

795225

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 : 84

Sub : Medical Oncology

समय : 02:30 घण्टे + 10 मिनट अतिरिक्त\*  
Time : 02:30 Hours + 10 Minutes Extra\*

Exam Date - 04/07/2024

अधिकतम अंक : 150  
Maximum Marks : 150

प्रश्न-पुस्तिका के पेपर की सील/पॉलिथीन 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 अध्यापय) 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।

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।

### 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.



1. A 64-year-old man presents to his primary care physician for routine follow up. He has been feeling well and has no new complaints today. His medical issues include hypertension and diabetes. Complete physical examination is unremarkable. Laboratory testing shows elevated total protein, but the blood work including complete blood counts, serum calcium, serum creatinine and electrolytes are within normal limits. Subsequent evaluation reveals a 1.2 g/dL IgA monoclonal protein, with a serum free light chain (FLC) ratio of 1.4. Skeletal survey does not show any lytic bone lesions. Bone marrow biopsy shows 6% kappa clonal plasma cells. Which of the following is associated with increased risk of disease progression in this patient?
- (1) Age < 65 years
  - (2) IgA subtype monoclonal protein
  - (3) Abnormal FLC ratio of 1.4
  - (4) Serum M protein level of 1.2 g/dL
  - (5) Question not attempted
2. What is the mechanism of action of osimertinib?
- (1) MEK inhibitor
  - (2) EGFR TKI active against T790M mutation
  - (3) VEGF inhibitor
  - (4) PD-1 monoclonal antibody
  - (5) Question not attempted
3. Which of the following fusion genes is targeted by Crizotinib in NSCLC?
- (1) KRAS
  - (2) EGFR
  - (3) ALK
  - (4) HER2
  - (5) Question not attempted
4. Which treatment is preferred for a patient with NSCLC and brain metastases from an ALK-positive tumor?
- (1) Whole brain radiation
  - (2) Ceritinib
  - (3) Crizotinib
  - (4) Alectinib
  - (5) Question not attempted
5. Which histologic subtype of NSCLC is most associated with cavitation and keratinization?
- (1) Adenocarcinoma
  - (2) Large cell carcinoma
  - (3) Squamous cell carcinoma
  - (4) Small cell carcinoma
  - (5) Question not attempted
6. A patient with non-Hodgkin's lymphoma receiving R-CHOP develops tumor lysis syndrome (TLS). Which initial laboratory finding is characteristic of TLS?
- (1) Hypokalemia
  - (2) Hypercalcemia
  - (3) Hyperuricemia
  - (4) Hypophosphatemia
  - (5) Question not attempted
7. What is a common presenting laboratory finding in chronic lymphocytic leukaemia?
- (1) Anemia with thrombocytopenia
  - (2) Pancytopenia
  - (3) Lymphocytosis
  - (4) Monocytosis
  - (5) Question not attempted
8. Which of the following histologic feature is most suggestive of small cell lung cancer?
- (1) Abundant cytoplasm and gland formation
  - (2) Keratinization and intercellular bridges
  - (3) Round blue cells with nuclear molding
  - (4) Papillary structures with mucin production
  - (5) Question not attempted



9. Which biomarker is used to predict benefit from adjuvant atezolizumab in resected stage II-III NSCLC ?
- (1) EGFR mutation
  - (2) ALK rearrangement
  - (3) PD-L1 expression  $\geq 50\%$
  - (4) KRAS mutation
  - (5) Question not attempted
10. Which of the following agents is a BTK inhibitor used in CLL ?
- (1) Idelalisib
  - (2) Ibrutinib
  - (3) Venetoclax
  - (4) Azacitidine
  - (5) Question not attempted
11. Which factor most strongly predicts long-term survival in limited stage small cell lung cancer ?
- (1) Age under 60
  - (2) Response to chemotherapy
  - (3) Prophylactic cranial irradiation
  - (4) Smoking cessation
  - (5) Question not attempted
12. Which of the following treatments is approved for MET exon 14 skipping mutation-positive NSCLC ?
- (1) Crizotinib
  - (2) Osimertinib
  - (3) Capmatinib
  - (4) Selpercatinib
  - (5) Question not attempted
13. Which histological feature is characteristic of invasive mucinous adenocarcinoma of the lung ?
- (1) High grade nuclei and necrosis
  - (2) Solid nests with desmoplasia
  - (3) Lepidic growth with mucin-producing columnar cells
  - (4) Basaloid pattern with rosettes
  - (5) Question not attempted
14. Which of the following patients is eligible for lung cancer screening per USPSTF guidelines (2021) ?
- (1) 45-year-old non-smoker
  - (2) 50-year-old with 15 pack-year history, quit 20 years ago
  - (3) 55-year-old current smoker with 30 pack-year history
  - (4) 75-year-old never smoker
  - (5) Question not attempted
15. Which treatment strategy is associated with the best survival benefit in stage IIIA NSCLC ?
- (1) Chemoradiation only
  - (2) Immunotherapy alone
  - (3) Surgery followed by chemotherapy
  - (4) Chemoradiation followed by durvalumab
  - (5) Question not attempted
16. In patients with extensive stage SCLC, addition of immunotherapy to chemotherapy improves survival via targeting :
- (1) VEGF
  - (2) CTLA-4
  - (3) PD-L1
  - (4) EGFR
  - (5) Question not attempted
17. Which of the following is the mechanism of resistance to EGFR TKIs involving histologic transformation ?
- (1) MET amplification
  - (2) ALK fusion
  - (3) Transformation to small cell lung cancer
  - (4) T790M reversion
  - (5) Question not attempted
18. Which of the following is most characteristic of leukostasis ?
- (1) Low white blood cell count
  - (2) Organ dysfunction due to high leukocyte burden
  - (3) Increased platelet count
  - (4) Normal oxygenation
  - (5) Question not attempted



19. Which of the following leukemias is associated with smudge cells on peripheral smear ?  
 (1) AML (2) ALL  
 (3) CML (4) CLL  
 (5) Question not attempted
20. In NSCLC, which mutation predicts resistance to immune checkpoint inhibitors ?  
 (1) STK11  
 (2) BRAF V600E  
 (3) KRAS G12C  
 (4) EGFR exon 20 insertion  
 (5) Question not attempted
21. Which of the following is most associated with pneumonitis during immunotherapy in lung cancer ?  
 (1) Prior chest radiation  
 (2) Never-smoking status  
 (3) Female gender  
 (4) Age over 75  
 (5) Question not attempted
22. Which drug targets RET fusion-positive NSCLC ?  
 (1) Alectinib (2) Pralsetinib  
 (3) Capmatinib (4) Sotorasib  
 (5) Question not attempted
23. Which targeted therapy is most appropriate for relapsed AML with IDH1 mutation ?  
 (1) Enasidenib (2) Ivosidenib  
 (3) Gilteritinib (4) Azacitidine  
 (5) Question not attempted
24. Which gene mutation is associated with resistance to anti-EGFR therapy in metastatic colorectal cancer ?  
 (1) APC (2) KRAS  
 (3) SMAD4 (4) TP53  
 (5) Question not attempted
25. A 21-year-old college student with no past medical history is presenting for an initial medical oncology consultation after right orchiectomy for stage 1 seminoma. His alpha-fetoprotein (AFP) at diagnosis was within the normal range, and beta-human chorionic gonadotropin (beta-HCG) was 23 mIU/mL. A CT of the abdomen and pelvis with IV contrast was negative for nodal involvement, and a chest X-ray was within normal limits. He feels well approximately 10 days after surgery, and has no complaints. His AFP and HCG on the day of his visit are within normal limits and undetectable, respectively. Which of the following is the most appropriate next step ?  
 (1) Proceed with carboplatin area under the curve (AUC)  $5 \times 1$  as definitive treatment for his intermediate risk seminoma.  
 (2) Proceed with retroperitoneal lymph node dissection (RPLND) for good risk seminoma to avoid the risk of secondary malignancy and bowel irritation associated with radiation.  
 (3) Proceed with radiation with a dog-leg field rather than a para-aortic field to minimize the risk of secondary malignancy and other radiation induced toxicity.  
 (4) Initiate a surveillance protocol because his risk of being cured by orchiectomy alone is 80%.  
 (5) Question not attempted
26. Which molecular feature predicts response to immune checkpoint inhibitors in colorectal cancer ?  
 (1) p53 mutation  
 (2) Microsatellite instability-high (MSI-H)  
 (3) KRAS wild type  
 (4) BRAF mutation  
 (5) Question not attempted



