

FINAL ANSWER KEY

Question 32/2024/OL

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Code:

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Department Medical Education

Question1:-46 year old premenopausal lady with ECOG PS0, underwent Left BCS (Breast Conservation Surgery) and SLNB (Sentinel Lymph Node Biopsy) for left medial quadrant breast cancer. Post-operative histopathology shows IDC, Gr2, T = 3.5 cm, SLNB - One Lymph node positive. ER + PR + Her2 Neu Negative. Metastatic work up within normal limits. She is not planned for further axillary node dissection and decided to be treated with post BCS adjuvant RT. What is the best RT schedule ?

A:-Left whole breast, internal mammary and supraclavicular drainage areas 40Gy/15 Fr RT with SIB for tumour bed boost 48Gy/15fr using VMAT technique.

B:-Left whole breast, internal mammary, axilla and supraclavicular drainage areas 40Gy/15 Fr RT with SIB for tumour bed boost 48Gy/15fr using VMAT technique.

C:-Left whole breast, internal mammary, axilla drainage areas 40Gy/15 Fr RT with SIB for tumour bed boost 48Gy/15fr using VMAT technique.

D:-Left whole breast, axilla and supraclavicular drainage areas 40Gy/15 Fr RT with SIB for tumour bed 48Gy/15fr using VMAT technique.

Correct Answer:- Option-A

Question2:-Which of the following OAR dose volume parameter for the RT plan of whole breast, is not an acceptable one ?

A:-The prescription dose is 26Gy/5fr over a week. Ipsilateral lung dose V7.8Gy 18%

B:-The prescription dose is 40Gy/15fr over 3 weeks. Ipsilateral lung dose V12Gy 17%

C:-The prescription dose is 26Gy/5fr over a week. Heart dose V6.5Gy 4%

D:-The prescription dose is 40Gy/15fr over 3 weeks. Heart dose V10Gy 4%

Correct Answer:- Option-A

Question3:-68 year old lady underwent TAH+BSO and Bilateral pelvic lymph node dissection for endometrioid endometrial cancer. ECOG PS is 1, no co-morbidities. Postoperative histopathology shows Grade2 endometrioid carcinoma involving >50% myometrium, ER+, P53 abnormal, cervical stromal involvement, LVSI negative, Left and right pelvic lymph nodes negative for cancer. Best treatment option for this patient among the following is

A:-External beam radiation+ Vaginal vault brachytherapy alone

B:-Radiotherapy with concurrent chemotherapy and also adjuvant chemotherapy

C:-Sequential chemotherapy and radiotherapy without concurrent chemotherapy

D:-Either 2 or 3

Correct Answer:- Option-D

Question4:-65-year-old gentleman a diagnosed case of Adenocarcinoma of Prostate. ECOG PS0, Gleason Score 6, PSA-15ng/ml. Metastatic Work up done with a PSMA PET Scan, showed no evidence of Lymph nodal or distant Metastases. What is the best treatment option if he is not considering surgical or surveillance option ?

A:-Induction chemotherapy with Docetaxel and Leuprolide followed by Radical RT

B:-Induction treatment with Leuprolide for 3-6 months and Radical EBRT 60Gy/20fr

C:-Radical EBRT to a dose of 60Gy/20 Fraction over 4 week

D:-Docetaxel and Abiraterone

Correct Answer:- Option-B

Question5:-Which of the statements is TRUE about DNA repair processes ?

A:-Mutations in the genes that encode proteins involved in trans lesion DNA synthesis are typically present in people who develop hereditary non-polyposis colon cancer

B:-Between 10-20% of the population is thought to be heterozygous for the types of mutations that are responsible for causing Ataxia Telangiectasia (AT)

C:-The most common types of DNA damage induced by ionizing radiation are repaired through base excision repair

D:-Sub-lethal damage repair is significant for both x-rays and neutrons

Correct Answer:- Option-C

Question6:-Equal doses of densely-and sparsely-ionizing radiations, produce different levels of biological damage. Which of the following is the best explanation of the difference in biological effectiveness ?

A:-The ratio of DNA double-to single-strand breaks is approximately 20:1 per 1 Gy for sparsely ionizing radiation and approximately 1:1 for densely ionizing radiation, independent of radiation quality

B:-Sparsely-ionizing radiation is less effective due to wastage of ionizations in water

C:-Densely-ionizing radiation produces more ionization per unit mass

D:-Densely ionizing radiations produces more ionizations per unit length of the track

Correct Answer:- Option-D

Question7:-A patient with a diagnosis of oral cavity cancer was planned for Radical Radiation treatment. The dose prescription was 70Gy/35 fraction over a period of 7 weeks with 5 fractions a week. After 5 week of treatment he defaulted and lost the

whole 6th week of radiation. He is now ready for continuation of the treatment. He has no contraindication for continuing it. After the gap, treatment resumes on the Monday of the seventh week of the schedule. As a radiation oncologist you wish to give a correction for the gap. What will be the best option among the following ?

