



PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)
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I d'\$)

/ACUITY 1/ 2EDICA0 SCIENCES

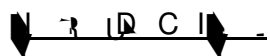
1UTOINES 1/ TESTS SY00ABI AND C1URSES 1/ READING

/1R

BACHE01R 1/ SCIENCE 2EDICA0 TECHN101GY (3-RAY)
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BACHE01R 1/ SCIENCE (2EDICA0 TECHN101GY- 3-RAY)



Objectives:

Rules of Examination for B.Sc. Medical Technology (x-ray) Course.

Students will not be allowed to appear in the examination unless their attendance is 75% of the total theory and practical academic subjects parallelly.

Data of examination and appointment of examiners will be available by the University.

In the theory examination, essay type or multiple choice objective type questions will be included in the question paper.

There will be separate assignments for internal assessment in each of the subjects.

PART-II

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xa nation o art III

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c' anc s at sx ont' y nt rva s to pass n t' os subj cts How v r,
' s' a s to pass n t' os subj cts n t' s two xtra att pts ' or
s' w b r qur to r p att' w' o xa nation o art II
Mar so t' xa nation ar v n n App n x II

PART -III.(a)-(b)-(c)-Please refer to page non

d Rule Nf. 1 of ehol b .ofami- Auion.
xaRucandidate ho fails in ene or more subjects in b e given to more
chances at six monthly intervals to pass in those subjects. However, if
hx she fails to pass in those subjects in these to extrattempts he or
she all be required to repeat the hole examination.t-r

Appendix II (B.Sc. Medical Technology X-ray Course)

Distribution of Marks

	First Year ac' subj ct	Second Year ac' subj ct	Third Year ac' subj ct
Theory	40 Marks	40 Marks	40 Marks
Practical & viva 100	40 Marks	40 Marks	40 Marks
Internal Assessment	20 Marks	20 Marks	20 Marks
Total	100 Marks 40 Marks	100 Marks 40 Marks	100 Marks 40 Marks

**B.sc Medical Technology
A THREE YEAR PROGRAMME**

B.SC. MEDICAL TECHNOLOGY (X-RAY) (TRANSCRIPT)

Transcript for B.Sc. Medical Technology (X-Ray) Course

Instructional Material: En

Not student

For transcription

BJEC A GH

1 A II

Anato an p s o o an r at pat o o o
u an o art II

Equ p nt or a o a nos s art I

s cs or ca a n

4 Bas c ra o rap c t c n qu s II an sp c a proc ur s

1 A III

p c a proc ur n a o a nos s ann n
A n a o a nos s

Equ p nt or a o a nos s ne u n
n w r v op nts

Total hrs teaching (theory only) for 3 years

u ct Anato an p soo an r at pat oo	N o-o rs- rs
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r at nt car n a o rap nc u n G	rs
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Equ p nt or a o a nos s nc u n n w r v op nt an qua t assuranc	rs
s cs or ca a n an ra at on p s cs nc u n ra at on prot ct on	rs
ann n an ua t contro n a o a nos s	rs
C can I E can tra sono rap uc ar I a n a o rap p c a proc ur o rn I a n c no o	rs
Total	1160 hrs

Total hrs of practical training for 3 years

	Radiodiagnosis
art I	Hrs
art II	Hrs
art III	Hrs

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Part - I	
r at nt strat on	w s
Dar oo ract c	w s
Extr t s ra o rap	w s
C st ra o rap nc u n r s	Dw s
A o n ra o rap	w s
r at nt car	w s
G	w s
rt bra cou n ra o rap nc u n v c r	w s
Total	40 weeks
Part - II	
Bar u stu s GI tract	w s
I	w s
p c a proc ur s H G o rap Dacroc sto rap Art ro rap an Cav to rap tc -	w s

perforation atricentric	4 weeks
ulceration anastomosis	weeks
arteriovenous anastomosis	weeks
Celiac ganglionectomy	weeks
Dental radiography	weeks
Total	40 weeks
PART- III	
angiography	weeks
Interventive procedures vascular and nonvascular neck and EGCT, BD and CECT	weeks
C	weeks
Color Doppler	weeks
I	weeks
D A	weeks
ultrasound examination and protection	weeks
Hospital practice and outpatient	weeks
Total	40 weeks

AVAILABILITY OF EQUIPMENT IN DEPARTMENT OF RADIODIAGNOSIS

angiography accreditation 5 Awt requirement

MODE OF EXAMINATION

Final examinations conducted at the discretion of the respective departments
For Part I, Part II, Part III, and the entire content of the subject