27. Which of the following criteria is part of the SLiM-CRAB diagnostic features for multiple myeloma ?
- (1) Serum calcium < 8.5 mg/dL
  - (2) Serum free light chain ratio > 100
  - (3) Low M-protein in urine
  - (4) Presence of a solitary plasmacytoma
  - (5) Question not attempted
28. Genetic alterations occurring in 1% or more of the human population are known as :
- (1) Mutations
  - (2) Polymorphisms
  - (3) Pleiotropism
  - (4) Phenotype variations
  - (5) Question not attempted
29. Which translocation is characteristic of follicular lymphoma ?
- (1) t(8;14)
  - (2) t(11;14)
  - (3) t(14;18)
  - (4) t(15;17)
  - (5) Question not attempted
30. BRCA genes are :
- (1) Oncogenes
  - (2) Protooncogenes
  - (3) Tumor suppressor genes
  - (4) Checkpoint inhibitors
  - (5) Question not attempted
31. Which mutation is associated with poor prognosis in colorectal cancer and occurs in ~10% of cases ?
- (1) KRAS
  - (2) BRAF V600E
  - (3) APC
  - (4) NRAS
  - (5) Question not attempted
32. A phase III trial of a cancer vaccine reports a relative risk (RR) of 0.8 for death compared to placebo. How is this best interpreted ?
- (1) Vaccine increased risk by 20%
  - (2) Vaccine reduced risk by 20%
  - (3) No effect of vaccine
  - (4) Absolute risk reduction of 80%
  - (5) Question not attempted
33. What is the most common subtype of gastric cancer ?
- (1) Mucinous
  - (2) Intestinal-type adenocarcinoma
  - (3) Diffuse-type adenocarcinoma
  - (4) Signet ring cell carcinoma
  - (5) Question not attempted
34. Which CD markers are typically expressed in classical Hodgkin's lymphoma (Reed-Sternberg cells) ?
- (1) CD20 and CD79a
  - (2) CD3 and CD5
  - (3) CD15 and CD30
  - (4) CD10 and BCL6
  - (5) Question not attempted
35. Best initial management for severe cancer-related dyspnea is :
- (1) Benzodiazepines
  - (2) Opioids
  - (3) Diuretics
  - (4) Corticosteroids
  - (5) Question not attempted
36. A 20-year-old athletic man develops pain in the right knee after trauma during a basketball game. The discomfort persists and is progressive. Plane radiograph reveals a destructive lesion in the distal femur with cortical erosion, periosteal elevation with sunburst appearance, and extra osseous extension. Which of the following is the most likely diagnosis ?
- (1) Malignant Giant Cell tumor
  - (2) Ewing's sarcoma
  - (3) Osteogenic sarcoma
  - (4) Dedifferentiated chondrosarcoma
  - (5) Question not attempted



37. A pharmaceutical company asks your advice about developing a new drug. They have developed toponopo, a novel pan-topoisomerase inhibitor that shows promising activity in small cell lung cancer (SCLC), non-small cell lung cancer (NSCLC), and ovarian cancer in phase I trials. Dose-limiting toxicity of toponopo was renal toxicity with significant elevation of serum creatinine in 4/6 patients treated at the highest dose studied. They think toponopo will be best utilized in combination chemotherapy. They solicit your advice as to the best way to proceed in the development of toponopo.

Which of these combination would you recommend as having the best chance of success?

- (1) Toponopo + cisplatin
- (2) Toponopo + etoposide
- (3) Toponopo + carboplatin
- (4) Toponopo + topotecan
- (5) Question not attempted

38. Which genetic syndrome is associated with colorectal polyps and mucocutaneous pigmentation?

- (1) Cowden syndrome
- (2) Peutz-Jeghers syndrome
- (3) Turcot's syndrome
- (4) Li-Fraumeni syndrome
- (5) Question not attempted

39. A 27-year old man is seen by his primary care physician (PCP) because of blood per rectum. Exam demonstrates supernumerary teeth, multiple subcutaneous smooth skin nodules, and irregularity of the jaw. At colonoscopy, the large intestine is carpeted with polyps. Biopsy of multiple lesions reveals adenomatous changes. A total colectomy is performed. Two years after the procedure, the patient is again evaluated. On exam, there is palpable abdominal mass effect. CT imaging confirms a large soft tissue mass in the mesentery. Biopsy reveals a spindle cell proliferation.

Which one of the following tumors is the likely diagnosis?

- (1) Gastrointestinal Stromal Tumor (GIST)
- (2) Leiomyosarcoma
- (3) Dermatofibrosarcoma Protuberans (DFSP)
- (4) Aggressive Fibromatosis  
Desmoid tumor/fibromatosis
- (5) Question not attempted

40. Which of the following is the gold standard for assessing pain in a palliative care patient?

- (1) CT scan findings
- (2) Patient self-report
- (3) Physician's judgment
- (4) Serum cortisol level
- (5) Question not attempted



