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MPA-25

प्रश्न-पुस्तिका संख्या व बारकोड /
Question Booklet No. & Barcode

इस प्रश्न-पुस्तिका को तब तक न खोलें जब तक
कहा न जाए। Do not open this Question
Booklet until you are asked to do so.

पुस्तिका में पृष्ठों की संख्या : 24
Number of Pages in Booklet : 24
पुस्तिका में प्रश्नों की संख्या : 150
No. of Questions in Booklet : 150



Paper Code : 75

Sub : Radiation Oncology / Radiotherapy

समय : 02:30 घण्टे + 10 मिनट अतिरिक्त * *Exam Date 03/07/2025* अधिकतम अंक : 150
Time : 02:30 Hours + 10 Minutes Extra * Maximum Marks : 150

प्रश्न-पुस्तिका के पेपर की सील/पॉलीथीन बैग को खोलने पर प्रश्न-पत्र हल करने से पूर्व परीक्षार्थी यह सुनिश्चित कर लें कि :

- प्रश्न-पुस्तिका संख्या तथा ओ.एम.आर. उत्तर-पत्रक पर अंकित बारकोड संख्या समान हैं।
- प्रश्न-पुस्तिका एवं ओ.एम.आर. उत्तर-पत्रक के सभी पृष्ठ व सभी प्रश्न सही मुद्रित हैं। समस्त प्रश्न, जैसा कि ऊपर वर्णित है, उपलब्ध हैं तथा कोई भी पृष्ठ कम नहीं है / मुद्रण त्रुटि नहीं है। किसी भी प्रकार की विसंगति या दोषपूर्ण होने पर परीक्षार्थी वीक्षक से दूसरा प्रश्न-पत्र प्राप्त कर लें। यह सुनिश्चित करने की जिम्मेदारी अभ्यर्थी की होगी। परीक्षा प्रारम्भ होने के 5 मिनट पश्चात् ऐसे किसी दावे/आपत्ति पर कोई विचार नहीं किया जायेगा।

On opening the paper seal/polythene bag of the Question Booklet before attempting the question paper, the candidate should ensure that :
• Question Booklet Number and Barcode Number of OMR Answer Sheet are same.

- All pages & Questions of Question Booklet and OMR Answer Sheet are properly printed. All questions as mentioned above are available and no page is missing/misprinted.

If there is any discrepancy/defect, candidate must obtain another Question Booklet from Invigilator. Candidate himself shall be responsible for ensuring this. No claim/objection in this regard will be entertained after five minutes of start of examination.

परीक्षार्थियों के लिए निर्देश

1. प्रत्येक प्रश्न के लिये एक विकल्प भरना अनिवार्य है।
2. सभी प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का मात्र एक ही उत्तर दीजिए। एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
4. OMR उत्तर-पत्रक इस प्रश्न-पुस्तिका के अन्दर रखा है। जब आपको प्रश्न-पुस्तिका खोलने को कहा जाए, तो उत्तर-पत्रक निकाल कर ध्यान से केवल नीले बॉल पॉइंट पेन से विवरण भरें।
5. कृपया अपना रोल नम्बर ओ.एम.आर. उत्तर-पत्रक पर सावधानीपूर्वक सही भरें। गलत रोल नम्बर भरने पर परीक्षार्थी स्वयं उत्तरदायी होगा।
6. ओ.एम.आर. उत्तर-पत्रक में करेक्शन पेन/व्हाइटनर/सफेदा का उपयोग निषिद्ध है।
7. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है।
8. प्रत्येक प्रश्न के पाँच विकल्प दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4, 5 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले (बबल) को उत्तर-पत्रक पर नीले बॉल पॉइंट पेन से गहरा करना है।
9. यदि आप प्रश्न का उत्तर नहीं देना चाहते हैं तो उत्तर-पत्रक में पाँचवें (5) विकल्प को गहरा करें। यदि पाँच में से कोई भी गोला गहरा नहीं किया जाता है, तो ऐसे प्रश्न के लिये प्रश्न अंक का 1/3 भाग काटा जायेगा।
10. * प्रश्न-पत्र हल करने के उपरांत अभ्यर्थी अनिवार्य रूप से ओ.एम.आर. उत्तर-पत्रक जाँच लें कि समस्त प्रश्नों के लिये एक विकल्प (गोला) भर दिया गया है। इसके लिये ही निर्धारित समय से 10 मिनट का अतिरिक्त समय दिया गया है।
11. यदि अभ्यर्थी 10% से अधिक प्रश्नों में पाँच विकल्पों में से कोई भी विकल्प अंकित नहीं करता है तो उसको अयोग्य माना जायेगा।
12. मोबाइल फोन अथवा अन्य किसी इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए राजस्थान सार्वजनिक परीक्षा (भर्ती में अनुचित साधनों की रोकथाम अध्यापन) अधिनियम, 2022 तथा अन्य प्रभावी कानून एवं आयोग के नियमों-प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

INSTRUCTIONS FOR CANDIDATES

1. It is mandatory to fill one option for each question.
2. All questions carry equal marks.
3. Only one answer is to be given for each question. If more than one answers are marked, it would be treated as wrong answer.
4. The OMR Answer Sheet is inside this Question Booklet. When you are directed to open the Question Booklet, take out the Answer Sheet and fill in the particulars carefully with Blue Ball Point Pen only.
5. Please correctly fill your Roll Number in OMR Answer Sheet. Candidates will themselves be responsible for filling wrong Roll No.
6. Use of Correction Pen/Whitener in the OMR Answer Sheet is strictly forbidden.
7. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. A wrong answer means an incorrect answer or more than one answers for any question.
8. Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
9. If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.
10. * After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.
11. A candidate who has not darkened any of the five circles in more than 10% questions shall be disqualified.
12. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt with as per rules.

Warning : If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would be liable to be prosecuted under Rajasthan Public Examination (Measures for Prevention of Unfair means in Recruitment) Act, 2022 & any other laws applicable and Commission's Rules-Regulations. Commission may also debar him/her permanently from all future examinations.