A:-Ideally these ten fractions should be delivered over the five remaining treatment days so as not to extend the treatment. The missed dose can therefore be compensated for by delivering the remainder of the treatment as twice-daily fractions (minimum of six hours apart) in each weekday of the final week

B:-Retain overall time by increasing dose per fraction for same number of post-gap days as there were gap days

C:-Accept that treatment extension is unavoidable and deliver extra fractions, using increased dose per fraction to minimise the extension duration

D:-Retain overall time by using smaller number of larger fractions after the gap

Correct Answer:- Option-A

Question8:-58 year old gentleman ECOG PS1 with a diagnosis of Left Parietal Glioblastoma Multiforme, is planned postoperative adjuvant Radiotherapy with concomitant Temozolamide. He was planned 60Gy/30 fraction as convention fractionation schedule along with daily Temozolamide 75 mg/ m^2 and also Co-Trimoxazole as PCP prophylaxis. His routine blood is done every week during the course of treatment. Which of the following is not acceptable decision in this treatment plan ?

A:-Second week of treatment his Platelet count is 48,000/microliter. All other blood counts and general condition is normal. He needs interruption of Temozolamide till recovery of platelet to 1,00,000/microliter but he can continue RT.

B:-Second week of treatment his Platelet count is 48,000/microliter. All other blood counts and general condition is normal. He can be continued on Temozolamide and RT with platelet cover to avoid efficacy of the treatment.

C:-Third week of treatment his absolute Neutrophil count is 1000. All other blood counts and general condition is normal. He needs interruption of Temozolamide till ANC recovery to 1500 and continue RT.

D:-First week of treatment he has Grade3 vomiting. All blood counts and general condition is normal without any signs of dehydration. He needs continuation of Temozolamide with antiemetics and also continue RT.

Correct Answer:- Option-A

Question9:-A tumour has a cell cycle time of 10 days, a growth fraction of 0.5 and a cell loss factor of 1.0. Considering these kinetic parameters remain constant over a period of one month, how much would the tumour volume have increased during that time ?

A:-Increase 2-fold

B:-Remain the same

C:-Increase 5-fold

D:-Increase 4-fold

Correct Answer:- Option-B

Question10:-A Radiation schedule of 60 Gy in once-daily 2 Gy fractions was planned for the patient. If the fraction size is decreased to 1.3 Gy in an attempt to reduce the incidence of late effects, approximately what total dose should be delivered to maintain the same level of tumor control ? (Assume an equal effect per fraction, no repopulation, and an α/β ratio for the tumour of 10 Gy.)

A:-60 Gy

B:-64 Gy

C:-62 Gy

D:-76 Gy

Correct Answer:- Option-B

Question11:-Carboplatin along with Paclitaxel was planned for the ovarian cancer patient as adjuvant chemotherapy. While calculating the dose of carboplatin using the Calvert formula $(GFR+25) \times \text{target AUC}$, the consultant asked the resident why 25 is added to GFR ? Resident gave the correct explanation and she was congratulated. What would have been her explanation to this question ?

A:-Majority of the times GFR is underestimated and a study proved that on an average 25 ml/minute needs to be added to get the exact GFR

B:-25 ml/minute is a constant which measures the non-GFR clearance of Carboplatin

C:-A large multi institutional study showed that the thrombocytopenia is directly linked to this

D:-She didn't give any of the explanation mentioned above

Correct Answer:- Option-B

Question12:-52 year chronic smoker ECOG PS 1, history of migraine attacks, newly diagnosed as a case of Non-Small cell lung cancer, Adeno carcinoma stage IV liver metastases. EGFR, ALK, ROS1 mutations were all wild type. PDL1 69%. He was started on immunotherapy with Pembrolizumab. He completed 3 cycles of the treatment fairly well. On day 10 of the third cycle of Pembrolizumab he reported to the emergency department with tiredness, severe headache and blurred vision. On examination he was afebrile, BP 98/62 mm of Hg. Otherwise he is conscious oriented and no other symptoms. What is the best initial management for him ?

A:-Start him on antiedema measures, analgesics and immediately request for an MRI brain, contrast study

B:-Start him on antiedema measures, analgesics and immediately request for an CT brain, contrast study

C:-Start on IV Methyl prednisolone 1mg/kg, analgesics after sending blood for Serum Cortisol, ACTH, TSH

D:-Start on oral prednisolone 0.5mg/kg and analgesics, send for Serum Cortisol, ACTH, TSH

Correct Answer:- Option-C

Question13:-A patient treated with combination chemotherapy with Docetaxel and Cyclophosphamide for metastatic breast cancer reports to the emergency department with tiredness and sore throat on 8th day of chemotherapy. On clinical examination he is afebrile, Respiratory rate-25/minute, pulse rate 100/minute.

Oxygen saturation 90%. BP 90 systolic. Management options include some or all of the following.

- a. Intravenous line
- b. IV antibiotics with Piperacillin and Tazobactam
- c. Blood for complete blood count, Biochemistry, S. lactate, Culture and sensitivity
- d. Intravenous fluid with normal saline
- e. Oxygen inhalation.