41. A 73-year-old woman with a past medical history of well-controlled hypertension undergoes a colonoscopy for symptomatic iron deficiency anemia. The colonoscopy reveals a mass in the cecum; the biopsy reveals adenocarcinoma. She then undergoes staging CT of the chest, abdomen, and pelvis that reveals multiple peritoneal implants. There is no other evidence of metastatic disease. Molecular profiling of the tumor reveals microsatellite instability-high status, absence of KRAS and NRAS mutation, presence of BRAF V600E mutation, and very high tumor mutation burden. HER2 was not amplified. She is in otherwise good health. Her anemia improved with iron supplementation. She maintains an Eastern Cooperative Oncology Group (ECOG) performance status of zero and normal liver and kidney function.
- What is the most appropriate initial treatment option for this patient?
- (1) mFOLFOX-6 (leucovorin, 5-fluorouracil, and oxaliplatin) plus cetuximab
  - (2) Pembrolizumab
  - (3) Encorafenib and cetuximab
  - (4) FOLFIRI (leucovorin, 5-fluorouracil, and irinotecan) plus bevacizumab
  - (5) Question not attempted
42. A 70-year-old male in hospice develops noisy breathing ("death rattle"). What is the most appropriate management?
- (1) Initiate intubation
  - (2) Administer anticholinergic agents
  - (3) Increase hydration
  - (4) Start antibiotics
  - (5) Question not attempted
43. Which of the following is a hallmark of cancer as proposed by Hanahan and Weinberg?
- (1) Reversible differentiation
  - (2) Avoidance of immune destruction
  - (3) Lack of angiogenesis
  - (4) Sensitivity to apoptosis
  - (5) Question not attempted
44. Which of the following increases the risk of gastric cancer?
- (1) High salt intake
  - (2) Proton pump inhibitors
  - (3) High-fiber diet
  - (4) Bile reflux
  - (5) Question not attempted
45. In colorectal cancer, what is the mechanism of action of panitumumab?
- (1) Anti-PD-1
  - (2) Anti-VEGF
  - (3) Anti-EGFR monoclonal antibody
  - (4) BRAF inhibitor
  - (5) Question not attempted
46. Which of the following best describes a GIST (gastrointestinal stromal tumor)?
- (1) Lymphoma of Peyer's patches
  - (2) Neuroendocrine tumor of colon
  - (3) Mesenchymal tumor with KIT or PDGFRA mutation
  - (4) Adenocarcinoma of the stomach
  - (5) Question not attempted
47. A special type of PCR that uses a forward primer specific for the mutant sequence and another primer specific for the corresponding wild-type sequence is known as:
- (1) Allele specific PCR
  - (2) Fragment analysis
  - (3) High throughput PCR
  - (4) Mismatch repair PCR
  - (5) Question not attempted



48. Which DNA repair pathway is targeted by PARP inhibitors ?  
 (1) Mismatch repair  
 (2) Base excision repair  
 (3) Nucleotide excision repair  
 (4) Homologous recombination  
 (5) Question not attempted
49. Which statement best describes "palliative sedation" ?  
 (1) Hastens death intentionally  
 (2) Used only for non-cancer patients  
 (3) Reduces consciousness to relieve refractory symptoms  
 (4) Replaces active pain management  
 (5) Question not attempted
50. Which of the following gene mutations is most characteristic of familial adenomatous polyposis ?  
 (1) TP53 (2) MSH2  
 (3) APC (4) PTEN  
 (5) Question not attempted
51. Which of the following features is most predictive of recurrence in stage II colon cancer ?  
 (1) Left sided location  
 (2) p53 mutation  
 (3) Perineural invasion  
 (4) KRAS mutation  
 (5) Question not attempted
52. Which of the following patients is most likely to benefit from immunotherapy in gastric cancer ?  
 (1) MSI-high tumor  
 (2) HER2-positive tumor  
 (3) BRAF-mutant tumor  
 (4) PD-L1 negative tumor  
 (5) Question not attempted
53. Which of the following is the most common molecular subtype of breast cancer ?  
 (1) HER2-enriched  
 (2) Luminal A  
 (3) Luminal B  
 (4) Triple-negative  
 (5) Question not attempted
54. Which phase of a clinical trial is primarily designed to assess safety and dosage ?  
 (1) Phase I (2) Phase II  
 (3) Phase III (4) Phase IV  
 (5) Question not attempted
55. Which of the following is the most important prognostic factor in early stage breast cancer ?  
 (1) Tumor size  
 (2) Hormone receptor status  
 (3) Nodal involvement  
 (4) Ki-67 index  
 (5) Question not attempted
56. A 45-year-old breast cancer survivor treated with anthracyclines and radiotherapy presents with a new mediastinal mass. What is the most likely second malignancy ?  
 (1) Basal cell carcinoma  
 (2) Hodgkin's lymphoma  
 (3) Radiation-induced sarcoma  
 (4) Non-small cell lung cancer  
 (5) Question not attempted
57. Which of the following is **not** considered a potential etiology for mesothelioma development ?  
 (1) Asbestos  
 (2) Erionite exposure  
 (3) Human Papilloma Virus (HPV)  
 (4) Simian Virus 40 (SV40) infection  
 (5) Question not attempted



58. Which drug is most associated with causing secondary acute myeloid leukemia (AML)?
- (1) Methotrexate
  - (2) Cyclophosphamide
  - (3) Doxorubicin
  - (4) Etoposide
  - (5) Question not attempted
59. Which test assesses the recurrence risk and chemotherapy benefit in ER-positive, HER2-negative breast cancer?
- (1) BRCA1/2 mutation analysis
  - (2) Oncotype DX
  - (3) HER2 FISH
  - (4) Ki-67 index
  - (5) Question not attempted
60. Which germline mutation should you test for in a patient with medullary thyroid cancer and a mother with pheochromocytoma?
- (1) BRCA1 mutation
  - (2) CHEK2 mutation
  - (3) Mutation of CDH1
  - (4) Mutation of RET proto-oncogene
  - (5) Question not attempted
61. Which of the following best describes overall survival (OS) in clinical trials?
- (1) Time from diagnosis to disease progression
  - (2) Time from treatment start to measurable response
  - (3) Time from randomization to death from any cause
  - (4) Time from progression to next line therapy
  - (5) Question not attempted
62. Which of the following mutations is commonly found in Triple-Negative Breast Cancer (TNBC)?
- (1) ESR1
  - (2) PIK3CA
  - (3) BRCA1
  - (4) ERBB2
  - (5) Question not attempted
63. Which of the following antineoplastic drugs is **not** associated with Syndrome of Inappropriate Antidiuretic Hormone secretion (SIADH)?
- (1) Cisplatin
  - (2) Cyclophosphamide
  - (3) Cytarabine
  - (4) Vinblastine
  - (5) Question not attempted
64. Which of the following findings suggests inflammatory breast cancer?
- (1) Breast pain
  - (2) Nipple inversion
  - (3) Peau d'orange appearance
  - (4) Palpable axillary lymph node
  - (5) Question not attempted
65. Which of the following factors is included in the Nottingham Histologic Score for breast cancer grading?
- (1) Tumor size
  - (2) Mitotic count
  - (3) Ki-67 index
  - (4) PR status
  - (5) Question not attempted
66. What is the most appropriate initial imaging modality for evaluating a breast lump in a woman under 30?
- (1) Mammogram
  - (2) CT scan
  - (3) Ultrasound
  - (4) MRI
  - (5) Question not attempted
67. What is the standard surgical approach for a small, node-negative DCIS lesion?
- (1) Radical mastectomy
  - (2) Axillary dissection
  - (3) Breast-conserving surgery with radiotherapy
  - (4) Neoadjuvant chemotherapy
  - (5) Question not attempted