उत्तर-पत्रक में दो प्रतियाँ हैं - मूल प्रति और कार्बन प्रति। परीक्षा समाप्ति पर परीक्षा कक्ष छोड़ने से पूर्व परीक्षार्थी उत्तर-पत्रक की दोनों प्रतियाँ वीक्षक को सौंपेंगे, परीक्षार्थी स्वयं कार्बन प्रति अलग नहीं करें। वीक्षक उत्तर-पत्रक की मूल प्रति को अपने पास जमा कर, कार्बन प्रति को मूल प्रति से कट लाइन से मोड़ कर सावधानीपूर्वक अलग कर परीक्षार्थी को सौंपेंगे, जिसे परीक्षार्थी अपने साथ ले जायेंगे। परीक्षार्थी को उत्तर-पत्रक की कार्बन प्रति चयन प्रक्रिया पूर्ण होने तक सुरक्षित रखनी होगी एवं आयोग द्वारा माँगे जाने पर प्रस्तुत करनी होगी।

1. Which of the following types of radiation has the highest Linear Energy Transfer (LET) ?

- (1) Neutrons
- (2) Protons
- (3) Gamma rays

(4) X-rays

(5) Question not attempted

2. Healthy 13-year-old girl received a vaccine against Human Papilloma Virus (HPV), is an example of :

(1) Primary prevention

(2) Secondary prevention

(3) Tertiary prevention

(4) Case finding

(5) Question not attempted

3. Beam flatness is measured over _____ of field width, specified at 10 cm depth.

(1) 50%

(2) 60%

(3) 70%

(4) 80%

(5) Question not attempted

4. Example of Pure Beta Emitter isotope :

(1) Cobalt-60

(2) Caesium-137

(3) Strontium-90

(4) Tantalum-182

(5) Question not attempted

5. If an atom is ionized, a vacancy may be created in an inner electron orbital. An electron in an outer orbital will then fill the vacancy and a photon with energy equal to the difference in energy of the two orbitals is created.

The photon is known as

(1) Characteristic X-rays

(2) Bremsstrahlung X-rays

(3) Auger electrons

(4) Fluorescent yield

(5) Question not attempted

6. SBRT is generally preferred in Cancer of Lung in

(1) Central tumors

(2) Peripheral tumors

(3) SVC syndrome

(4) Pleural effusion

(5) Question not attempted

7. Recommended dose to spinal cord during Cranio spinal irradiation

(1) 23.4 Gy (2) 36 Gy

(3) 50.4 Gy (4) 60 Gy

(5) Question not attempted

8. What is correct about 'START-A' trial of breast radiotherapy ?

(1) The treatment was delivered in 5 weeks in test arm.

(2) Loco-regional recurrences were same in 39 and 41.6 Gy arm.

(3) α/β ratio for breast cancer is 10.

(4) There was no conventional RT arm.

(5) Question not attempted

9. A 40 year young lady has come with a 3 cm painless lump in right breast UOQ and USG-Mammography reports as BIRADS 4. What next step is best ?
- (1) FNAC
 - (2) Excision biopsy
 - (3) Core biopsy
 - (4) Mastectomy followed by histopathology
 - (5) Question not attempted
10. Which molecular subgroup of the medulloblastoma has the worst prognosis ?
- (1) Type - 4
 - (2) SHH
 - (3) WNT
 - (4) Group - 3
 - (5) Question not attempted
11. Which of the following sub sites require elective nodal radiotherapy ?
- (1) T2N0M0 nasal cavity cancer.
 - (2) T1N0M0 lower lip cancer.
 - (3) T2N0M0 supraglottic cancer.
 - (4) T3N0M0 paranasal sinus cancer.
 - (5) Question not attempted
12. In flank radiation therapy in a child of Wilms' tumor, which is not correct ?
- (1) Start radiation therapy within preferably D10.
 - (2) Dose is 10.8 Gy/ 6 Fr for favourable histology.
 - (3) The radiation portal covers only half width of the spine to limit toxicity.
 - (4) The radiation fields are usually 3D anterior-posterior fields.
 - (5) Question not attempted
13. Pre operative dose for Cancer of Rectum in the Swedish trial was
- (1) 50 Gy/ 25 fractions
 - (2) 40 Gy/ 20 fractions
 - (3) 25 Gy/ 5 fractions
 - (4) 30 Gy/ 10 fractions
 - (5) Question not attempted
14. A 60 year old smoker has hoarseness of voice with no palpable neck nodes. On the IDL examination you can see the Rt vocal cord mobile. Left VC has a growth and however looks slightly restricted. What do you think is the stage of the tumor ?
- (1) cT1N0M0
 - (2) cT2N0M0
 - (3) cT3N0M0
 - (4) cT4N0M0
 - (5) Question not attempted
15. Radiotherapy doses employed to treat Histiocytosis-X
- (1) 30-32 Gy
 - (2) 7-10 Gy
 - (3) 40 Gy
 - (4) 50-55 Gy
 - (5) Question not attempted
16. For a conventional planning of T1N0M0 carcinoma of glottic larynx, which of the following is false ?
- (1) The typical field size is a square of 5-6 cm.
 - (2) Upper border is kept at the top of thyroid cartilage.
 - (3) Inferior border is placed above the cricoid cartilage.
 - (4) Posterior border is at the anterior edge of the vertebral body.
 - (5) Question not attempted

17. What is the recommended schedule for prophylactic cranial radiotherapy for small cell lung cancer ?
- (1) 25 Gy @ 2.5 Gy per fraction
 - (2) 36 Gy @ 3 Gy per fraction
 - (3) 30 Gy @ 3 Gy per fraction
 - (4) 20 Gy @ 4 Gy per fraction
 - (5) Question not attempted
18. Wedge angle used for treatment of Cancer of Maxillary antrum
- (1) 30 Degree (2) 45 Degree
 - (3) 15 Degree (4) 60 Degree
 - (5) Question not attempted
19. 50 years old female underwent a surgery for carcinoma lateral border tongue. Post-op histopathology is suggestive of tumor size of 4.5 cm along C 5 nodes positive along with extracapsular extension. What is the ideal management ?
- (1) Observation
 - (2) Post-op radiotherapy 60–66 Gy
 - (3) Post-op radiotherapy – 70 Gy
 - (4) Post-op radiotherapy with cisplatin
 - (5) Question not attempted
20. What is the treatment of choice for Pancoast tumor ?
- (1) Induction chemotherapy followed by surgery.
 - (2) Surgery followed by adjuvant chemoradiation.
 - (3) Chemoradiation followed by surgery.
 - (4) Radiation followed by sequential chemotherapy.
 - (5) Question not attempted
21. As attending radiation oncologist, you have been called to review a 3D-CRT plan for carcinoma lung. V30 for heart as per QUANTEC is acceptable, if the mean dose is less than :
- (1) 26 Gy (2) 36 Gy
 - (3) 46 Gy (4) 56 Gy
 - (5) Question not attempted
22. Mould brachytherapy is feasible in
- (1) Cancer of Tonsil
 - (2) Cancer of Hypopharynx
 - (3) Cancer of Uvula
 - (4) Cancer of Hard Palate
 - (5) Question not attempted
23. Which statement is correct about male breast cancer ?
- (1) Aromatase inhibitors are preferred over Tamoxifen.
 - (2) Invasive lobular carcinoma is the most common histology.
 - (3) Hormone receptor positivity rate is high among male breast cancer.
 - (4) Presents in early stages due to lack of soft tissue.
 - (5) Question not attempted