What is the correct sequence of the immediate management for the clinical condition ?

A:-a, c, d, e, b without waiting for blood results

B:-a, c, d, e then if ANC<500 start on 'b'

C:-c, a, d, e then if ANC<500 start on 'b'

D:-c, a, d, e, b without waiting for blood results

Correct Answer:- Option-A

Question14:-What is false about Sacituzumab Govitecan ?

A:-Efficacy was evaluated in TROPiCS-02, a multi-center, open label, randomized study

B:-Sacituzumab Govitecan works by targeting TROP-2-expressing cancer cells with a humanized antibody (RS7), then being internalized and releasing the topoisomerase I inhibitor SN-38 to trigger DNA damage-mediated apoptosis

C:-Patients who are homozygous for the UGT1A1 *28 allele are at an elevated risk of neutropenia after starting Sacituzumab Govitecan

D:-Inhibition of topoisomerase I results in single-strand DNA breaks, apoptosis, and ultimately cell death and termination of cellular replication

Correct Answer:- Option-D

Question15:-What is false about phases of Clinical Trials ?

A:-Phase2- Determines whether drug can have any efficacy; at this point, the drug is not presumed to have any therapeutic effect

B:-Phase3- Testing of drug on participants to assess efficacy, effectiveness and safety

C:-Phase0- oral bioavailability and half-life of the drug is primary goal

D:-Phase 3 is post-marketing surveillance

Correct Answer:- Option-D

Question16:-Which among the following is incorrectly matched with regards to chemotherapy extravasation ?

A:-Platin salts- Apply dry warm compresses for 20 minutes

B:-Anthracyclines- Apply dry cold compresses for 20 minutes

C:-Mechlorethamine- Sodium thiosulfate is an antidote

D:-Mitomycin C- Hyaluronidase is an antidote

Correct Answer:- Option-D

Question17:-Which is false regarding imaging in Oncology ?

A:-The basic principle of PET is that proton-rich radionuclides decay by emitting positrons (β^+), which subsequently travel a short distance and annihilate with an electron (β^-) to create two, 255 KeV photons that arise almost exactly 180° apart

B:-Tc-99m MDP-Bone scan we can get a Superscan in prostate cancer and hyperparathyroidism

C:-The half life of Fluorine-18 is 110 minutes

D:-In Gallium DOTA-NOC PET scan, the isotope used is Gallium 68 and not Gallium 67

Correct Answer:- Option-A

Question18:-Which among the following is false with respect to 'RadScopal' effect ?

A:-The novel strategy of combining high dose RT directed at the primary tumor and low dose RT directed at secondary metastatic tumors is coined "RadScopal Technique"

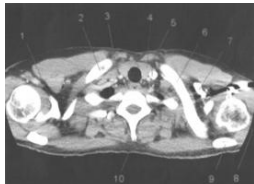
B:-Unlike tumoricidal-dose RT, low-dose RT can reprogram the tumor microenvironment and reactivate the immune microenvironment, thus reversing the resistance of patients to immunotherapy

C:-An interesting phenomenon that local radiation may exert a systemic antitumor immune response and lead to the regression of non-irradiated distant tumors

D:-Low-dose RT may result in the damage of CD4+ T cells and promote the conversion to a Th2 phenotype

Correct Answer:- Option-C

Question19:-Below is the axial CT slice at the level of upper thorax.



Which of the following is not correctly matched regarding this CT slice ?

A:-Arrow labelled 3- represent Right internal jugular vein

B:-Arrow labelled 5- represent left internal jugular vein

C:-Arrow labelled 4- left lobe of thyroid

D:-Arrow labelled 9- Spine of left scapula

Correct Answer:- Option-A

Question20:-50-year-old male is undergoing Stereotactic Body Radiation Therapy (SBRT) for an unresectable cholangiocarcinoma of the common bile duct. The duodenum is a major Organ at Risk. With regards to the relations of the duodenum identify the false statement.

A:-Anterior relation is transverse colon and jejunum

B:-Left ureter, left renal vessels, left adrenal gland forms posterior relation

C:-Laterally are Ascending colon, Right colic flexure, Right kidney

D:-Medially are Head of pancreas, ampulla, bile duct and accessory pancreatic

duct

Correct Answer:- Option-B

Question21:-You are contouring the target volumes on a 53-year-old male with a T3N0M0 adenocarcinoma of the low rectum. The tumour extends below the dentate line. The lymph node groups that this lesion could potentially drain are bilateral inguinal, bilateral external iliac, bilateral internal iliac, bilateral obturator, mesorectal, presacral lymph node groups.

In the same patient, if the primary rectal cancer was above the dentate line, which nodal groups would you remove from your list above ? Give the best answer.