68. Which of the following is a risk factor for male breast cancer ?
- (1) Smoking
  - (2) Klinefelter's syndrome
  - (3) Obesity
  - (4) BRCA2 mutation
  - (5) Question not attempted
69. Regarding cancer treatment in geriatric patients :
- Assertion (A) :** Chronological age alone should dictate cancer treatment decisions in older adults.
- Reason (R) :** Age accurately predicts physiological reserve and treatment tolerance.
- (1) Both (A) and (R) are true, (R) is correct explanation.
  - (2) Both (A) and (R) are true, but (R) is not correct explanation.
  - (3) (A) is false, (R) is true.
  - (4) Both (A) and (R) are false.
  - (5) Question not attempted
70. A family insists on full resuscitation for a terminally ill patient despite medical futility. What is the best ethical approach ?
- (1) Immediately proceed with CPR
  - (2) Refuse CPR based on futility
  - (3) Seek a court order
  - (4) Discuss goals of care with the family
  - (5) Question not attempted
71. Which concept explains cancer development due to accumulation of mutations over time ?
- (1) Multi-step carcinogenesis
  - (2) Field effect
  - (3) Epigenetic drift
  - (4) Monoclonal selection
  - (5) Question not attempted
72. A 39-year-old lymphoma survivor complains of new-onset fatigue, anxiety, and social withdrawal 2 years after completing treatment. What is the best initial intervention ?
- (1) Cardiac stress testing
  - (2) Referral to survivorship program with psychosocial support
  - (3) Immediate PET-CT
  - (4) Empiric antidepressant therapy
  - (5) Question not attempted
73. Which of the following best describes the principle of lead-time bias in cancer screening ?
- (1) Overestimation of survival due to earlier diagnosis
  - (2) Underestimation of mortality due to data lag
  - (3) Improvement in outcomes due to better treatment
  - (4) False positives causing anxiety
  - (5) Question not attempted
74. Which of the following genetic mutations is most commonly associated with clear cell renal carcinoma ?
- (1) TP53
  - (2) VHL
  - (3) MET
  - (4) BRAF
  - (5) Question not attempted
75. Which of the following is an approved first-line treatment for metastatic RCC with IMDC intermediate or poor risk features ?
- (1) Sunitinib
  - (2) Pazopanib
  - (3) Atezolizumab plus bevacizumab
  - (4) Nivolumab plus ipilimumab
  - (5) Question not attempted



76. A middle-aged man develops backache and his X-ray of the lumbar spine is reported as showing osteosclerotic metastasis in the body of L2 lumbar vertebra. Which cancer is most likely to produce bone metastases that are osteosclerotic rather than osteolytic?
- (1) Prostate cancer
  - (2) Bladder cancer
  - (3) Colorectal cancer
  - (4) Lung cancer
  - (5) Question not attempted
77. Which Gleason score range is considered Grade Group 2 in prostate cancer?
- (1) 3+3=6
  - (2) 3+4=7
  - (3) 4+3=7
  - (4) 4+4=8
  - (5) Question not attempted
78. All the following are risk reduction strategies in BRCA mutated individuals except:
- (1) Prophylactic B/L salpingectomy
  - (2) Prophylactic B/L salpingo oophorectomy
  - (3) Prophylactic B/L tubal ligation
  - (4) Prophylactic B/L mastectomy
  - (5) Question not attempted
79. Which of the following is **not** a component of a "good death" according to palliative care principles?
- (1) Pain-free experience
  - (2) Preservation of dignity
  - (3) Aggressive ICU interventions
  - (4) Presence of loved ones
  - (5) Question not attempted
80. All are correct regarding The Key findings of the ENDURANCE trial which studies newly diagnosed patients with multiple myeloma except:
- (1) The KRd regimen did not improve progression-free survival compared with the VRd regimen in patients with newly diagnosed multiple myeloma.
  - (2) The KRd regimen had more toxicity.
  - (3) The VRd triplet regimen remains the standard of care for induction therapy for patients with standard-risk and intermediate-risk newly diagnosed multiple myeloma.
  - (4) The KRd regimen had a better 3-year OS rates.
  - (5) Question not attempted
81. Which mutation is most commonly found in papillary type 1 renal cell carcinoma?
- (1) VHL
  - (2) MET
  - (3) TP53
  - (4) TSC2
  - (5) Question not attempted
82. Oberlin criteria is used in which malignancy?
- (1) Osteosarcoma
  - (2) Rhabdomyosarcoma
  - (3) Wilms' tumor
  - (4) Ewing's sarcoma
  - (5) Question not attempted
83. p-value is defined as
- (1) Probability of declaring a significant difference when actually it is not present
  - (2) Probability of declaring a significant difference when actually it is present
  - (3) Probability of not declaring a significant difference when actually it is not current
  - (4) Probability of not declaring a significant difference when actually it is present
  - (5) Question not attempted



84. A patient receiving pembrolizumab presents with fatigue, hypotension, and hyponatremia. Labs show low cortisol and ACTH. What is the most likely diagnosis?
- (1) SIADH
  - (2) Primary adrenal insufficiency
  - (3) Immune checkpoint inhibitor-induced hypophysitis
  - (4) Paraneoplastic syndrome
  - (5) Question not attempted
85. A 52-year old woman presented with hot flushes. Her last menstrual period had been 1 year previously. She was treated with ethinylestradiol and medroxyprogesterone acetate. Which potential consequence of oestrogen therapy is most reduced by co-prescription of a progestogen?
- (1) Breast cancer
  - (2) Breast pain
  - (3) Endometrial cancer
  - (4) Mood changes
  - (5) Question not attempted
86. A 58-year-old man with a two year history of chronic liver disease presents to your multidisciplinary liver cancer clinic after undergoing a surveillance ultrasound which shows a new 2-cm liver nodule. You order a CT for further evaluation, and per protocol, he will need to undergo a liver biopsy?
- Which characteristics of the nodule on CT prompted him to need a biopsy?
- (1) Arterial hypervascularity and venous washout
  - (2) Early enhancement and delayed phase lack of enhancement
  - (3) Hyperintense lesion with hypoattenuation on portal venous phase
  - (4) Arterial enhancement with hyperattenuation on portal venous phase
  - (5) Question not attempted
87. A 50-year-old woman with T3N2MO, ER+, PR+, HER2- high-risk, early breast cancer after surgery should receive:
- (1) Chemotherapy alone
  - (2) Radiation therapy only
  - (3) Endocrine therapy + CDK4/6 inhibitor
  - (4) Endocrine therapy
  - (5) Question not attempted
88. Which drug is a VEGF tyrosine kinase inhibitor used in metastatic renal cell carcinoma?
- (1) Nivolumab
  - (2) Sorafenib
  - (3) Bevacizumab
  - (4) Enzalutamide
  - (5) Question not attempted
89. A 35-year old woman presents with a palpable, non-painful, right breast lump, present for 2 weeks. Targeted breast ultrasound at the site of palpable concern demonstrates an oval, anechoic cyst with circumscribed margins and posterior enhancement.
- Which of the following is the most appropriate next step?
- (1) Routine follow-up
  - (2) A stereotactic core biopsy
  - (3) An MRI of the breasts
  - (4) An excisional biopsy
  - (5) Question not attempted
90. Which of the following genetic alterations may be found in aggressive variant prostate cancer?
- (1) BRCA1 mutation
  - (2) MYC amplification
  - (3) PTEN loss
  - (4) RET fusion
  - (5) Question not attempted



91. A 57-year-old woman with history of hypertension presented with cough of several months duration. She is able to walk several miles daily and continues to work as a nurse. She is a former smoker (quit 7 years ago), and CT scan revealed a 4-cm left lobe mass, left hilar adenopathy (2 cm). PET scan reveals intense uptake in left lower lobe and left hilar nodes.

Which of the following is the most appropriate next step?

