

# ABR

## PART. II (THERAPY)

### DE BRIEF

SEPT. 2002

TAMPA, FL

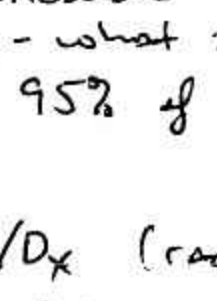
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9/11/02

(1)

- Virtual Source position  $\frac{d(\text{cm})}{r(\text{cm})}$ 

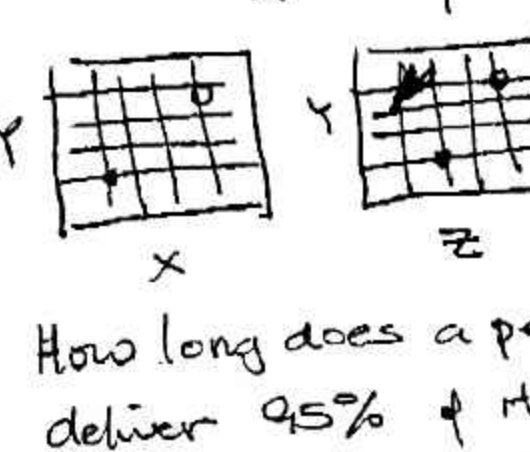
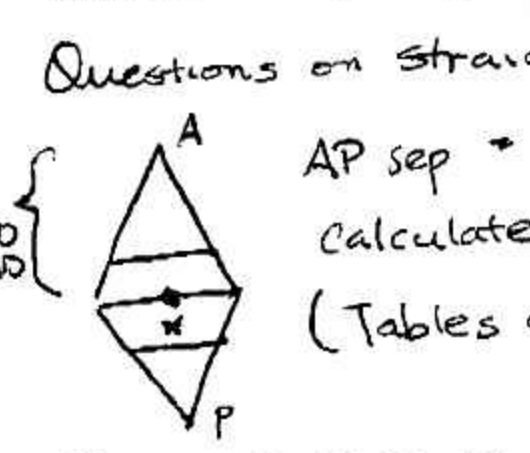
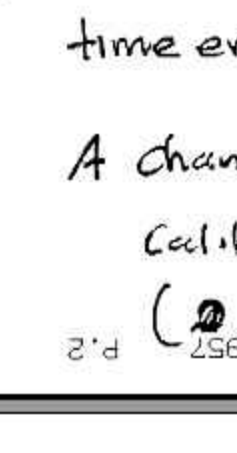
120	100
120	44
140	25

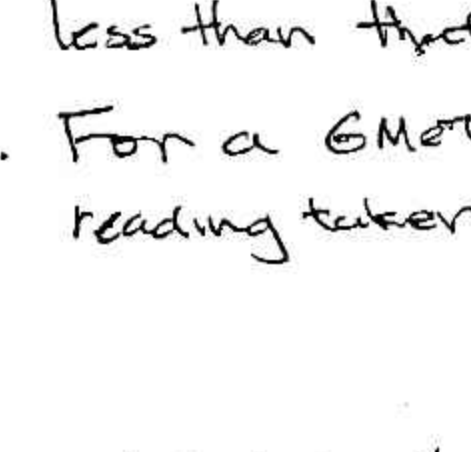
Apparatus and @ 100 cm  
100 cm diameter ref.  
What is virt. source position?
- AAPM report 54 - What is max size of SRS Scanning chamber?
- NCRP 49? What is max exposure for undeveloped film in storage?
- TG-51: Applicable to 3-50 MeV  $e^-$ ?  
(Pichart False statement about TG-51)
- Calculate couch kick given field sizes (H&N)  
to match 
- Calculate transport gantry  $\theta$  for  $1/2$  beam blocked transport
- Numerous calculate TVLs,  $B_{sx}$ ,  $B_{tx}$  shielding needed  
Scatter shielding - what if  $20 \text{ cm}^2$  scatter via beam?
- I-125 gives 95% of its dose over — days?
- Calculate  $D_y/D_x$  (radium needles) for 10:10:10 mg Radium loading  
 $\frac{1 \text{ cm} \cdot 1 \text{ cm}}{2 \text{ cm}} \cdot \frac{1 \text{ cm} \cdot 1 \text{ cm}}{2 \text{ cm}} \cdot \frac{1 \text{ cm} \cdot 1 \text{ cm}}{2 \text{ cm}}$
- Numerous RARTEX-type MU/timer calc. problems  
Find card dose given CAX dose for AP/PA fields.
- What is ~~Sc-90~~ Sr-90 2.27 MeV  $\beta$  range in air?