A:-Bilateral Internal iliac

B:-Bilateral Inguinal

C:-Bilateral Inguinal and Bilateral external iliac

D:-Bilateral External iliac

Correct Answer:- Option-C

Question22:-Hodgkin's lymphoma one of the pathological hall mark is presence of Reed Sternberg in microscopy. Which among the following is not true about Reed Sternberg cell ?

A:-Large often multinucleated cell

B:-Basophilic inclusion like nucleoli with Owl's eye appearance

C:-Nucleus can be bi-lobed

D:-CD30 and CD15 positive except in the lymphocyte predominance type where they are negative

Correct Answer:- Option-B

Question23:-Superior pulmonary sulcus tumors, also called Pancoast tumors, arise from the apical pleuropulmonary groove located superior to the first rib. When these tumors involve the surrounding structures such as the brachial plexus, cervical paravertebral sympathetic nervous system, and stellate ganglion, they cause a group of signs and symptoms that are collectively called Pancoast syndrome.

In this context which is false regarding this scenario ?

A:-Shoulder or arm pain with associated paraesthesia along the medial half of the fourth, fifth fingers and medial side of the hand, arm, and forearm are due to C8 through T1 radiculopathy

B:-Resectable NSCLC superior sulcus tumors (T3 invasion, N0-1) are best treated with trimodality therapy comprising systemic chemotherapy, radiation treatments, and surgical resection

C:-Contraindications to surgical resection include presence of metastases, involvement of ipsilateral or contralateral mediastinal nodes or supraclavicular nodes, involvement of vertebral bodies greater than 50%, involvement of esophagus and trachea, involvement of brachial plexus below T1 nerve root

D:-Horner syndrome with ipsilateral ptosis, miosis, and anhidrosis can be seen along with sometimes contralateral flushing and sweating as well. This happens due to a hyperactive contralateral sympathetic reaction called Harlequin syndrome

Correct Answer:- Option-C

Question24:-Pain management is an integral part of cancer treatment. Oral morphine are very commonly used in pain management. There are scenarios where we need to switch morphine to other opioids. In this context of switching oral morphine to below mentioned opiods the ratio followed is correct except

- A:-To oral oxycodone 1:1.5
- B:-To oral hydromorphone 1:3
- C:-To transdermal buprenorphine 75:1
- D:-To transdermal fentanyl 100:1

Correct Answer:- Option-B

Question25:-Which is true regarding radioisotopes used in pain management ?

- A:-*Strontium*⁹⁰ commonly used
- B:-*Samarium*¹⁵³ is not used
- C:- *Strontium*⁸⁹ is a pure beta emitter with long physical half life (50 days)
- D:-*Samarium*¹⁵³ is a beta emitter with short physical half life

Correct Answer:- Option-C

Question26:-Regarding emesis management which is false ?

- A:-Epirubicin dose > 90mg/m² belongs to high risk emesis category
- B:-Dolasetron may increase the QT interval in a dose-dependent fashion
- C:-Rolapitant has an extended half-life and should not be administered at less than 2-week intervals
- D:-Netupitant is a less selective NK1 receptor antagonist that targets serotonin and substance P-mediated pathways

Correct Answer:- Option-D

Question27:-65 year old lady ECOG PS0 is planned for combination adjuvant chemotherapy for Ovarian cancer. Following is the blood investigation report prior to the start of chemotherapy. Junior Resident has multiple queries prior to start of chemotherapy based on this report. Being a consultant you have cleared all the queries. Which among the below is the best advice ?

Test	Patient's value	Reference range
Hb	15.5 g/dl	12.0-16.0 g/dL
Platelet Count	158 x 10 ⁹ /L	150-400 x 10 ⁹ /L
ANC	3.8x10 ⁹ /L	2.5-6.0 x 10 ⁹ /L
S.Bilirubin	25 μmol/L	2-17 μmol/L
SGOT	68 IU/L	5 to 30 IU/L
SGPT	65IU/L	4-36 IU/L
Alkaline phosphatase	100IU/L	30-120 IU/L
CCT	92ml/minute	88-128ml/min

- A:-Paclitaxel dose needs to be modified from 175 mg/m² to 135 mg/m² , carboplatin needs no dose modification
- B:-Paclitaxel and carboplatin 75% of the calculated dose
- C:-No dose modification required as LFT is only mildly altered
- D:-Paclitaxel to a dose of 9mg/m² and no need to modify carboplatin dose

Correct Answer:- Option-A

Question28:-Which is false in the management of Gastro Intestinal Stromal Tumour (GIST) ?

A:-Approximately 80% of GIST have a mutation in the gene encoding the KIT receptor tyrosine kinase; another 5%-10% of GIST have a mutation in the gene encoding the related PDGFRA receptor tyrosine kinase

B:-The presence and type of KIT and PDGFRA mutations are strongly correlated with prognosis

C:-KIT exon 9 mutations have a lower response rate and Progression-Free Survival (PFS) than exon 11 tumours at 400 mg, but dosing at 400 mg BID has been associated with better PFS

D:-Most PDGFRA mutations are associated with a response to Imatinib, with the exception of D842V

Correct Answer:- Option-B

Question29:-Which of the following is a prodrug ?