- (1) Transthoracic biopsy of the left lobe mass
- (2) VATS (Video-Assisted Thoracic Surgery) for left lower lobectomy
- (3) EBUS (Endobronchial ultrasound) fine-needle aspiration (FNA) of mediastinal and hilar nodes
- (4) Bronchoscopy and FNA of left lower lobe mass
- (5) Question not attempted

92. Which histologic subtype of testicular cancer is most likely to spread via lymphatics?

- (1) Yolk sac tumor
- (2) Choriocarcinoma
- (3) Embryonal carcinoma
- (4) Seminoma
- (5) Question not attempted

93. A 42-year-old right-handed man complains of left arm clumsiness. In retrospect, this started a few years ago and recently worsened. An MRI of the brain shows a 7 cm mass in the right frontal lobe with subtle contrast enhancement. Gross total resection demonstrates anaplastic (WHO grade III) astrocytoma.

Which of the following is the most prognostic biomarker?

- (1) Mutation in isocitrate dehydrogenase (IDH) 1
- (2) Ki67 index
- (3) Epidermal Growth Factor Receptor (EGFR) mutation
- (4) Glial Fibrillary Acidic Protein (GFAP)
- (5) Question not attempted

94. A previously healthy 46-year-old man presents for a consultation after removal of colonic mass. He underwent laparoscopic right hemicolectomy 3 weeks ago when he presented with intussusception, and has now fully recovered from the surgery. Pre-operative CT scan had shown a 5-cm mass in the cecum with an adjacent 3-cm pericolic lymph node. The pathology report describes a high-grade lymphoma with medium size and highly monomorphic cells which was 100% positive for Ki-67, and positive for CD20, CD10, and BCL6. Additional fluorescence in situ hybridization tests are positive for MYC-IGH fusion, and negative for IGH-BCL2 fusion or BCL6 rearrangement. Complete blood count, lactate dehydrogenase, renal function, and HIV serology are normal. A combined PET-CT scan and bone marrow biopsy show no evidence of lymphoma.

What is the most appropriate treatment plan for this patient?

- (1) Three cycles of R-CHOP chemotherapy followed by radiation therapy
- (2) Three cycles of R-CODOX-M chemotherapy, including IT prophylaxis
- (3) Six cycles of R-CHOP chemotherapy
- (4) Adjuvant radiation therapy to right lower quadrant
- (5) Question not attempted

95. Which gene mutation is associated with high-grade serous ovarian carcinoma?

- (1) BRCA1/2
- (2) KRAS
- (3) BRAF
- (4) PTEN
- (5) Question not attempted



96. Which drug is a PARP inhibitor used in maintenance therapy for BRCA-mutated ovarian cancer?

- (1) Bevacizumab
- (2) Olaparib
- (3) Pembrolizumab
- (4) Letrozole
- (5) Question not attempted

97. A 52-year-old man who suffers mild headaches but is otherwise healthy presents to your clinic. Imaging showed a heterogeneously enhancing mass in the right frontal lobe. Resection demonstrated glioblastoma. Molecular analysis demonstrated MGMT promoter methylation, and no mutation in IDH1 or 2. Headaches resolved after surgery and he is otherwise asymptomatic. Performance status is normal. He asks you, how long do I have to live, doc?

Which of these statements is the most appropriate way to answer his question?

- (1) The average survival is about 15 months.
- (2) You will likely be dead in less than 2 years.
- (3) Very few patients survive 5 years.
- (4) Let's discuss a typical case, the best case, and the worst case scenarios.
- (5) Question not attempted

98. Which histologic feature is associated with Type II endometrial cancer?

- (1) Estrogen-dependent
- (2) Endometrioid histology
- (3) Serous carcinoma
- (4) Low-grade glandular pattern
- (5) Question not attempted

99. Which mutation is frequently associated with Type I endometrioid endometrial carcinoma?

- (1) TP53
- (2) PIK3CA
- (3) HER2
- (4) RET
- (5) Question not attempted

100. A 64-year-old woman, retired shipyard worker presents to her primary care physician for routine visit. She has smoked half a pack a day for 20 years. Her past medical history is significant for thyroid cancer for which she underwent partial thyroidectomy in her forties. Her home medications include an aspirin, levothyroxine, and vitamin D. Family history is significant for a history of chronic leukemia in her mother, diagnosed at 78 years of age. Physical examination reveals palpable non tender lymphadenopathy in left upper cervical chain as well as bilateral axillary and inguinal areas. On laboratory testing her hemoglobin is 14 g/dL, white blood cell count is 9,000/ $\mu$ L (lymphocytes 65%, neutrophils 31%, eosinophils 2%, basophils 2%), and platelets are 115,000/ $\mu$ L. Flow-cytometry on peripheral blood shows a monoclonal population of mononucleated cells that are positive for CD5, CD19, weak CD20 and CD38, but are negative for FMC7 and cyclin D1.

Which of the following is the strongest risk factor for this patient's disorder?

- (1) Occupation as a shipyard worker
- (2) Female gender
- (3) Personal history of smoking
- (4) Family history of hematopoietic disorder
- (5) Question not attempted



101. Which HPV types are most commonly associated with cervical cancer?

- (1) 6 and 11      (2) 16 and 18
- (3) 31 and 33    (4) 52 and 58
- (5) Question not attempted

102. A 42-year-old woman presents with abdominal distention and discomfort, progressive over several months. Imaging showed ascites and a complex pelvic mass, and biomarker studies showed markedly elevated CA-125 at 2500 U/mL, and a normal carcinoembryonic antigen. Referrals to you, the medical gynecologic oncologist; and to the gynecologic oncologist were initiated. She has no family history; germline testing was submitted. The patient's primary concern is for her children and how long she may live.

Which germline finding/prognosis pair is the most likely answer for this patient's concern?

- (1) No germline mutations were observed; she may have a worse prognosis.
- (2) A germline CHEK2 1100delC mutation was found and portends a poor outcome.
- (3) Germline mutation testing was unremarkable and somatic mutation testing was requested in order to offer prognostic direction.
- (4) A germline deleterious BRCA1 mutation was identified leading to a conclusion of poor prognosis.
- (5) Question not attempted

103. A 68-year-old man presents to oncology clinic with complaints of worsening back pain for 1 week. He denies any history of trauma or falls. He was diagnosed with high risk t(14;16) IgA lambda multiple myeloma three years ago for which he received bortezomib and dexamethasone therapy followed by autologous stem cell transplantation. His supportive care included bisphosphonates. He has not received any therapy over the last year as he has been travelling around the world. Physical examination is remarkable for point tenderness over L1 and L2 vertebrae. Laboratory tests reveal worsening normocytic anemia and a 10-fold increase in his M protein levels. Skeletal survey shows new lytic lesions throughout the axial skeleton, along with acute L1 and L2 vertebral body compression fractures. His oncologist recommends initiating second-line therapy with elotuzumab, lenalidomide and dexamethasone.

Which of the following most appropriately describes the mechanism of action of elotuzumab?

- (1) Inhibitory monoclonal immunoglobulin directed against cluster of differentiation 38 (CD38)
- (2) Stimulatory monoclonal antibody directed against signalling lymphocyte activation molecule F7 (SLAMF7)
- (3) Histone deacetylase inhibitor
- (4) Inhibition of chymotrypsin-like activity of 20S proteasome
- (5) Question not attempted



104. A 70-year-old woman with a history of gastric bypass surgery was recently evaluated for recurrent iron deficiency anemia with a hemoglobin of 11.3 g/dL. She reported fatigue, but no dyspepsia, weight loss, or abdominal pain. An upper endoscopy showed chronic gastritis with evidence of *Helicobacter pylori* infection, as well as a lymphoepithelial infiltrate of small, CD20-positive, BCL-2 positive B-cells invading gastric glands. Molecular testing is positive for a clonal rearrangement of the immunoglobulin heavy chain gene, but does not demonstrate t(11;18) or t(14;18). Physical examination and radiographic studies reveal no perigastric or other lymphadenopathy. The patient receives a 14-day course of H. Pylori eradication therapy.