24. Dose for post operative Radiotherapy in Cancer Breast devised in START-B Trial ?
 (1) 50 Gy/ 25# (2) 36 Gy/ 6#
 (3) 40 Gy/ 15# (4) 30 Gy/ 10#
 (5) Question not attempted
25. Which meta-analysis of cancer trails deals with head and neck cancers ?
 (1) MACHNC (2) MAGIC
 (3) CHHiP (4) CROSS
 (5) Question not attempted
26. A 68 year old man is newly diagnosed with a prostate cancer showing the following features – cancer in 6 of 12 core biopsies, bilaterally. Gleason score 4+5=9, PS A = 10.4 ng/dl. CT & bone scan without evidence of lymphadenopathy or distant metastases. What is the more appropriate treatment plan ?
 (1) Active surveillance with yearly biopsies & PSA test
 (2) Brachytherapy
 (3) External beam radiotherapy & short term ADT
 (4) External beam radiotherapy & long term ADT
 (5) Question not attempted
27. Tolerance Dose of Radiation for whole Kidney in general
 (1) < 20 Gy (2) < 40 Gy
 (3) < 30 Gy (4) < 50 Gy
 (5) Question not attempted
28. In the CROSS trial, the dose of radiation therapy to oesophagus PTV was
 (1) 41.4 Gy (2) 45 Gy
 (3) 50 Gy (4) 60 Gy
 (5) Question not attempted
29. A 48 year male was treated for anaplastic astrocytoma about a year back, with postoperative chemo radiation. He is on follow up and complains of fever of possible viral etiology and headache. An MRI was done and showed some altered signals in the operated area. The signals are T1 iso, T1 C patchy enhancement, T2 flair bright. The MRS showed high lipid lactate peak, low choline creat peak with decreased perfusion. What is the probable diagnosis ?
 (1) Recurrence of anaplastic astrocytoma
 (2) Transformation to glioblastoma
 (3) Radiation necrosis
 (4) Radiation gliosis
 (5) Question not attempted
30. Cranial and caudal limits for contouring level II neck nodes
 (1) Cranial edge of lateral process of C-2 Spine, Cranial edge of Hyoid Bone.
 (2) Caudal edge of lateral process of C-2 Spine, Cranial edge of Thyroid Cartilage.
 (3) Cranial edge of lateral process of C-1 Spine, Cranial edge of Hyoid Bone.
 (4) Caudal edge of lateral process of C-1 Spine, Caudal edge of Hyoid Bone.
 (5) Question not attempted

31. Which structure is not included in target volume for cancer of the Head of Pancreas ?

- (1) Duodenal bed
- (2) Porta hepatis
- (3) Pancreaticoduodenal nodes
- (4) Splenic hilum
- (5) Question not attempted

32. Radioactive isotope used for permanent implant in cancer Prostate

- (1) I-125 (2) Co-60
- (3) Cs-137 (4) Ir-192
- (5) Question not attempted

33. As per ICRU, Internal organ motion is separately accounted for by

- (1) Gross Target Volume
- (2) Internal Target Volume
- (3) Planning Target Volume
- (4) Clinical Target Volume
- (5) Question not attempted

34. Most common acute reaction during thoracic radiotherapy

- (1) Spinal cord toxicity
- (2) Mediastinitis
- (3) Oesophagitis
- (4) Bronchitis
- (5) Question not attempted

35. Dose for involved site radiotherapy post chemotherapy in Hodgkin's lymphoma

- (1) 20-30 Gy (2) 50-60 Gy
- (3) 10-15 Gy (4) 45 Gy
- (5) Question not attempted

36. Maximum Lung Volume acceptable in Tangential fields for Breast Radiotherapy

- (1) 2-3 Cm (2) 5 Cm
- (3) 7-8 Cm (4) < 1 Cm
- (5) Question not attempted

37. Choice of treatment for Ewing's sarcoma of Rib post Chemotherapy

- (1) Surgery
- (2) Radiotherapy
- (3) Immunotherapy
- (4) Observation
- (5) Question not attempted

38. Best Diagnostic method for Cancer Cervix staging

- (1) MRI
- (2) EUA
- (3) CT scan
- (4) Clinical examination
- (5) Question not attempted

39. The Fast Forward trial showed that only 5 fractions of adjuvant RT in breast may be non inferior. If you have to reproduce their result in your patients, what will be the lung constraint you will use as per their protocol ?
- (1) $V20 < 30\%$
 - (2) Ipsilateral lung receiving 8 Gy $< 15\%$ volume
 - (3) Mean lung dose $< 15\%$
 - (4) $V30 < 20\%$
 - (5) Question not attempted
40. In which tumor Prophylactic Cranial Irradiation is a part of treatment ?
- (1) Hodgkin's lymphoma
 - (2) Testicular lymphoma
 - (3) Carcinoma of bladder
 - (4) CML
 - (5) Question not attempted
41. Radiotherapy alone is an option for which type of Hodgkin's Lymphoma (HL) \bar{C} Ann - Arbor stage I ?
- (1) Lymphocytic depletion classic HL
 - (2) Lymphocytic rich classic HL
 - (3) Mixed cellularity classic HL
 - (4) Nodular lymphocytic predominant HL
 - (5) Question not attempted
42. In adjuvant radiation therapy of breast cancer, multiple fractionations are now proven safe and effective like 50 Gy/ 25 Fractions, 42.5 Gy/ 16 Fr, 40 Gy/ 15 Fractions etc. What can be common in all for a patient of Breast Conservation Surgery ?
- (1) Total dose to PTV
 - (2) Dose to Heart
 - (3) Dose to Ipsilateral Lung
 - (4) Dose of the boost of cavity
 - (5) Question not attempted
43. In an elderly patient with glioblastoma, evidence supports what fractionation of adjuvant RT ?
- (1) 40 Gy in 3 weeks
 - (2) 30 Gy in 2 weeks
 - (3) 50 Gy in 4 weeks
 - (4) 40 Gy in 2 weeks
 - (5) Question not attempted
44. What is the gold standard treatment for locally advanced nasopharyngeal cancer ?
- (1) Surgery alone
 - (2) Concurrent chemo-radiation
 - (3) NACT followed by chemo-radiation
 - (4) Chemo-radiation followed by adjuvant chemotherapy
 - (5) Question not attempted