A:-Busulfan

B:-Dacarbazine

C:-Cisplatin

D:-Chlorambucil

Correct Answer:- Option-B

Question30:-Which is false regarding the basic principles in chemotherapy and radiotherapy ?

A:-The *therapeutic index* for a given chemotherapeutic agent is the ratio between the toxic dose and the therapeutic dose for that drug

B:-The basis for a positive *therapeutic gain* is the additive or synergistic tumor effects that exceed any summative toxicity patterns in normal tissues accomplished with combination therapy

C:-*Maximum tolerated dose* is an empirically derived value that represents the highest dose of a given drug that can be administered in the absence of unacceptable or irreversible side effects to a limited population sample

D:-*Dose Maximum* is a measure of dose per unit of time and thus allows comparisons between protracted and compacted dosing schedules

Correct Answer:- Option-D

Question31:-Nucleus of an atom contains

A:-Electrons

B:-Protons

C:-Electrons and protons

D:-Protons and neutrons

Correct Answer:- Option-D

Question32:-Curie is the unit of

A:-Radiation exposure

B:-Absorbed radiation dose

C:-Radioactivity

D:-Radiobiology

Correct Answer:- Option-C

Question33:-Oxygen enhancement ratio decreases as

A:-LET decreases and RBE increases

B:-LET increases and RBE increases

C:-LET increases and RBE decreases

D:-LET decreases and RBE decreases

Correct Answer:- Option-B

Question34:-One curie a unit of activity is equal to

A:- 3.7×10^2 disintegrations per sec.

B:- 3.7×10^{20} disintegrations per sec.

C:- 3.7×10^{10} disintegrations per sec.

D:- 3.7×10 disintegrations per sec.

Correct Answer:- Option-C

Question35:-The S.I. unit for roentgen. Is

A:-Coulomb/kg

B:-Joule/kg

C:-Sievert

D:-Becquerel

Correct Answer:- Option-A

Question36:-Pair production is possible only with photon having energy more than

A:-1.02 MeV

B:-100 MeV

C:-1.02 KeV

D:-100 KeV

Correct Answer:- Option-A

Question37:-A fission product of uranium is

A:-Cobalt - 60.

B:-Radium - 226.

C:-Cesium - 137.

D:-Iridium - 192.

Correct Answer:- Option-C

Question38:-The unit-of-dose equivalent that is used to express radiation exposure to living tissue is the

A:-Roentgen.

B:-Rad.

C:-Rem.

D:-Erg.

Correct Answer:- Option-C

Question39:-In photo electric effect, the x-ray interact with

A:-Neutrons

B:-Free electrons

C:-Bound electrons

D:-Protons

Correct Answer:- Option-C

Question40:-In the ortho-voltage range of radiation therapy, which of the following interactions predominates ?

A:-Classic scattering

B:-Photoelectric effects

C:-Compton effect

D:-Pair production

Correct Answer:- Option-B

Question41:-Percentage depth dose increase with increases in

A:-HVL

B:-SSD

C:-Both 1 and 2

D:-None

Correct Answer:- Option-B

Question42:-In a fixed SSD technique, the dose is routinely normalized at

A:-Dmax

B:-Tumor depth

C:-Isocentre

D:-On the surface

Correct Answer:- Option-A

Question43:-Concept of fractionated radiotherapy was given by

A:-Benoist

B:-W. C. Roentgen and Henri Becquerel

C:-Irene Curie and Frederic Joliot

D:-Henri Coutard and Claude Regau

Correct Answer:- Option-D

Question44:-When parallel opposed 6MV photon beams are used in a 22 cm thick patient, the maximum dose will occur at

A:-The entrance/exit of each field

B:-The dose will be uniform throughout the patient

C:-The tumor

D:-The midplane in the patient

Correct Answer:- Option-B

Question45:-The attenuation of Cerrobend is

A:-About 15 percent more than lead

B:-About 15 percent less than lead

C:-The same as lead

D:-About 10 percent less than lead

Correct Answer:- Option-B

Question46:-True about stochastic effect are all except

A:-Severity is independent of dose

B:-Probability of it occurring increases with dose

C:-Has a threshold of dose

D:-None of the above

Correct Answer:- Option-C

Question47:-Half life of Cobalt-60 is

A:-15 years

B:-5.3 years

C:-28 years

D:-1600 years

Correct Answer:- Option-B

Question48:-Increasing the distance from 80 to 90 cm. causes the dose rate to change by

A:-0.8095

B:-0.8111

C:-0.6400

D:-0.7901

Correct Answer:- Option-D

Question49:-Which of the following is not a part of gantry of modern LINAC ?