What is the most appropriate next step in the management of this patient's lymphoma?

- (1) Upper endoscopy and biopsy in 3 months
- (2) Maintenance rituximab every 2 months for 2 years
- (3) Endoscopy and PET-CT in 4 weeks
- (4) Ongoing clinical surveillance, without further scans or procedures
- (5) Question not attempted

105. You have been asked by your cancer center to identify patients that are suitable for Low-Dose Thoracic CT scan for lung cancer screening.

Which of the following patients is acceptable for lung cancer screening by low-dose thoracic CT scan per United States Preventative Task Force screening guidelines developed from the National Lung Cancer Screening Trial?

- (1) 40-year-old female, current smoker, who has smoked 2 packs a day since the age of 15.
- (2) 45-year-old male, current smoker, who has smoked 1 pack per day since the age of 15.
- (3) 60-year-old female, former smoker, who had smoked 1 pack per day since the age of 15 until the age of 50.
- (4) 70-year-old male, former smoker, who had smoked 1 pack per day since the age of 15 until the age of 50.
- (5) Question not attempted

106. A 44-year-old woman presents with a clinical T3N1 grade 3, estrogen receptor positive, progesterone receptor-negative, HER2-negative tumor. Limited family history is available, but the patient knows that her birth mothers' family had cancer. Multi-gene panel testing reveals that she has a germline pathogenic PALB2 mutation (EX12del). Her 41-year-old sister is tested and harbors the same germline mutation.

Which annual screening test is appropriate for the sister?

- (1) Automated breast ultrasound
- (2) Mammogram with tomosynthesis
- (3) Molecular breast imaging
- (4) Breast MRI
- (5) Question not attempted



107. An 18-year-old presents to the emergency department with complaints of fatigue, exertional shortness of breath, and body aches for 1 week. He denies any fever, runny nose, ear ache, or sick contacts. Physical examination shows a temperature is 98.6 F, heart rate of 112/min, blood pressure of 110/74 mmHg, and conjunctival pallor. On laboratory testing, his white blood cell count is 24,000/ $\mu$ L (neutrophils 40%, lymphocytes 10%, blasts 50%), hemoglobin is 9/g/dL, and platelets are 92,000/ $\mu$ L. Peripheral smear shows pancytopenia, numerous immature white blood cells with convoluted nuclear membrane, open chromatin, indistinct nucleoli, scant cytoplasm and high N:C ratio. A CT of chest, abdomen and pelvis shows a 4 x 5 cm mediastinal mass. Which of the following will be the most likely immune-phenotype of the neoplastic cells?

- (1) Positive for CD2, CD3, CD7, CD10
- (2) Positive for CD10, CD19, CD20, CD22
- (3) Positive for CD13, CD33, CD34, CD45
- (4) Positive for CD20, CD25, CD11c, CD103
- (5) Question not attempted

108. Which gynecologic malignancy is most likely to be associated with endometriosis?

- (1) High-grade serous ovarian carcinoma
- (2) Endometrioid ovarian carcinoma
- (3) Cervical squamous cell carcinoma
- (4) Choriocarcinoma
- (5) Question not attempted

109. Which histologic subtype of ovarian cancer is most resistant to platinum chemotherapy?

- (1) High-grade serous
- (2) Mucinous
- (3) Endometrioid
- (4) Low-grade serous
- (5) Question not attempted

110. In depth understanding of the immune system has led to the development of multiple different immunotherapies like anti-CTLA4 and anti-PD1/PDL-1 antibodies. These agents have shown efficacy in multiple tumor types, and several new checkpoint inhibitor are in clinical testing.

Which of the following statements most appropriately describes steps in T-cell antigen recognition and activation?

- (1) Class II MHC is expressed on all cell types, and serves as the antigen presenting molecule for CD8+ cells.
- (2) The primary co-stimulatory signal is delivered through the CD28 receptor.
- (3) Interaction of the B7-1 or B7-2 receptor with CTLA-4 leads to costimulation of the T-cell.
- (4) CD80 and CD86 are typically found on the T-cells and lead to costimulation.
- (5) Question not attempted

111. What is the recommended surveillance strategy for stage I epithelial ovarian cancer after adjuvant therapy?

- (1) Monthly CA 125
- (2) CT scans every 3 months
- (3) Clinical review with CA 125 every 3-6 months
- (4) PET scan every 6 months
- (5) Question not attempted



112. A 36-year-old woman has been newly diagnosed with stage IV melanoma, metastatic to the liver, lungs, bones and lymph nodes. She still feels well overall, and she has no prior history of autoimmune disease. On physical exam, you confirm her performance status, and review of pathology show BRAF mutant negative metastatic melanoma. You want to start her on the combination therapy of ipilimumab and nivolumab. The patient is curious to hear the difference between combination therapy versus nivolumab only.

Which of the following do you tell her regarding the combination treatment?

- (1) The combination is more toxic compared to single agent, with >40% of patients requiring permanent discontinuation.
- (2) Survival times are longer with the combination as compared to nivolumab alone.
- (3) The combination has an overall response (defined as complete and partial response) of 35% versus 15% for single-agent nivolumab.
- (4) The combination requires PD-L1 testing at baseline, as patients with PD-L1 positive tumors have shorter progression-free survival when treated with immunotherapy.
- (5) Question not attempted

113. A 49-year-old athletic perimenopausal woman presents to her gynecologist with intermittent periods and rare intermittent brown vaginal spotting. She has no complaints of fever, purulent discharge, dyspareunia, pelvic pain, blood in stool, tenesmus, constipation or diarrhea, urinary symptoms, or other symptoms. Her pelvic examination was unremarkable as were laboratory tests. Her 45-year-old brother was recently diagnosed with colorectal cancer that was null for MSH2 on immunohistochemical staining and polymerase chain reaction.

What next steps should be considered?

- (1) An endometrial biopsy with staining for mismatch repair protein loss.
- (2) The patient should be referred to gastroenterology for a colonoscopy due to risk of familial colorectal cancer.
- (3) The patient should be advised that her symptoms are not unreasonable for a perimenopausal woman and routine cervical smear and scraping performed.
- (4) None of these
- (5) Question not attempted

114. Which of the following drugs is a first line tyrosine kinase inhibitor for CML?

- (1) Imatinib
- (2) Dasatinib
- (3) Nilotinib
- (4) All of these
- (5) Question not attempted



**115.** A 46-year-old woman presents for a consultation after hysterectomy and bilateral salpingo-oophorectomy. She was initially diagnosed with a 6.7-cm ovarian mass on presentation with progressive abdominal pain and nearly 40 lb weight loss. During surgery, the mass was discovered to be a pelvic node separate from the ovary. The final pathology describes an anaplastic large cell lymphoma which is positive for CD4, CD30, subset positive for granzyme B and negative for CD8, CD20, PAX5, ALK1. A staging PET scan demonstrates additional pelvic masses up to 6.1 cm, multiple right external iliac and common iliac, inguinal, and retroperitoneal lymph nodes up to 2.4 cm. Lactate dehydrogenase is 141 U/L, and soluble IL-2 receptor is 14,339 pg/mL (reference range, 622-1619 pg/mL).