45. What is true for solitary brain metastasis of a follow up patient of cancer breast ?
- (1) Surgery followed by SRS gives the best outcome.
 - (2) Surgery alone is sufficient.
 - (3) SRS alone is sufficient.
 - (4) Surgery followed by WBRT is best.
 - (5) Question not attempted
46. The criteria which defines indication for post hysterectomy radiation therapy in early stage cervix cancer is
- (1) Sedlis criteria
 - (2) WPOI criteria
 - (3) Van-Nuys criteria
 - (4) ASTRO criteria
 - (5) Question not attempted
47. CTCAE is used to measure toxicity in oncology clinic, what is the full form ?
- (1) Common Toxicity Criteria for Adverse Events
 - (2) Common Terminology Criteria for Adverse Events
 - (3) Comprehensive Toxicity Criteria for Adverse Events
 - (4) Comprehensive Terminology Criteria for Adverse Events
 - (5) Question not attempted
48. A 50 year old man has blood in urine and is found with urothelial cancer of the bladder. Which is an indication for organ preservation approach with chemo-radiation therapy ?
- (1) Multifocal bladder cancer, low grade
 - (2) High grade bladder cancer with lymph nodes
 - (3) Multifocal high grade bladder cancer, muscle invasive with no lymph nodes
 - (4) Hamartoma of urinary bladder
 - (5) Question not attempted
49. A patient presents with a shock-like sensation in the extremities with neck flexion 4 months after receiving head & neck radiation. What is the most likely cause of his symptoms ?
- (1) Brachial Plexopathy
 - (2) Lhermittes' syndrome
 - (3) Sciatica
 - (4) Guillian – Barre syndrome
 - (5) Question not attempted
50. In SBRT Liver, often studies have explored constraints to how much volume of liver ?
- (1) 200 cc
 - (2) 500 cc
 - (3) 700 cc
 - (4) 1500 cc
 - (5) Question not attempted

51. Which of the following best describes abscopal effect ?
- (1) A localized tumor response following Stereotactic Body Radiotherapy (SBRT)
 - (2) A combined effect observed at the irradiated site
 - (3) Systemic effects of immunosuppression
 - (4) Therapeutic effect at distance from irradiated site.
 - (5) Question not attempted
52. What is the post-operative radiotherapy dose for Wilms' tumor for flank RT ?
- (1) 10.8 Gy in 6 fractions
 - (2) 12 Gy in 8 fractions
 - (3) 10.5 Gy in 7 fractions
 - (4) 19.8 Gy in 11 fractions
 - (5) Question not attempted
53. TSET is most effective in
- (1) Cutaneous T Cell lymphoma, any stage
 - (2) Mycosis fungoides
 - (3) Sezary syndrome
 - (4) Skin involvement in Kaposi's sarcoma
 - (5) Question not attempted
54. A 11 year boy with rhabdomyosarcoma, on chemotherapy has reported with painful liver enlargement without any metastasis seen. He has jaundice and weight gain and edema. There is suspicion of sinusoidal obliteration syndrome. Which drug is most likely the culprit ?
- (1) Actinomycin D
 - (2) Vincristine
 - (3) Doxorubicin
 - (4) Steroids
 - (5) Question not attempted
55. Which of the following is the primary cause of hypersensitivity reactions associated with paclitaxel administration ?
- (1) IgE-mediated allergic response to paclitaxel itself
 - (2) Accumulation of paclitaxel metabolites in the liver
 - (3) Release of cytokines due to tumor cell lysis
 - (4) Cremophor EL, the solvent used in the paclitaxel formulation
 - (5) Question not attempted
56. FDA Risk factor for chemotherapeutic drugs during pregnancy category X refers to
- (1) Controlled studies have shown that the foetus has low risk of harm in first as well as later trimesters.
 - (2) No studies exist about safety or effects in pregnant women. No information about safety.
 - (3) Studies have shown fetal malformations and thus these drugs are contraindicated in pregnancy.
 - (4) There is evidence that drugs may be toxic to foetuses but benefits to pregnant women outweigh the risks.
 - (5) Question not attempted

57. A patient with cancer cervix is on chemotherapy and radiation therapy and presents with severe weakness. Her serum potassium is low and despite infusion of KCL, not much clinical and biochemical improvement is there. What may be the cause ?

- (1) KNO_3 is a better infusion than KCL for hypokalemia
- (2) Low sodium often coexists with hypokalemia
- (3) Low magnesium may cause refractory hypokalemia
- (4) Low calcium may cause refractory hypokalemia
- (5) Question not attempted

58. Which of the following represents the correct nomenclature for a humanized monoclonal antibody used in immunotherapy ?

- (1) -omab (2) -zumab
- (3) -mumab (4) -ximab
- (5) Question not attempted

59. A patient of Glioblastoma is prescribed Temozolomide with radiation therapy. Which is the most common toxicity of the drug requiring dose reductions ?

- (1) Neutropenia
- (2) Thrombocytopenia
- (3) Anemia
- (4) Intratumoral bleeding
- (5) Question not attempted

60. Most cytotoxic chemotherapies are given in 3 weekly gaps. Why ? What is the best reason for the same ?

- (1) The 3 week time is required for the tumor to go into accelerated repopulation and the next cycle is more effective then.
- (2) The 3 week time is required for the haematopoietic cells to recover.
- (3) The 3 week time is required for the drugs to wash out from the body as most anti cancer drugs have half life of approximately 2-3 weeks.
- (4) The 3 week time is required for macrophage and immune cells to clear debris from the previous cycle necrosis produced.
- (5) Question not attempted

61. Chemoprophylaxis of Breast Cancer can be done by

- (1) Tamoxifen
- (2) Endoxan tablets
- (3) Estrogen pills
- (4) Clomiphene Citrate tablets
- (5) Question not attempted

62. Which of the following anti neoplastic agents causes predominantly reversible cardiac abnormalities ?

- (1) Adriamycin
- (2) Epirubicin
- (3) Trastuzumab
- (4) Mitomycin C
- (5) Question not attempted