A:-Flattening filter

B:-Optical Distance Indicator

C:-Multi-leaf collimator

D:-6DOF (Degree of Freedom) movement

Correct Answer:- Option-D

Question50:-The central axis percentage depth dose of various energies should be defined at

A:-5 cm

B:-8 cm

C:-10 cm

D:-12 cm

Correct Answer:- Option-C

Question51:-The technique employed in radiotherapy to counteract the effect of tumor motion due to breathing is known as

A:-Arc Technique

B:-Modulation

C:-Gating

D:-Shunting

Correct Answer:- Option-C

Question52:-The term GTV as defined by ICRU, means

A:-The tissues that are to be irradiated to a specified dose according to a specified time dose

B:-The gross palpable or visible/demonstrable tumor extent to be irradiated to a specified dose

C:-The gross palpable or visible/demonstrable tumor extent

D:-The tissues that are to be irradiated

Correct Answer:- Option-B

Question53:-Film badge reports are stated in quantities of

A:-Rads.

B:-Rems or millirems.

C:-Roentgens.

D:-Milliamperes.

Correct Answer:- Option-B

Question54:-The commonest wedge used for treatment of carcinoma maxilla is

A:-20° wedge

B:-45° wedge

C:-30° wedge

D:-60° wedge

Correct Answer:- Option-B

Question55:-Tangential fields are used in the treatment of

A:-Lymphomas

B:-Carcinoma breast

C:-Carcinoma lung

D:-Carcinoma thyroid

Correct Answer:- Option-B

Question56:-Wedge filters are useful because

A:-Percentage depth dose is increased

B:-Output is increased

C:-Dose distributions become uniform

D:-Skin sparing effect is lost

Correct Answer:- Option-C

Question57:-Which of the following is not a immobilization device ?

A:-Thermoplastic mask

B:-Alpha cradles

C:-Head rest

D:-Front pointer

Correct Answer:- Option-D

Question58:-The minimize the risk of cold and hot spot in the junction between two photon fields, the gap should

A:-Be moved several times during the treatment course

B:-Be increased 0.5 cm each week

C:-Be increased and shifted once during the whole treatment course

D:-Be moved and decreased several times during the treatment course

Correct Answer:- Option-A

Question59:-All of the following except are various methods used for in-vivo dosimetry in Radiotherapy

A:-TLD

B:-OSLD

C:-Port Films

D:-MOSFET

Correct Answer:- Option-C

Question60:-Which of the following is not true about Dose-Volume Histogram (DVH) ?

A:-Graphically summarizes the simulated radiation distribution within a volume of a interest

B:-DVH clearly shows where within a structure a dose is received

C:-DVHs can be used as input data to estimate Tumor Control Probability (TCP) and Normal Tissue Complication Probability (NTCP)

D:-DVHs presenting the uniformity of dose in the target volume and any hot spots in adjacent normal organs or tissues

Correct Answer:- Option-B

Question61:-The higher the energy of an electron beam

A:-The greater is the percentage surface dose

B:-The greater is the bremsstrahlung dose to the patient

C:-The sharper is the dose fall-off beyond the 90% depth dose

D:-Greater is the electron backscatter from lead

Correct Answer:- **Question Cancelled**

Question62:-Which of the following is not true ?

A:-Electron beam energy selected should cover the target volume completely within 100% isodose curve

B:-Bolus is used to achieve adequate surface dose of 90-100%

C:-There is rapid dose falloff beyond the maximum dose

D:-Mean deposition of energy in tissue is 2 MeV/cm

Correct Answer:- Option-A

Question63:-When the field is reduced below that required for lateral scatter equilibrium

A:-Dmax and R90 shifts to surface

B:-Percentage Depth Dose (PDD) decreases

C:-Surface dose decreases

D:-Practical range (Rp) remains same

Correct Answer:- **Question Cancelled**

Question64:-The minimum thickness of lead required to block a 12MeV electron beam is approximately

A:-6 mm

B:-6 cm

C:-7 mm

D:-7 cm

Correct Answer:- Option-C

Question65:-What is the primary standard for electron dosimetry ?

A:-Thimble chamber

B:-Graphite calorimeter

C:-Parallel plate chamber

D:-Farmer chamber

Correct Answer:- Option-B

Question66:-At photon-electron field matching

A:-Beams should abut each other, there are cold spots in photon side and hotspots in electron side

B:-Beams should abut each other, there are cold spots in electron side and hotspots in photon side

C:-There should be a gap of 5 millimetres in between to avoid hotspots on either side

D:-There is no dose uncertainty involved

Correct Answer:- Option-B

Question67:-As the beam obliquity increases, the following would happen except

A:-Increased surface dose

B:-Dmax shifts towards surface

C:-Reduces therapeutic range

D:-Penumbra increases for surface close to source

Correct Answer:- Option-D

Question68:-Which is not true regarding total skin electron therapy ?

A:-Surface to Skin Dose (SSD) is 120 cm

B:-Modified Stanford technique with 6 different treatment positions is used

C:-Energy of electron beam used is 3-7 MeV

D:-Eighty percent isodose line should fall >4 mm deep to skin surface to ensure that epidermis and dermis fall in the high dose region

Correct Answer:- Option-A

Question69:-Which of the following is not true with respect to TSET ?