PART - I

Theory papers

Anatomy, Physiology, and Pathology of the Human Body

Microbiology, Immunology, and Parasitology

Plant and Animal Biochemistry

4. Basic Laboratory Techniques

Practical and viva voce exam in the entire subjects (100 marks in each subject)

Internal assessment in the entire above subjects (50 marks in each subject)

PART - II

Theory paper

Anato	p	s o o	an r at	pat o o	o Hu an	o	ar s
Equ p	nt or ra o	a nos s	art I				ar s
r	s cs or	ca	a n				ar s
4	Bas c ra o rap c t c n qu s II an sp c a proc ur						ar s

Practical and viva voice exam in the entire subjects (100 marks in each subject)

Internal assessment in the entire above subjects (50 marks in each subject)

Board of examiners comprises of two external and two internal examiners .

coor nator o t cours r o ssor H a o t D pt-o a o a nos s st
 conv n r cu nt rna xa n r-

ⁿ nt rna xa n r s tutor o ca t c no o X a

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PART - III

Theory paper

p c a proc ur n a o rap c	ann n	ar s
A n a o a nos s		
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n w r v op nts		
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4 a at on p s cs an a at on prot ct on		ar s

Practical and viva voice exam in the entire subjects (100 marks in each subject)

Internal assessment in the entire above subjects (50 marks in each subject)

Board of examiners comprises of two external and two internal examiners .

coor nator o t cours r o ssor H a o t D pt-e a o a nos s st
 conv n r cu nt rna xa n r-

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pr scr t nst tut -

A can at stan n s con n t na xa nat on w or t awar o v r
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con t ons pr scr t nst tut -

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a prov s s cur sa n u o ar s an u t var ous t r s an
con t ons pr scr t nst tut -

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s succ ss u co p t s t o ow n

- a Has pass a t t r xa nat ons-
- Has sat s actor co p t t u p r o o p r o o ars -
- c H s r wor an con uct ur n t p r o o tra n n as n
sat s actor -

s r s awar on t a o convocat on as c t nst tut -

INTRODUCTION

In the modern concept of customer service, the importance of support role is a key factor. The process cannot be over-pas - For this reason, the Institute attaches great value to the selection and training of personnel. With the provisions to review and update the course contents and syllabus, the program is designed to provide the necessary operations and management skills. BSc - Customer Service is an important role to play in the service industry.

The training can be structured for BSc - Customer Service. The course is designed to equip students with the necessary skills to carry out their duties. The course is designed to provide the necessary skills to carry out their duties. The course is designed to provide the necessary skills to carry out their duties.

The course is designed to provide the necessary skills to carry out their duties. The course is designed to provide the necessary skills to carry out their duties. The course is designed to provide the necessary skills to carry out their duties.

The student will be able to identify the various aspects of the service industry. The student will be able to identify the various aspects of the service industry. The student will be able to identify the various aspects of the service industry.

student are evaluated by a student representative committee annually. The examination is conducted in a written form.

TRAINING

Students are provided with practical training. For practical training, students are provided with various sections, rooms and a laboratory. The practical training is provided by the faculty members and supervisors. For this purpose, the students are provided with a practical manual and a practical notebook. The practical training is provided in a systematic manner.

FIRST YEAR

PAPER-I

ANATOMY AND PHYSIOLOGY AND RELATED PATHOLOGY OF HUMAN BODY

Objectives and practical demonstrations

Introduction to the course as a whole

Cell structure and function

Epithelium	:	Types, structure, characteristics, functions
Connective tissue	:	Quaternary, cellular, molecular
Cartilage	:	Types, structure, function
Bone	:	Arterial, venous, capillary, bone marrow
Muscle	:	Types, structure, function
Nervous system	:	Central, peripheral, autonomic
Endocrine system	:	Major glands, hormones, functions

Development of the human embryo from zygote to fetus. Development of the human embryo from zygote to fetus. Development of the human embryo from zygote to fetus.

AXIAL Skeleton

Skull: Cranial, facial, sutures, fontanelles, sutures, fontanelles, sutures, fontanelles.