63. A 63 years old woman is diagnosed with a high-grade serous adenocarcinoma of the ovary, FIGO stage III C. She received optimal debulking & recovered well from surgery. She is a known carrier of a BRCA1 mutation. What is the best management for this patient ?
- (1) Hyperthermic intraperitoneal chemotherapy
 - (2) 6 cycles of Paclitaxel / Carboplatin followed by Bevacizumab maintenance
 - (3) 6 cycles of Paclitaxel / Carboplatin followed by Olaparib maintenance
 - (4) Six cycles of Carboplatin / Paclitaxel
 - (5) Question not attempted
64. Half life of Temozolamide is
- (1) 2 hours (2) 2 days
 - (3) 2 minutes (4) 2 weeks
 - (5) Question not attempted
65. Which 'wonder drug' established the concept of oncogene addiction and revolutionized Chronic Myelogenous Leukemia (CML) therapy ?
- (1) Gefitinib
 - (2) Imatinib
 - (3) Bevacizumab
 - (4) Temozolamide
 - (5) Question not attempted
66. Which of the following descriptions best fits the definition of febrile neutropenia ?
- (1) Oral temperature $> 38^{\circ}\text{C}$ for 2 hours & absolute neutrophil count (ANC) $< 1.0 \times 10^9/\text{l}$
 - (2) Oral temperature $> 38.5^{\circ}\text{C}$ & ANC $< 0.5 \times 10^9/\text{l}$
 - (3) Oral temperature with two consecutive readings $> 37.5^{\circ}\text{C}$ and ANC $< 0.5 \times 10^9/\text{l}$
 - (4) Oral temperature $> 38.5^{\circ}\text{C}$ and ANC $< 1.0 \times 10^9/\text{l}$
 - (5) Question not attempted
67. A 53 year old man has completed chemoradiotherapy for PDL-1 positive stage III B adeno-NSCLC. Staging CT reveals partial remission. Which is the most appropriate further management ?
- (1) Durvalumab therapy for 12 months.
 - (2) Pembrolizumab therapy for 12 months.
 - (3) No further therapy required, regular follow-up.
 - (4) Maintenance therapy with pemetrexed until progression.
 - (5) Question not attempted
68. Chemotherapy combination most commonly used in treatment of cancer of anal canal
- (1) Cis-platinum and Etoposide
 - (2) 5-FU and Mitomycin
 - (3) Doxorubicin and Cyclophosphamide
 - (4) 5-FU and Oxaloplatin
 - (5) Question not attempted

69. Chemotherapeutic drug used in treatment of stage I Seminoma
- (1) Bleomycin
 - (2) Etoposide
 - (3) Carboplatin
 - (4) Actinomycin-D
 - (5) Question not attempted
70. Which one of the following is not associated with primary Glioblastoma multiformae ?
- (1) EGFR amplification
 - (2) PTEN mutation
 - (3) LOH 10p
 - (4) IDH1 mutation
 - (5) Question not attempted
71. Overall Survival benefit of adding chemotherapy to radiation in cancer of Cervix
- (1) 10% (2) 6%
 - (3) 20% (4) No benefit
 - (5) Question not attempted
72. While considering the adjuvant hormonal therapy with Aromatase inhibitor which patients are not considered to be post menopausal ?
- (1) FSH-35 mIU/ml, Estradiol-5 pg/ml
 - (2) Age > 50 years
 - (3) Age < 50 years but amenorrhoeic for 12 months in absence of drugs
 - (4) Post bilateral salpingo - oophorectomy
 - (5) Question not attempted
73. Dose limiting toxicity of Bleomycine is
- (1) Neutropenia
 - (2) GI Toxicity
 - (3) Hand Foot Syndrome
 - (4) Pneumonitis
 - (5) Question not attempted
74. Bortezomib causes inhibition of
- (1) Bcl-2
 - (2) Proteasome
 - (3) Thymidilate synthetase
 - (4) MDM2
 - (5) Question not attempted
75. As per Bonner's trial, addition of Cituximab to Radiotherapy in Head and Neck Cancers, increases
- (1) Local control only
 - (2) Local control and Disease free survival
 - (3) Local control, Disease free and overall survival
 - (4) No benefit
 - (5) Question not attempted
76. Example of Microtubule stabilizing drug
- (1) Cyclophosphamide
 - (2) Taxane
 - (3) Vinblastine
 - (4) Procarbazine
 - (5) Question not attempted

77. The HPV vaccine Gardasil

- (1) Is a quadrivalent vaccine containing Virus Like Particle (VLP) from four different types of HPV
- (2) Protects from all HPV causing cervical cancer
- (3) Is recommended only for sexually active women
- (4) Is recommended for treating cervical cancer
- (5) Question not attempted

78. Dose of Adjuvant Temozolamide after Radiotherapy in Glioblastoma Multiformae

- (1) 75 Mg/M²
- (2) 300 Mg/M²
- (3) 200 Mg/M²
- (4) 500 Mg/M²
- (5) Question not attempted

79. Targeted Therapy for Metastatic Adenocarcinoma of Lung ALK positive

- (1) Gefitinib
- (2) Erlotinib
- (3) Crizotinib
- (4) Imatinib
- (5) Question not attempted

80. Which of the following statements regarding prophylactic oophorectomy is true ?

- (1) Prophylactic Bilateral Salpingo - Oophorectomy (BSO) is the most effective therapy to reduce the risk of ovarian cancer in women with BRCA 1 or BRCA 2 gene mutation.
- (2) BSO in BRCA 1 or BRCA 2 gene mutation carriers is indicated at age 30.
- (3) BSO in BRCA 1 or BRCA 2 gene mutation carriers has no effect on the risk of developing breast cancer.
- (4) All of these
- (5) Question not attempted

81. If a patient of metastatic breast cancer with bone mets and limited lung mets is started on tamoxifen and develops progression of lung mets and increase in bone pain, most appropriate next line of management will be :

- (1) Wait and watch
- (2) Shift to aromatase inhibitors
- (3) Shift to fulvestrant
- (4) Shift to systemic chemotherapy
- (5) Question not attempted

82. Which of the following is an Anti PD1 Targeting Agent ?

- (1) Imatinib (2) Cetuximab
- (3) Nivolumab (4) Rituximab
- (5) Question not attempted

83. Chemotherapeutic Drug used to treat Melanoma

- (1) Dacarbazine
- (2) Chloambucil
- (3) Temozolamide
- (4) Carmustine
- (5) Question not attempted

84. A patient on adjuvant chemotherapy for rectal cancer was advised to chew ice cubes for oral mucositis while receiving chemotherapy in the day care. Suddenly he starts complaining of tingling sensations in mouth. What is the reason ?