Which genomic alteration is associated with a better prognosis in this patient's disease?

- (1) IDH2 mutation
- (2) TET2 mutation
- (3) DUSP22 rearrangement
- (4) TP63 rearrangement
- (5) Question not attempted

**116.** A 30-year-old man who works as a firefighter presents with a non-tender 2.5-cm subcutaneous mass in the posterior neck, which has persisted over the past 4 months. His examination is otherwise unremarkable, and he does not endorse any bothersome symptoms. A fine-needle aspiration is non-diagnostic and a surgical excision is undertaken. This shows a lymph node with a distorted architecture notable for numerous B-cell-rich follicles that contain rare large CD15- and CD30-negative, CD20-positive popcorn cells surrounded by numerous CD4-positive T-cells. Staging studies reveal no other sites of disease.

Which of the following statements describes a characteristic feature of this patient's lymphoma?

- (1) The Epstein-Barr virus-encoded RNA (EBER) or latent membrane protein 1 (LMP1) can be detected in the malignant cells in 50% of cases.
- (2) The risk of the same lymphoma among first-degree relatives is nearly 20 times higher than in the general population.
- (3) Most patients experience transformation to diffuse large B-cell lymphoma within 15 years from the initial therapy.
- (4) Compared with other groups, incidence rate is much lower among black patients, and their survival is worse.
- (5) Question not attempted



117. A 55-year-old man with 100 pack-years of smoking history has lung adenocarcinoma. Sequencing of the tumor tissue demonstrates a RAS mutation and no mutations in ALK, EGFR, or BRAF. Extracranial disease is stable following chemotherapy and radiotherapy. He complains of bumping into walls on the right and brain imaging by MRI shows one enhancing lesion in the left occipital lobe that is 1 cm across in the largest diameter and no significant surrounding edema. Which of the following is the most appropriate next step?

- (1) 30 Gy of Whole Brain Radiotherapy (WBRT)
- (2) 60 Gy of WBRT
- (3) Stereotactic radiosurgery
- (4) Resection followed by 60 Gy of WBRT
- (5) Question not attempted

118. A 65-year-old man with a metastatic gastrointestinal stromal tumor (GIST) is referred to you by his local oncologist. The patient had metastatic disease to the liver on diagnosis and was treated with imatinib 400 mg daily for the last 5 months. He has tolerated imatinib well overall, with the only adverse effects of intermittent diarrhoea and fatigue. His local oncologist obtained new imaging, which is evident for progressive disease in the liver. You obtained mutational testing of the tumor, which showed a D842V mutation in exon 18 of PDGFRA.

Which of the following is the most appropriate next step?

- (1) Escalate imatinib dose
- (2) Change therapy to sunitinib
- (3) Change therapy to avapritinib
- (4) Change therapy to regorafenib
- (5) Question not attempted

119. The Kaplan-Meier statistic requires which of the following quantities to calculate median cancer specific survival?

- (1) Length of participating individuals' time in the study.
- (2) Number of participating individuals' deaths occurring during the study.
- (3) Participating individuals' date of cancer diagnosis
- (4) Both Length of participating individuals' time in the study and Number of participating individuals' deaths occurring during the study.
- (5) Question not attempted

120. Which of the following is a poor prognostic factor in AML?

- (1) t(15;17)
- (2) t(8;21)
- (3) FLT3-ITD mutation
- (4) inv(16)
- (5) Question not attempted

121. A 65-year-old former smoker comes to discuss her overall health. She quit smoking 10 years ago and has been eating healthy and exercising regularly. She has several friends that have told her that since she quit 10 years ago, that her risk of developing lung cancer is back to that of the normal population.

By what percentage has her risk of lung cancer decreased?

- (1) 0%
- (2) 25%
- (3) 50%
- (4) 75%
- (5) Question not attempted

122. Which cytogenetic abnormality is associated with favorable prognosis in AML?

- (1) t(15;17)
- (2) del(5q)
- (3) Complex karyotype
- (4) Monosomy 7
- (5) Question not attempted



123. Which is not essential features for Syndrome of Inappropriate Secretion of Antidiuretic Hormone (SIADH) ?  
 (1) Fractional sodium excretion >1%  
 (2) No recent use of diuretics  
 (3) Urine sodium >40 mmol/L with normal dietary salt intake  
 (4) Normal thyroid and adrenal function  
 (5) Question not attempted
124. Hakim's triad includes all except  
 (1) Cognitive decline  
 (2) Precipitate micturition  
 (3) Gait apraxia  
 (4) Headache  
 (5) Question not attempted
125. Which of the following mutations is most frequently observed in HPV-negative head and neck squamous cell carcinoma ?  
 (1) BRAF (2) IDH1  
 (3) TP53 (4) KRAS  
 (5) Question not attempted
126. What is the primary mechanism of carcinogenesis in HPV-positive oropharyngeal cancer ?  
 (1) Overexpression of EGFR  
 (2) Inactivation of p53 and Rb by viral oncoproteins  
 (3) Microsatellite instability  
 (4) Germline BRCA mutation  
 (5) Question not attempted
127. All are correct regarding Epidemiology & Biostatistics except  
 (1) Epidemiology is the study of diseases in populations  
 (2) Biostatistics is the branch of statistics related to medical and health applications  
 (3) Biostatistics underpins the methodologies used in epidemiological investigations and research  
 (4) Epidemiologists develop and apply statistical methods to scientific research in health-related fields, including medicine, epidemiology, and public health  
 (5) Question not attempted
128. Which molecular marker is most commonly used as a surrogate for HPV positivity in oropharyngeal cancer ?  
 (1) p63 (2) Ki-67  
 (3) p16 (4) HER2  
 (5) Question not attempted
129. Passenger genes are not ultimately pathogenic but mapping them is important because :  
 (1) They lead to discovery of driver mutations  
 (2) They expose the DNA repair pathways imperative to cancer development  
 (3) They work as unique signatures for a particular tumor  
 (4) All of these  
 (5) Question not attempted
130. What is the recommended margin for a wide local excision of early oral cavity squamous cell carcinoma ?  
 (1) 1 mm (2) 3 mm  
 (3) 5 mm (4) 10 mm  
 (5) Question not attempted
131. Group psychotherapy has become a popular, effective and efficient means of providing psychological support for patients with cancer. Which is **not** the common element of group psychotherapy ?  
 (1) Emotional expression  
 (2) Detoxifying dying  
 (3) Quality of life assessment  
 (4) Symptom control  
 (5) Question not attempted
132. Which of the following is true about HPV-positive oropharyngeal cancer compared to HPV-negative disease ?  
 (1) Higher smoking association  
 (2) Worse prognosis  
 (3) Common in older patients  
 (4) Better response to chemoradiotherapy  
 (5) Question not attempted