Appendicular skeleton, bones of the upper and lower limbs

PAPER-II
RADIOLOGICAL SCIENCE FOR TECHNOLOGIST

Introduction of radioisotopes in the field of medicine and industry
Sources of radioisotopes and their uses

Physical and chemical properties of radioisotopes

Applications of radioisotopes in medicine and industry

Radioisotopes in the field of agriculture and food

Radioisotopes in the field of research

Radioisotopes in the field of environmental studies

Radioisotopes in the field of space research

Radioisotopes in the field of archaeology

Radioisotopes in the field of geology

Radioisotopes in the field of hydrology

Radioisotopes in the field of oceanography

Radioisotopes in the field of meteorology

Radioisotopes in the field of climatology

Radioisotopes in the field of atmospheric science

Radioisotopes in the field of environmental science

Radioisotopes in the field of environmental health

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PAPER-III

PATIENT CARE IN RADIOGRAPHY AND C.P.R

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THE RADIOGRAPHER AS A MEMBER OF THE HEALTH CARE

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Et ca an co a Cons rat on
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Car
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/at nt r ts
a pract c

ATTITUDES AND COMMUNICATION IN PATIENT CARE

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C a n s n co un cat on
C r n an a o sc nts
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A t r stat s o consc ousn ss
/at nts w o o not sp a H n
Co un cat ons w t pat nts Fa s,
Co un cat ons w t co wor rs
c art as a r sourc
/rob s or nt ca r cor n
out n co un cat on

SAFETY, TRANSFER AND POSITIONING

F r pr v nt on
In cas o r
t r co on a ar s
Bo c an cs
/at nt trans r
c a r trans r
/r tc r trans r
/os t on n or sa t co ort
n car
a t straps an ra s

students and observations
Accounts and records=reports

EVALUATING AND MEETING PHYSICAL NEEDS

the person's
review as a professional
Current status
/ assessments
tasks

INFECTION CONTROL

connections
Infectious organisms
reservoir connections
susceptible host
/ transmission routes
/ practices
Hand hygiene
Disposal of contaminated waste
Environmental aspects
Isolation techniques
/ isolation of patient in room
/ precautions for contact with patient
surfaces

MEDICATION AND THEIR ADMINISTRATION

route of administration
category of medication
topical route
oral route
/ parenteral route
/ intravenous route
Contraindications

DEALING WITH ACUTE SITUATIONS

CONTRAST MEDIA AND SPECIAL IMAGING TECHNIQUES

Io nat contrast a

Aquous o n co poun s or ntravascu ar n ct on

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N uc ar c n

a o rap

r o rap

BEDSIDE RADIOGRAPHY SPECIAL CONDITION AND ENVIRONMENTS

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rt opa cs ra s

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C.P.R.

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How to v G

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PAPER-IV

BASIC RADIOGRAPHIC TECHNIQUE-1 RADIOGRAPHY TECHNIQUES

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- a- pp r b w t sp c a r r nc to an wr st o nt an b ow o nt upp ntar
t c n qu s or carpa tunn scap o bon ractur a o ra us an supra con ar
pro ct ons-
- b- ow r b w c nc u s a t bon s w t sp c a r r nc to an o nts n o nt
pat a t c n qu s or ca can u bon supp ntar t c n qu s or at oot
nt rcoh ar notc an ur an tafarsa s tc-
- c- ou r r an t orax
- rt bra cou n w t sp c a t c n qu s or c rv ca sp n nt r v rt bra o nt an
ora na u osacra o nt-
- v c r an pr on-
- sp rator s st C st ra o rap or bot t un s ap ca or ot c an ob qu
v ws at ra v ws t c n qu s to onstrat u v s us on nt t orac c
cav t cub tus A an o t ow r astro nt st na tract

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 ar nx os t on structur an unct ons
 a var an s os t on structur an unct ons-
 Esop a us os t on structur an unct ons
 to ac os t on structur an unct ons-
 v r os t on structur an unct ons-
 Ga a r os t on structur an unct ons
 a nt st n os t on structur an unct ons-
 ar nt st n os t on structur an unct ons

D st on an a sorpt on ta o s o carbo rat s rot ns an ats -D s as s an
 con t ons o t st v s st s-

d) The Urinary System

arts o ur nar s st s-
 K n s os t on structur an unct ons
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 at r an co pos t on o ur n -
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 D s as s an con t ons o t s st -

e) The reproductive system

Female reproductive system

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 Int rna or ans os t on structur an unct ons
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 t rus
 Fa op an tu s
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 Br asts a ar an s os t on structur an unct ons-

C an s pu rt n pr nanc ur n actat on-

Male reproductive system.

cro tu t st s p us os t on structur an unct ons-
p r ato n s s -
p r at c cor s s na v s c s acu ator uct s os t on structur an unct ons-
rostat an s os t on structur an unct ons
r t ra an p n s os t on structur an unct ons
Funct ons o a r pro uct v s st -
u rt
D s as o a an a r pro uct v s st s

Endocrine system

Enocr n an s.