- (1) Capecitabine induced neuropathy
- (2) Oxaloplatin induced hypocalcemia
- (3) Capecitabine induced hypocalcemia
- (4) Oxaoloplatin induced neuropathy
- (5) Question not attempted

85. As per RECIST criteria 1.1 Partial Response is defined as

- (1) > 50% regression
- (2) > 30% regression
- (3) No regression
- (4) > 20% increase
- (5) Question not attempted

86. Principal treatment limiting side effects of which drug is hypersensitivity reaction ?

- (1) Paclitaxel
- (2) Asparaginase
- (3) Rituximab
- (4) Nivolumab
- (5) Question not attempted

87. Nerve at risk of damage during Thyroid Surgery

- (1) Cervical Sympathetic Chain
- (2) Phrenic Nerve
- (3) Recurrent Laryngeal Nerve
- (4) Vagus Nerve
- (5) Question not attempted

88. T2N1 presentation in HPV Positive Oropharynx cancer is considered as

- (1) Stage II (2) Stage III
- (3) Stage I (4) Stage IV
- (5) Question not attempted

89. Which of the following is a contraindication for interstitial brachytherapy used as APBI in breast cancer treatment ?

- (1) Early stage invasive ductal carcinoma
- (2) Clear surgical margins after lumpectomy
- (3) Diffuse or multicentric disease with total size of tumor 3.5 cm
- (4) Tumor size less than 3 cm
- (5) Question not attempted

90. What is the T staging if no head & neck primary is found after workup ?

- (1) T₀ (2) T_x
- (3) T₁ (4) T_{is}
- (5) Question not attempted

91. Which of the following nerve is responsible for Otolgia in cancers of larynx / hypopharynx ?

- (1) Auriculotemporal nerve
- (2) Jacobson nerve
- (3) Arnold nerve
- (4) Hypoglossal nerve
- (5) Question not attempted

92. In which stage of prostate cancer is radiation therapy generally considered superior or equivalent to robotic-assisted radical prostatectomy in terms of oncologic outcomes and quality of life ?

- (1) Localized low-risk prostate cancer
- (2) Locally advanced (Stage T3 or T4) prostate cancer
- (3) Metastatic prostate cancer
- (4) Benign Prostatic Hyperplasia (BPH)
- (5) Question not attempted

93. Reese - Ellsworth grouping system is used for which malignancy ?

- (1) Neuroblastoma
- (2) Ewing's sarcoma
- (3) Wilms' tumor
- (4) Retinoblastoma
- (5) Question not attempted

94. Positive Supraclavicular node is considered as, in cancer Nasopharynx

- (1) N-1 (2) N-3
- (3) N-2 (4) N-0
- (5) Question not attempted

95. What is the meaning of R₁ resection in Onco surgery ?

- (1) Negative margin
- (2) Gross residual disease
- (3) Microscopic positive disease
- (4) None of these
- (5) Question not attempted

96. Which anti-emetic causes constipation ?

- (1) Steroids
- (2) Ondansetron
- (3) Metoclopramide
- (4) Domperidone
- (5) Question not attempted

97. Mr. Rajesh is a 50 year old sportsman in excellent general condition and has been diagnosed with inoperable pancreatic cancer with SMA encasement.

Choose correct option :

- (1) He should be referred to only palliative care now, because his cancer may not be cured completely.
- (2) He should not be referred to palliative care right now, as death is not yet close, he is not terminal and is in good health.
- (3) He should be started in chemoradiation and also palliative care as early as possible.
- (4) He should be given only palliative chemotherapy and also palliative care as early as possible.
- (5) Question not attempted

98. According to the Recursive Partitioning Analysis (RPA) derived from three consecutive RTOG trials on brain metastases, all of the following characteristics are associated with RPA class I, except :

- (1) Age less than 65 years
- (2) KPS of 70 or higher
- (3) Controlled primary malignancy
- (4) Controlled extra-cranial metastasis disease
- (5) Question not attempted

99. Dr. Nirmala is on call duty in the cancer center and an advanced elderly patient of cancer colon has come with pain in abdomen with impending intestinal obstruction. He has no comorbidity. The patient has already refused for any kind of surgery. Which injection is relatively contraindicated ?

- (1) Inj. Buscopan
- (2) Inj. Dexamethasone
- (3) Inj. Diclofenac Sodium
- (4) Inj. Paracetamol
- (5) Question not attempted

100. What statement is true regarding Morphine ?

- (1) Morphine comes both in oral & parenteral forms.
- (2) The starting dose is 5-10 mg, six hourly.
- (3) A laxative is prescribed when patient presents with constipation.
- (4) There is a ceiling effect beyond which the dose should not be exceeded.
- (5) Question not attempted

101. Hospice care is generally recommended when a patient has

- (1) Chronic illness with intermittent exacerbations.
- (2) A terminal illness with a life expectancy of 6 months or less if the disease follows its usual course.
- (3) A condition requiring long term ventilatory support.
- (4) An illness that can be managed with disease modifying agents.
- (5) Question not attempted

102. A 60 year old gentleman has retired from railways and is diagnosed with squamous cell lung cancer with multiple liver metastasis. His general condition is fair and all blood parameters are normal. What should be the care plan ?

- (1) Palliative Care alone as his disease is not curable. No chemotherapy.
- (2) Palliative Care along with chemotherapy as it has some survival advantage.
- (3) Chemotherapy alone as he is not yet terminal.
- (4) Chemotherapy along with palliative care as chemotherapy will improve QOL without increasing survival.
- (5) Question not attempted

103. In the palliative management of lytic bone metastasis in shaft of femur :

- (1) A single fraction of 8 Gy may be sufficient for palliation.
- (2) A dose of 30 Gy / 10 Fr of EBRT is superior to single fraction of 8 Gy.
- (3) A dose of 20 Gy / 5 Fr of EBRT is superior to single fraction of 8 Gy.
- (4) A dose of 50 Gy / 25 Fr of EBRT is superior to single fraction of 8 Gy.
- (5) Question not attempted

104. Which step of the 'SPIKES' protocol involves assessing the patient's understanding of their condition ?

- (1) Perception (2) Invitation
- (3) Knowledge (4) Strategy
- (5) Question not attempted

105. Optimal TBI dose for Immunosuppression

- (1) 2-4 Gy (2) 4-6 Gy
- (3) 13-15 Gy (4) 8-10 Gy
- (5) Question not attempted

106. 'Do no harm' concept is emphasized in which of the following ethical principles ?