A:-Dose is 36Gy in 2 Gy per fractions in 18 cycles

B:-3 positions are treated on one day and the other 3 are treated on a different day in Modified Stanford technique

C:-Beam spoiler device will ensure that sufficient treatment depth is covered (both epidermis and dermis are getting treated)

D:-Eye shields are usually not recommended

Correct Answer:- Option-D

Question70:-Regarding IORT, which of the following is not true ?

A:-Precise localisation of the tumour bed and targeted delivery of high-dose radiation to the tumour bed

B:-Opportunities for dose escalation beyond that can be achieved with EBRT

C:-Different modalities include electron beam, kilovoltage x-rays and HDR brachytherapy

D:-Not suitable in recurrent setting

Correct Answer:- Option-D

Question71:-Which of the following is true about Ir-192 brachytherapy source ?

A:-Its role is limited in High-Dose-Rate (HDR) brachytherapy

B:-Average photon energy of 1.25 MeV

C:-Half-life~73.8 days

D:-HVL is 5 millimetres of lead

Correct Answer:- Option-C

Question72:-Which of the following brachytherapy radioisotopes has the greatest HVL ?

A:-Co-60 (average energy 1.25 MeV)

B:-Ra-226 (average energy 0.83 MeV)

C:-Cs-137 (average energy 0.66 MeV)

D:-Ir-192 (average energy 0.397 MeV)

Correct Answer:- Option-B

Question73:-Which of the following is used for LDR brachytherapy source calibration ?

A:-Graphite calorimeter

B:-Well type ionisation chamber

C:-Thimble chamber

D:-Farmer chamber

Correct Answer:- Option-B

Question74:-Which one of the following is said to be the biological advantage of LDR brachytherapy when compared to HDR ?

A:-Prolonged contact of the source with tumor tissue resulting in higher tumor killing

B:-Low dose rate is biologically similar to fractionated radiotherapy and results in sublethal damage repair of the normal tissues

C:-High specific activity of CS-137 LDR source is meaningful

D:-All of the above

Correct Answer:- Option-B

Question75:-What is the maximum depth of the tumor for which surface mould brachytherapy can be used for cure ?

A:-3mm

B:-5mm

C:-10mm

D:-12mm

Correct Answer:- Option-B

Question76:-Which of the following is not true about after loading in brachytherapy ?

A:-Can be done either manually or by remote control

B:-Significantly less radiation exposure to staff involved

C:-Plaque brachytherapy involves manual after loading technique

D:-Ir-192 and Co-60 are the most commonly used for after loading

Correct Answer:- Option-C

Question77:-Which of the following is not an implantation technique used in interstitial brachytherapy ?

A:-Peterson-Parker

B:-Manchester

C:-Quimby

D:-Stockholm

Correct Answer:- Option-D

Question78:-Which among the following is not true about ideal placement of intracavitary brachytherapy applicator in carcinoma cervix treatment ?

A:-The tandem should lie at midway between bladder and sacrum

B:-Tip of the tandem should not cross sacral promontory superiority

C:-Separated by 0.5-1 cm admitting flange in between

D:-Unacceptable geometry will result in unacceptable normal tissue toxicity, but patient's survival is not affected

Correct Answer:- Option-D

Question79:-Which among the following is not a radio pharmaceutical drug used for palliative treatment of bone metastasis ?

A:-Ra-223

B:-Sr-89

C:-Sm-153

D:-Pd-103

Correct Answer:- Option-D

Question80:-Which of the following is not true about Ir-192 brachytherapy facility ?

A:-Initial activity is usually 10 curies

B:-Higher specific activity of Ir-192 makes it an ideal source for HDR brachytherapy

C:-The source should be replaced in every 3 months or when the activity falls below 1 curie

D:-The primary barrier thickness should be 70 cm and secondary barrier thickness is 50 cm in order to ensure safety in the console

Correct Answer:- Option-D

Question81:-Which among the following does not contribute to background radiation ?

A:-Terrestrial radiation

B:-Cosmic radiation

C:-External radiation from nuclear reactors and other equipment

D:-Internal radiation arising from radioactive materials in the body

Correct Answer:- Option-C

Question82:-Out of the limits for occupational workers laid down by AERB listed below, which one is similar to those advised by ICRP ?

A:-An effective dose of 20 mSv/yr averaged over five consecutive years

B:-An effective dose of 30 mSV in any year

C:-An equivalent dose to the lens of the eye of 150 mSv in a year

D:-The equivalent dose limit to embryo/fetus shall be 1 mSv for the remainder of the pregnancy

Correct Answer:-**Question Cancelled**

Question83:-For an absorbed dose of 2 Gy during a TBI treatment using a LINAC, the equivalent dose received will be

A:-0.5 Sv

B:-1 Sv

C:-2 Sv

D:-4 Sv

Correct Answer:- Option-C

Question84:-The half value layer thickness of lead for ^{192}Ir is

A:-1 mm

B:-3 mm

C:-6 mm

D:-9 mm

Correct Answer:- Option-B

Question85:-TLD badges in India consist of following compound

A:-Lithium fluoride

B:-Lithium borate

C:-Calcium fluoride

D:-Calcium sulphate

Correct Answer:- Option-D

Question86:-Neutrons are produced with X-ray beam energy exceeding

A:-6 MV

B:-8 MV

C:-10 MV

D:-15 MV

Correct Answer:- Option-C

Question87:-For quality assurance of beam flatness for photon beams, how much dose variation is considered acceptable ?