133. What is the most common primary malignant brain tumor in adults ?  
 (1) Meningioma  
 (2) Medulloblastoma  
 (3) Oligodendroglioma  
 (4) Glioblastoma  
 (5) Question not attempted
134. Which of the following molecular feature is associated with a better prognosis in gliomas ?  
 (1) EGFR amplification  
 (2) IDH1 mutation  
 (3) TERT promoter mutation  
 (4) Chromosome 7 gain and 10 loss  
 (5) Question not attempted
135. 1p/19q co-deletion is a hallmark of which brain tumor subtype ?  
 (1) Astrocytoma  
 (2) Glioblastoma  
 (3) Medulloblastoma  
 (4) Oligodendroglioma  
 (5) Question not attempted
136. World Cancer Day is celebrated on  
 (1) 7<sup>th</sup> October  
 (2) 4<sup>th</sup> February  
 (3) 11<sup>th</sup> November  
 (4) 8<sup>th</sup> August  
 (5) Question not attempted
137. MGMT promoter methylation in glioblastoma is associated with  
 (1) Resistance to chemotherapy  
 (2) Improved response to temozolomide  
 (3) Increased tumor invasiveness  
 (4) Radio resistance  
 (5) Question not attempted
138. Which of the following is the most common presenting symptom of a frontal lobe glioma ?  
 (1) Visual field defect  
 (2) Hematemesis  
 (3) Hemiparesis  
 (4) Personality change  
 (5) Question not attempted
139. Which molecular classification is now integrated into the WHO CNS tumor classification (2021) ?  
 (1) Karnofsky score  
 (2) Ki-67 index  
 (3) Molecular subtype including IDH, 1p/19q, and TERT  
 (4) EGFR mutation only  
 (5) Question not attempted
140. Which of the following brain tumors is most likely to disseminate via cerebrospinal fluid (CSF) ?  
 (1) Glioblastoma  
 (2) Meningioma  
 (3) Medulloblastoma  
 (4) Ependymoma  
 (5) Question not attempted
141. Which gene fusion is a key driver in pediatric diffuse midline gliomas ?  
 (1) BCR-ABL (2) EML4-ALK  
 (3) H3K27M (4) TP53  
 (5) Question not attempted
142. Asking about sexual problems in cancer patients, BETTER model is proposed, which statement is FALSE about it ?  
 (1) Bring up the topic  
 (2) Explain that you are concerned with quality of life, including sexual health  
 (3) Tell patients that you will help find appropriate resources as needed  
 (4) Treat the patient's sexual problem  
 (5) Question not attempted
143. Which therapy is used in combination with ATRA for APL ?  
 (1) Methotrexate  
 (2) Daunorubicin  
 (3) Arsenic trioxide  
 (4) Fludarabine  
 (5) Question not attempted



144. What is the most common oncogenic driver mutation in non-smoking patients with lung adenocarcinoma?

- (1) KRAS                      (2) EGFR
- (3) ALK                      (4) ROS1
- (5) Question not attempted

145. Which marker is typically positive in precursor B-cell ALL?

- (1) CD5                      (2) CD10
- (3) CD33                      (4) CD14
- (5) Question not attempted

146. Which is the standard of care for a patient with EGFR-mutated stage IV NSCLC?

- (1) Platinum-doublet chemotherapy
- (2) Osimertinib
- (3) Atezolizumab
- (4) Carboplatin and paclitaxel with bevacizumab
- (5) Question not attempted

147. Which mutation in NSCLC is associated with resistance to first and second generation EGFR TKIs?

- (1) T790M                      (2) ALK
- (3) ROS1                      (4) RET
- (5) Question not attempted

148. In epidemiological studies, "confounding" refers to:

- (1) Random errors in data
- (2) Loss of subjects in follow-up
- (3) Mixing of effects between exposure and extraneous factors
- (4) Incorrect statistical testing
- (5) Question not attempted

149. A 59-year-old male with a 100 pack smoking history presents to the emergency department with acute onset of shortness of breath. He states that this occurred suddenly 1 week ago and has become progressively worse. He does have a nonproductive cough, worse than his baseline. He states that he has tried over-the-counter remedies without any improvement in his symptoms. He notices that lying down makes his coughing worse. On physical exam, he is noted to be markedly dyspneic with respiratory rate in the 30s. He is also tachycardic. There is facial fullness. You order a CT of the chest with intravenous (IV) contrast, which preliminarily reveals a large mass in the right upper lobe but no evidence of any obvious thromboembolism; this has not been verified by radiology. As the patient is returning from CT, you notice that he is stridor and developing worsening mentation.

What is the next best step in management?

- (1) Start empiric IV heparin therapy as you are still highly suspicious for pulmonary embolism
- (2) Page radiation oncology for an emergent evaluation
- (3) Page thoracic surgery to obtain a stat tissue biopsy of the mass
- (4) Start glucocorticoid therapy
- (5) Question not attempted

150. Which of the following is a paraneoplastic syndrome commonly associated with Small Cell Lung Cancer (SCLC)?

- (1) SIADH
- (2) Hypercalcemia
- (3) Carcinoid syndrome
- (4) Erythrocytosis
- (5) Question not attempted



## रफ कार्य के लिए स्थान / SPACE FOR ROUGH WORK

149. A 55-year-old male with a 100 pack smoking history presents to the emergency department with acute onset of shortness of breath. He states that this occurred suddenly 1 week ago and has become progressively worse. He does have a nonproductive cough worse than his baseline. He states that he has tried over-the-counter remedies without any improvement in his symptoms. He notices that lying down makes his coughing worse. On physical exam, he is noted to be markedly dyspneic with respiratory rate in the 30s. He is also tachycardic. There is facial edema. Your order a CT of the chest with intravenous (IV) contrast which predominantly reveals a large mass in the right upper lobe but no evidence of any obvious thromboembolism. This has not been verified by radiology. As the patient is returning from CT, you notice that he is struggling and developing worsening mentation.

What is the next best step in management?

- (1) Start empiric IV-heparin therapy as you are still highly suspicious for pulmonary embolism.
- (2) Page radiation oncology for an emergent evaluation.
- (3) Page thoracic surgery to obtain a stat tissue biopsy of the mass.
- (4) Start glucocorticoid therapy.
- (5) Question not attempted.

150. Which of the following is a paraneoplastic syndrome commonly associated with Small Cell Lung Cancer (SCLC)?

- (1) SIADH
- (2) Hypercholesterolemia
- (3) Carcinoid syndrome
- (4) Erythrocytosis
- (5) Question not attempted.

144. What is the most common oncogenic driver mutation in non-smoking patients with lung adenocarcinoma?

- (1) KRAS
- (2) EGFR
- (3) ALK
- (4) ROS1
- (5) Question not attempted.

145. Which marker is typically positive in precursor B-cell ALL?

- (1) CD5
- (2) CD10
- (3) CD33
- (4) CD13
- (5) Question not attempted.

146. What is the standard of care for a patient with EGFR-mutated stage IV NSCLC?

- (1) Platinum-doublet chemotherapy
- (2) Osimertinib
- (3) Alectinib
- (4) Crizotinib and paxitaxel with bevacizumab
- (5) Question not attempted.

147. Which mutation in NSCLC is associated with resistance to first and second generation EGFR TKIs?

- (1) T790M
- (2) ALK
- (3) ROS1
- (4) RET
- (5) Question not attempted.

148. In epidemiological studies, confounding refers to:

- (1) Random errors in data
- (2) Loss of subjects in follow-up
- (3) Mixing of effects between exposure and extraneous factors
- (4) Incorrect statistical testing
- (5) Question not attempted.