- (1) Justice
- (2) Autonomy
- (3) Beneficence
- (4) Non-maleficence
- (5) Question not attempted

107. What is Bowen's disease ?

- (1) Pre invasive Squamous Cell Carcinoma
- (2) Pre invasive Basal Cell Carcinoma
- (3) Pre invasive melanoma
- (4) Pre invasive Merkel cell cancer
- (5) Question not attempted

108. A study began in 1990 with enrolment of a group of 6000 adults in a city 'X' who were asked about their alcohol consumption, smoking, diet, environmental risk factors etc. All the participants were periodically examined & evaluated for evidence of various types of cancer between 2000-2005. Which of the following study designs best describe this ?

- (1) Case control study
- (2) Prospective cohort study
- (3) Ecological study
- (4) Retrospective cohort study
- (5) Question not attempted

109. The head coordinating unit for National Cancer Registry programme is at

- (1) New Delhi (2) Bengaluru
- (3) Mumbai (4) Chennai
- (5) Question not attempted

110. Most commonly used measure of central tendency

- (1) Mean (2) Mode
- (3) Median (4) Range
- (5) Question not attempted

111. Protons are preferred over photons for treating certain chordomas due to all of the following reasons except :

- (1) Steep dose gradients of protons
- (2) Excellent 5 year local control rates
- (3) Higher Relative Biological Effectiveness (RBE) of protons
- (4) Proximity of the tumor to critical structures
- (5) Question not attempted

112. Hyperthermia with radiation therapy tries to raise the temperature of the target to :

- (1) 40 degree Celsius
- (2) 50 degree Celsius
- (3) 60 degree Celsius
- (4) 70 degree Celsius
- (5) Question not attempted

113. External beam radiotherapy is a treatment option for refractory or progressive thyroid ophthalmopathy. The most common dose prescription recommended is :

- (1) 10 Gy in 5 fractions
- (2) 20 Gy in 10 fractions
- (3) 30 Gy in 15 fractions
- (4) 45 Gy in 25 fractions
- (5) Question not attempted

114. Modified Gail model is used for assessing the risk of developing breast cancer in a patient with familial predisposition. The following factors are included in the model except :

- (1) Age
- (2) Age at Menarche
- (3) Number of second degree relatives with breast cancer
- (4) Number of benign breast biopsies
- (5) Question not attempted

115. Which cancer is not covered in the NPCDCS program of Government of India started in 2012 ?

- (1) Cancer Cervix
- (2) Oral Cancer
- (3) Breast Cancer
- (4) Lung Cancer
- (5) Question not attempted

116. What is the primary goal of phase IV trial ?

- (1) Determine MTD
- (2) Obtain FDA approval
- (3) Post approval assessment of safety and effectiveness
- (4) Investigate off label indications
- (5) Question not attempted

117. A new cancer treatment facility is being established in Jaisalmer where lots of skin, oral and lung cancers occur. Which equipment will be most suitable ?

- (1) VERSA HD or True beam
- (2) Gamma Knife
- (3) Tomotherapy
- (4) CyberKnife
- (5) Question not attempted

118. Which of the following statements regarding carbon ion radiotherapy is most accurate ?

- (1) Carbon ion therapy has a lower RBE compared to conventional proton therapy.
- (2) Carbon ion exhibits a Bragg peak with minimal lateral scattering, allowing for superior dose conformity.
- (3) Carbon ion radiotherapy is associated with lower LET than proton therapy.
- (4) Carbon ion therapy is routinely available & widely used in standard oncologic practice across the world.
- (5) Question not attempted

119. Modern compact Proton Therapy Gantry accelerates the protons using :

- (1) Linear Accelerator
- (2) Cyclotron
- (3) Synchrotron
- (4) Megatron
- (5) Question not attempted

120. Ionizing radiation cannot be used to treat which benign condition ?

- (1) AVM
- (2) Grave's Disease
- (3) Keloids
- (4) Fibroids
- (5) Question not attempted

121. Which is the most preventable cancer ?

- (1) Breast cancer by screening mammography
- (2) Endometrial cancer by Pap smear and vaccination
- (3) Head and neck cancer by tobacco control
- (4) Radiation induced sarcomas
- (5) Question not attempted

122. Which of the following is a primary use of Total Body Irradiation (TBI) ?

- (1) To treat localized brain tumors
- (2) As part of pre-transplant conditioning for haematopoietic stem cell transplantation
- (3) To treat metastatic bone cancer
- (4) To treat superficial skin cancers
- (5) Question not attempted

123. Mr. John has been diagnosed with HepatoCellular Carcinoma (HCC) of liver with Portal Vein Thrombosis (PVT). One of the modalities of treatment is chemo-embolisation done by interventional radiologists. However the tumor board decides against this treatment. Why ?

- (1) The main blood supply of the HCC tumor and liver is by portal vein and in the presence of PVT, we cannot inject chemotherapy in the same.
- (2) The main blood supply of the HCC tumor is by hepatic artery and to the liver is from the portal vein. In the presence of PVT, normal liver may be harmed.
- (3) The main blood supply of the HCC tumor is by portal vein and to the liver from the hepatic artery. In the presence of PVT, we cannot inject the chemotherapy.
- (4) The main blood supply of the HCC and normal liver is by hepatic artery. In the presence of PVT, normal liver may be harmed.
- (5) Question not attempted

124. What is the most caudal structure transmitted through the cavernous sinus ?

- (1) Cranial nerve III
- (2) Cranial nerve V₁
- (3) Cranial nerve V₂
- (4) Cranial nerve VI
- (5) Question not attempted

125. What does the MIB index indicate in a tumor histopathology ?

- (1) The rate of mitosis, a marker of proliferative rate.
- (2) The rate of necrosis, a marker of tumor aggression.
- (3) The percentage of stem cells, a marker of tumor potential.
- (4) The probability and capacity to metastasize.
- (5) Question not attempted

126. Geometric penumbra increases with increase in all except :

- (1) Source – surface distance
- (2) Source – diameter
- (3) Source – diaphragm distance
- (4) Depth in the patient
- (5) Question not attempted

127. Positron genesis is due to

- (1) Excess neutrons in the nucleus
- (2) Excess electrons
- (3) Scattering of electrons
- (4) Excess protons in the nucleus
- (5) Question not attempted

128. Preferred follow-up investigation in Hodgkin's lymphoma

- (1) PSMA scan
- (2) CT scan
- (3) MRI
- (4) FDG PET scan
- (5) Question not attempted

