it can affect：

A) output and flatness

B) output only

C) ability to attach the applicator

D) selection of the correct scattering foil

Q86. Choose the right statement about biological effect of proton.

A)   It is regarless of depth

B) It is less than ^{60}Co gamma-ray

C) It is related to LET

D) It is almost same as clinical energy area of electron

Q87. Choose the majority of Head and neck cancer.

A) Adenocarcinoma

B) Transitional cell carcinoma

C) Squamous cell carcinoma

D) Lymphoma

Q88. Which one is used in high electrical field inside of waveguide of Linac to suppress arcing?

A) Hi-energy power pulses

B) Air

C) SF6

D) Steering coil

Q89. Choose the Biologic index in Plan Evaluation Indices.

A) Effective Volume

B) Equivalent Uniform Dose(EUD)

C) Dose Volume Histograms(DVH)

D) Normal-tissue complication probability(NTCP)

Q90. ODI(Optical distance indicator) of LINAC indicates 100 cm while actually it is 98 cm and the treatment was processed. In this case, what is actual dose?

A)   4% over dose

B)   4% dose in short

C)   2% over dose

D)   2% dose in short