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ro an s os t on structur an unct ons
A r na upra r na an os t on structur an unct ons
arat ro an s os t on structur an unct ons
ancr as os t on structur an unct ons
Hor on s s cr t on unct on contro -
n a an -
Co on tr san s as r at tot Enocr n s st -

The organs of sense :

H ar n an t ar xt rna an nn r ar- os t on structur an unct ons
s o o o ar n an s as s o ar-
t an t os t on structur an unct ons
c ra corn a c oro s c ar o r s ns r t na opt c
n rv s-
s o o o s t an s as o t -
ns o t s o actor n rv s or ns str but on-

soo o t s -

ns o tast - or ans p soo o t tast -

Co on s as o t s st -

The nervous systems.

Nurons os t on structur an unct ons

C ntra n rvous s st n urons n ura a n n s-
ntr c s o t ra n C - F -

B A I A C D structur s unct ons p r p ra n rvous s st -

p na an cran a n rv s or n str but on unct on-

Auto at c n rvous s st or n str but on unct on-

s r ct t ns on c rcu t-
 a wav r ct c rcu t-
 our va v u wav r ct c rcu t
 r p as u wav r ct c rcu t-
 o ta wav or s n t ns on n rators-
 Constant pot nt a c rcu ts
 ct rs va v s an so stat -
 r qu nc n rators, a vanc s an n w r v op nt-

b) The X-ray Tube:

G n ra tur s o t x ra tu -
 x ano x ra tu
 otat n ano x ra tu -
 at n o x ra tu -
 Foca spot s s-
 t o s o at ss pat on o x ra tu s-
 Co on tu au ts -
 D v op nts n rotat n ano tu -
 u stan s an c n tu supports-

c) Components and control in the x-ray circuits :

t ns on trans or r
 r ct cat on o t ns on-
 contro o ovo ta ovo ta n cat on -
 a nt c rcu t an contro o tu curr nt-
 Exposur t rs ctron c auto at c-
 a n vo ta co p nsat on-
 a ns supp an t x ra s t-

d) The Control of Scattered Radiation

n canc o scatt r
 B a t n v c s con s ap ra co ators -
 B a c nt r n v c s-
 s con ar ra at on r ts t p s co pon nts o t r r ov nts-t
 ass nt o t r unct ons-

e) Portable and mobile x-ray units

a n r qu r nt porta x ra ac n s an x ra qu p nts or op rat on t atr -

f) Fluoroscopic equipment

structure of fluoroscopic screen
fluoroscopic table - spot view scan operators -
protective apron - suspension -

g) Image intensifiers

Image intensifier tubes - applications -
tube suspension -
correction -
- - on torsion -
- - ratio -

h) Tomographic equipments

linear tomography -
arc tomography -
cut tomography -
transaxial tomography -
Equipment for tomography

i) Equipment for rapid serial radiography -

Automatic -
rotation -

j) Equipment for cranial and dental radiography.

sub -
cranial -
dental -

PAPER III

PHYSICS FOR MEDICAL IMAGING

No of Lectures & Practical Demonstration:40

1. RADIATION PHYSICS. Structure of atoms, production of x-rays, interaction of x-rays with matter, absorption of x-rays, contrast.

2. IMAGING WITH X-RAYS. Attenuation of x-rays, patient dose, scatter radiation, contrast, and collimation.

PAPER – IV

4. BASIC RADIOGRAPHIC TECHNIQUES II and SPECIL PROCEDURES

No. of lectures & Practical's Demonstration :40

1 **SKULL:-** a o rap o cran a on s\ cran u \ s ture ca\ or t
pt c ora na\ sup r or or ta ssur an n r or or ta ssur –

2 **FACIAL BONES** : i ara nasa s nus s\ pora on

3 **DENTAL RADIOGRAPHY** : a o rap o t t ntra ora\ xtra ora
an occ usa v w–

4– **ALIMENTARY TRACT** : i r parat on o pat nt– G n ra\ acut
pos t on n or u an a r v s\ a n xa nat on\ a o rap
o a a o n to oo or pr nanc : ntrav nous i o rap an
c sto rap –

5– **MACRORADIOGRAPHY** : i r nc pa\ a vanta\ t c n qu an
app cat ons –

– **STEREOGRAPHY** : i roc ur\ pr s ntat on or v w n\ st r oscop s\
st r o t r

Q- **SOFT TISSUE TECHNIQUE** :- a radiographic technique for

• soft

- **WARD MOBILE RADIOGRAPHY** :- technique for radiographic
protection equipment instructions to • follow for portable
radiography