129. Which ionization process primarily governs the interaction of megavoltage X-rays with human tissue in radiotherapy?

- (1) Pair production
- (2) Photoelectric effect
- (3) Compton effect
- (4) Photodisintegration
- (5) Question not attempted

130. Vaccine devised for prevention of Cancer Cervix is against which strain of HPV?

- (1) 12 and 14 (2) 16 and 18
- (3) 20 and 22 (4) 8 and 10
- (5) Question not attempted

131. A tumor with a CK 7- / CK 20+ immunophenotype is most suggestive of which primary malignancy?

- (1) Pancreatic adenocarcinoma
- (2) Urothelial carcinoma
- (3) Colorectal adenocarcinoma
- (4) Endometrial carcinoma
- (5) Question not attempted

132. Which type of collimation is multi leaf collimator?

- (1) Primary (2) Secondary
- (3) Tertiary (4) Off-axis
- (5) Question not attempted

133. What is the correct order of half life?

- (1) Ra226 > Cs137 > Co60 > Ir192
- (2) Cs137 > Ra226 > Co60 > Ir192
- (3) Co60 > Ra226 > Cs137 > Ir192
- (4) Cs137 > Co60 > Ra226 > Ir192
- (5) Question not attempted

134. The radioisotope commonly used for low dose rate GYN brachytherapy is -

- (1) I-131 (2) Pd-103
- (3) Cs-137 (4) Ir-192
- (5) Question not attempted

135. Lethal damage to cell by radiation is due to

- (1) RNA damage
- (2) Single strand break
- (3) Double strand break
- (4) None of these
- (5) Question not attempted

136. Which of the statement is true regarding stochastic effect?

- (1) It is also called deterministic effect.
- (2) Radiation induced cataract formation is an example.
- (3) No minimum threshold is required for the effect to occur.
- (4) None of these
- (5) Question not attempted

137. A patient of glioblastoma was treated with postoperative radiation to a dose of 60 Gy/ 30 Fractions. He was controlled for almost 2 years and now has small infield recurrence again operated and in good general condition. He can be re-irradiated, but you need to tell the BED of the 1st treatment ?
- (1) BED = 60 Gy
 - (2) BED = 72 Gy
 - (3) BED = 100 Gy
 - (4) BED = 110 Gy
 - (5) Question not attempted
138. Hereditary Nonpolyposis Colorectal Cancer (HNPCC) is characterized by which of the following ?
- (1) It is characterized by an autosomal recessive inheritance.
 - (2) It results from a defect in P53.
 - (3) It leads to malignancy more common in the proximal / ascending colon.
 - (4) HNPCC – associated cancers present at an average age of 25.
 - (5) Question not attempted
139. In the linear quadratic model of survival studies with ionizing radiation, what does the constant alpha represent ?
- (1) The component of cell kill that increases linearly with the increasing dose.
 - (2) The component of the cell kill that increases quadratically with the increasing dose.
 - (3) The constant component of cell kill.
 - (4) The component of the cell kill that varies inversely with the dose.
 - (5) Question not attempted
140. Which phase of the cell cycle is most radiosensitive ?
- (1) G1 phase
 - (2) G2 phase
 - (3) G2M phase
 - (4) S phase
 - (5) Question not attempted
141. The most commonly used biologically active molecule for PET scanning is a fluoridated analog of
- (1) Phosphate
 - (2) Glucose
 - (3) Calcium
 - (4) Albumin
 - (5) Question not attempted
142. Mutation of Gene responsible for genesis of Medullary Carcinoma of Thyroid :
- (1) RAS
 - (2) BRAF
 - (3) RET
 - (4) PRAR-yt
 - (5) Question not attempted
143. Calculate the equivalent square for a 5×10 cm field size.
- (1) 4×4 cm
 - (2) 6×6 cm
 - (3) 7×7 cm
 - (4) 10×10 cm
 - (5) Question not attempted
144. ThermoLuminescent Dosimeters (TLD) are commonly made of what material ?
- (1) Lithium fluoride
 - (2) Aluminium oxide
 - (3) Silver bromide
 - (4) Sulfur hexafluoride
 - (5) Question not attempted

145. Glioma grading includes all pathological features except

- (1) Nuclear atypia
- (2) Endothelial differentiation
- (3) Necrosis
- (4) Cell differentiation
- (5) Question not attempted

146. In brachytherapy, the dose falls with

- (1) Linearly with distance from source
- (2) Inverse of square of the distance
- (3) Distance from source * $(\alpha/\beta) / \text{KERMA}$
- (4) Square root of the distance from the source
- (5) Question not attempted

147. Hyperfractionation means :

- (1) More number of fractions of conventional dose of 2 Gy every day.
- (2) More number of fractions of lower doses multiple times a day.
- (3) Treating 6 to 7 days a week instead of conventional 5 days a week.
- (4) Treating with higher energy of radiations.
- (5) Question not attempted

148. What is the classic enhancement pattern of Hepatocellular Carcinoma (HCC) on cross-sectional imaging with a venous, arterial and delayed phase ?

- (1) Arterial : decreased, venous : increased, delayed : persistent washout
- (2) Arterial : decreased, venous : increased, delayed : no change
- (3) Arterial : increased, venous : decreased, delayed : persistent washout
- (4) Arterial : increased, venous : increased, delayed : persistent washout
- (5) Question not attempted

149. In BNCT the radiation damage to the target is caused by

- (1) Neutrons
- (2) Alpha particles
- (3) Beta rays
- (4) Electrons
- (5) Question not attempted

150. Which of the following is not a component of Child-Pugh scoring ?

- (1) Encephalopathy
- (2) Serum alkaline phosphatase
- (3) Albumin
- (4) Prothrombin time
- (5) Question not attempted

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145. Glioma grading includes all pathological features except
- (1) Nuclear atypia
 - (2) Endothelial differentiation
 - (3) Necrosis
 - (4) Cell differentiation
 - (5) Question not attempted
146. In brachytherapy, the dose falls
- (1) linearly with distance from source
 - (2) inverse of square of the distance
 - (3) distance from source
 - (4) square root of the distance from the source
 - (5) Question not attempted
147. Hyperfractionation means:
- (1) More number of fractions of conventional dose of 2 Gy every day
 - (2) More number of fractions of lower doses multiple times a day
 - (3) Treating 6 to 7 days a week instead of conventional 5 days a week
 - (4) Treating with higher energy of radiations
 - (5) Question not attempted
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