A:-+3% to -3%

B:-+5% to -5%

C:-+7% to -7%

D:-+75 to -5%

Correct Answer:- Option-A

Question88:-The amplification of charge in a Gieger-Muller counter is INDEPENDENT of

A:-Gas pressure inside the chamber

B:-Nature of gas inside the chamber

C:-Type of radiation being detected

D:-Potential difference between anode and cathode

Correct Answer:- Option-C

Question89:-In fluoroscopic simulation, if an image is acquired with the subject at a distance shorter than SSD (=100cm) while keeping the imager at the same distance, the subject will appear

A:-Magnified in size

B:-Minified in size

C:-No change in size

D:-Cannot be commented upon

Correct Answer:- Option-A

Question90:-Peak scatter factor denotes

A:-Tissue-air ratio specific for depth of peak dose

B:-PDD at Dmax

C:-Tissue-maximum ratio specific for depth of peak dose

D:-Tissue-phantom ratio specific for depth of peak dose

Correct Answer:- Option-A

Question91:-As per ICRU report 50, which of the following statements is NOT true ?

A:-A hot spot represents a volume outside the PTV which receives a dose larger than 100% specified PTV dose

B:-A hot spot represents a volume outside the PTV which receives a dose larger than 107% specified PTV dose

C:-Degree of heterogeneity should be kept within +7% and -5% of prescribed dose

D:-For three dimensional computation, a volume is considered clinically meaningful if its minimum diameter exceeds 15 mm

Correct Answer:- Option-B

Question92:-The ICRU report 62 introduced the following aspects of 3D treatment planning in addition to the ones already explained in ICRU report 50, EXCEPT

A:-Internal margin

B:-Set-up margin

C:-Irradiated volume

D:-Planning organ at risk volume

Correct Answer:- Option-C

Question93:-Which of the following statements is NOT TRUE for inverse planning for IMRT ?

A:-Uses mathematical objective functions to assign relative importance to contoured structures

B:-Incorporates user defined dose-volume constraints

C:-Uses iterative computer-based algorithm

D:-Beam direction is assigned arbitrarily

Correct Answer:- Option-D

Question94:-In dynamic MLC delivery of IMRT, intensity modulation is achieved if parallel MLC leaves are moving

A:-In the same direction with same velocities

B:-In opposite directions with different velocities

C:-In same direction with different velocities

D:-In opposite directions with same velocities

Correct Answer:- Option-C

Question95:-As per HyTec are commendations, metastatic brain lesions should be considered for SRT instead of SRS if their maximum diameter exceeds

A:-15 mm

B:-20 mm

C:-25 mm

D:-30 mm

Correct Answer:- Option-B

Question96:-Which of the following mechanisms have been attributed to tumor cell death by SRS ?

A:-Direct DNA damage

B:-Radiation induced vascular damage

C:-Anti-tumor immune response after SRS

D:-All of the above

Correct Answer:- Option-D

Question97:-A dedicated gantry based isocentric linear accelerator for SRS/SBRT has which of the following ?

1. Flattening filter free beam

2. Reduced leaf width MLC

3. Motion management systems

4. 6D robotic couch table

A:-1 and 2

B:-2 and 3

C:-1, 2, 3 and 4

D:-2, 3 and 4

Correct Answer:- Option-C

Question98:-Which step in the installation and commissioning process of a new radiotherapy facility involves verifying the accuracy of beam delivery by comparing calculated and measured dose distributions in a phantom ?

A:-Dosimetric verification of treatment planning systems

B:-Measurement of treatment machine output factors

C:-Validation of source positioning accuracy

D:-Assessment of patient immobilization devices

Correct Answer:- Option-A

Question99:-What is a key procedural step in the installation and commissioning of a teletherapy radiotherapy facility that involves the verification of beam characteristics using water phantoms and ionization chambers ?

A:-Assessment of patient immobilization devices

B:-Validation of treatment planning systems

C:-Calibration of beam output using dosimetry techniques

D:-Evaluation of radiation shielding adequacy

Correct Answer:- Option-C

Question100:-In the calibration process of a new radiotherapy unit, what procedure ensures accurate delivery of prescribed radiation doses by establishing the relationship between monitor units and absorbed dose ?

A:-Dosimetric verification of treatment planning systems

B:-Measurement of treatment machine output factors

C:-Validation of source strength using ionization chambers

D:-Calculation of tissue-phantom ratios for various treatment depths

Correct Answer:- Option-B