Q- **OPERATION THEATRE TECHNIQUES** :- General precautions

Aspects of technique concerning the use of

equipment selection of exposure factors exposure rate

protection and rapid processing -

PART - III

PAPER – I

SPECIAL PROCEDURES IN RADIODIAGNOSIS, PLANNING AND QA IN RADIODIAGNOSIS

NO. of Lectures & Practical Demonstration : 40

Radiological procedures pertaining to salivary glands , lachrymals system

Bronc o rap \ art ro rap an st rosa p n o rap var ous r qu r nts tro
s t up \ n cat ons an contra n cat ons \ contrast a us -

Ventriculography and encephalography \ c n qu \ contrast a us \
s qu nc -n cat ons an contra n cat ons \

Myelography :- Technique \ contrast a us \ n ct on o contrast a
n cat ons an contra n cat ons -

Intravenous cholangiography , T Tube :- Cholangiography, preoperative

c o an o rap \ proc ur \ contrast a \ n cat on an contra n cat ons -

Double contrast Barium studies \ s a bow n a \ Ba En a tc
roc ur \ r qu r nts \ n cat ons \ contra n cat ons an contrast a us -

Angiography :- Cerebral, cardiac , abdominal aortography , general , renal and

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pr caut ons \ pr caut ons \ ra at on prot ct on \ c an rs \ anua auto at c
p an \ t p s ar \ natur \ c n contrast a n ct on proc ur an
t c n qu -

Interventional radiological procedures :- PTC, PTBD, ERCP , fine needle

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Quality Assurance in Radiodiagnosis :- A o qua t assuranc n \ ca a n

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A \ act v t s app ca \ n-

Equ p nt s ct on p as

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PLANNING IN RADIO-DIAGNOSIS :-

Education of the part
Advanced part of the
Basics of anatomy
of the part

Basics of anatomy –
Etc

PAPER-II

2. Equipment for Radio – diagnosis including newer development

NO. of lectures & Practical Demonstration :20

- **Computed tomography** : History, development, principles and applications, various indications and contraindications, cross-sectional anatomy
- **Diagnostic Ultrasound**

7. PORTAL IMAGING

Basic principles of portal imaging
Devices
Interaction of X-rays
Advantages and uses
Imaging of portal imaging

8. INTERVENTIONAL RADIOLOGY

Definitions
Procedures of interventional radiology
Interaction of X-rays
Interaction of X-rays
Advantages of interventional radiology

9. COMPUTED RADIOGRAPHY

Definitions
Basic principles of CR
Interaction of X-rays
Interaction of X-rays
Interaction of X-rays
Advantages of CR

PAPER – IV

Radiation physics including radiation protection

No. of Lectures :- 30

No. of Practical :-10

Atomic structure as applied to interaction of X-rays and radioactivity
Interaction of X-rays - Effects of variation of tube voltage, current, filtration, wave length, target material on X-ray production - Law of radioactivity and decay
Secondary electron production - Photoelectric effect, Compton effect, pair production
Interaction of X-rays with matter - Photoelectric absorption, Compton scattering, pair production and annihilation processes
Effects of

t absorber an on ra at on qua t -trans sson o x ra t rou bo tssu - n ar
 n r trans r- an o s con ar ctron an ctron bu up- at v a ounts o
 scatt r ro o o n ous an t ro n ous a ur n t
 passa t rou a pat nt s ca r qu r nts o a ur n t passa t rou a
 pat nt s ca r qu r nts o a n n v c s
 --con s ap ra co ator tc- nts o ra at on asur nt sp c cat on o
 qua t an a va v t c n ss H an ts asur nt
 t rs an trat on - asur nt o ra at on an os t r proc ur s -ra at on
 t ctors an t r pr nc p s o wor n -D n t on o Bra p a p rc nta pt
 os p a scatt r actor tssu a r rat o -tssu tssu ax u rat o scatt r a r
 rat on s os curv s an ra at on p nu bra o r nt a s- t rs w
 an n an -Co p nsators a att n n t rs scatt r n to s s ca
 prop rt s o p anto s p anto at r a s bo us an bo us subst tut s -Factors us or
 tr at nt os ca cu at ons a tr at nt t an on tor un ts ca cu at on t o -
 s ca asp cts o ctron an n utron a t rap -

RADIATION PROTECTION :-

D n t on o ra at on a ar s ax u p r ss os an annua t o nta
 A I p r ss os v s on an aroun s a sourc ous n an nsta at on
 pr nc p s o ra at on prot ct on an A D s o r nt I G ru s stoc ast c an non
 stoc ast c cts -I portanc o A A A=p s ca pr nc p o s n an p ann n