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(2)


- Which of following is used for palliative tx bone mets?  $\rightarrow$  I-125 P-32  
Sr-89 Ca-223
- ~~TG-51 (2.642)~~ NRC requires HDR shielding to be surveyed  
— daily — after source change  
— weekly — annually
- Several unusual TG-40 questions (what/when it requires stuff)
- What detector is best for calibrating Ir-192 IVET source?  $\rightarrow$  well chamber?
- Usual TG-40 question: photon flatness spec is —?
- According to Kersey's report (ref?) the absorption rule of linear  $\mu$  in a maze is —?
- ~~Base~~ Largest contributor to dose rate at a point behind the gantry shield is. (Air kerma leakage?  $\mu$  of lead walls, scatter from patient)

1. Facility needs 66" of concrete but due to space restrictions only 36" is available. Need to mix concrete and steel. Determine the thickness of steel needed in the mix.  
~~(TVL steel = 3.88", TVL conc. = 13.6")~~
2. Recommended detector size for scanning  $\gamma$ -stereotactic cone profile? (TG 52?)
3. How often does kilometer need to be calibrated?
4.  $K_{air}$  for IVB source defined at what distance? (TG 62?)
5.  3 Cs-137 sources, .10 mg each; calculate ratio of Dose @ Y to dose @ X.
6.  Two points on a pair of orthogonal films; calculate distance between.  
( $d = \sqrt{x^2 + y^2 + z^2}$ )
7. How long does a permanent implant of I-125 take to deliver 95% of its dose?
8. Questions on straight Leakage, Scatter, and primary shielding
9.  AP sep = 22cm dose @ midline = 900 cGy  
Calculate point (cord) at 4cm from posterior.  
(Tables of TMR / PDD / OF / DR given for 4MV)
10. Timer error = 0.02 min, dose rate = 150 cGy/min  
what is minimum dose at 2 cm (PDD = 60%) so that time error contribution to dose is < 2%?
11. A chamber has volume of 0.19 cm<sup>3</sup>, what is the calibration factor is  $\times 10^8$  R/C.  
( $1 \text{ R} = 2.58 \times 10^{-4} \text{ C/kg}$ ,  $P = 0.001093 \frac{\text{R}}{\text{C}}$ )

12. When thyatron is fired, what are the 2 components that are also pulsed for linac?
13. Need to know electron oblique incidence on skin
14. Lung correction for X-ray dose ( $P_{lung} = 0.33 \text{ g/cm}^3$ )
15. What is the minimum distance between plastic tray placement from pt skin? (Skin dose concerns)
16.  Calculate penumbra @ 10cm depth  
 $SSD = 34 \text{ cm}$   $SSD = 80 \text{ cm}$   $d = 10 \text{ cm}$   
Source = 3mm
17. Why is the increase in PDD for increased SSD always less than that calculated using the Mayneord-Factor?
18. For a 6 MeV  $e^-$  beam with cone @ 100cm (surface) reading taken:
 

@ 100	100
@ 120	44
@ 140	25

 Calculate the virtual source position.
19. If have output factors measured @ 100 SSD, now you want to make this table @ 100 SAD, you should multiply the table values by?
20. When transfer TG-21 protocol to TG-51, the calculated output will be — them TG-21 values.  
a. 1-2% below b. 3-4% below c. 1-2% over etc...
21. How is the PDD determined for TG-51 protocol?
22. When should HDR room shielding be reconsidered and recalculated?

23. How does an electron cone cut-out affect:  
Output / PDD / flatness / Depth at 50% / Depth at 90%?
24. What is the practical range of an electron beam with  $E_0 = 1.7 \text{ cm} = 4 \text{ MeV}$ , and  $E_0 = 7 \text{ MeV}$ ?
25. What is an X-ray beam's PDD @ 5cm if  $\mu/\rho = 0.012 \text{ g/cm}^2$  and  $d_{max} = 2 \text{ cm}$ ?
26. What is the approximate ratio of MU between  $60^\circ$  and open if a  $30^\circ$  dose profile is needed? (WTF = 0.5)
27. Block is to be cut for a 100 SAD treatment with depth @ 10cm and 150 TFD. But pt is going to be treated on a 80 SSD co-60. What TFD should be used if blocks are to be cut from the original films?
28. A crack is detected in the wall shielding linac. A large volume chamber is used to measure dose exposure rate at the crack. 1 mR/hr is measured. At the same time, 0.5 mR/hr is read on intact portion of wall. What can be said about the real  $\dot{x}$  at the crack?
29. What is the dose rate of a shallow point 2cm outside a 6MV tx field as a ratio to the CAX dose?
30.  a lateral neck field is desired such that the field edge matches with the neckline. Given 80 SAD 15.5 AP dimension 20 Sup. Inf. dimension. What should the couch angle be?

(31) Type questions:

Given  $\rho$ , W, U, T, d and P, calculate # of TVL or HVL need to reach the P (permissible dose).

$$P = \left(\frac{1}{10}\right)^n \frac{WUT}{d^2} \quad \text{or} \quad P = \left(\frac{1}{2}\right)^n T \cdot \text{mCi} \cdot \frac{1}{d^2} \text{ etc.}$$