The Royal Australian and New Zealand College of Radiologists®

The Faculty of Radiation Oncology

Candidate Number: _____

FRANZCR Examination

Phase 2 Radiation Oncology

Pathology

July 2017

Time Allowed: 3 Hours

INSTRUCTIONS

ALL QUESTIONS are to be attempted.

There are a total of SIX (6) questions.

All questions are of equal value.

The marks allocated to each sub-part of the questions are indicated in brackets.

Hand **all** papers to the invigilator.

No papers are allowed to be taken from the examination room.

THIS INCLUDES THE QUESTION PAPERS.

Question 1

a. Compare and contrast the incidence, macroscopic, microscopic and biological behaviour of infiltrating ductal carcinoma of no special type with: **(4)**

i Infiltrating lobular carcinoma.

ii Metaplastic carcinoma of the breast.

b. With regards to breast cancer in patients with Li-Fraumeni Syndrome and Lynch Syndrome: **(2)**

i Describe the genetic mutation(s).

ii Outline the risks of breast cancer development.

iii List the other cancers that patients are at an increased risk of.

c. **(2)**

i List the risk factors for triple negative breast cancer.

ii List the factors that characterise the “basal cluster” in basal like breast cancer.

d. The TROG EXPERT breast cancer trial uses the PAM50 risk of recurrence score. Describe this tool and its clinical utility. **(2)**

Question 2

a. List the hallmarks of carcinogenesis. **(2)**

b. Describe the stages of carcinogenesis caused by physical agents. **(2)**

c. Describe the molecular changes causing carcinogenesis by HPV virus. **(2)**

d.

i In colorectal cancer, describe the APC pathway demonstrating the molecular basis of multistep carcinogenesis (diagram can be used). **(3)**

ii What are the clinical and prognostic implications of the different molecular pathways of colorectal cancer? **(1)**

Question 3

a. How is smouldering myeloma distinguished from multiple myeloma? **(2)**

b. Regarding Solitary Plasmacytoma. Provide a brief outline of the:

i Clinical features. **(3)**

ii Histopathological features. **(2)**

iii Prognosis. **(1)**

c. What factors are associated with a poor prognosis in multiple myeloma? **(2)**

Question 4

A 3 year old boy presents with a mass in relation to the upper pole of his left kidney. The initial clinical impression is that this lesion could either be a Wilms Tumour or a Neuroblastoma.

a. Compare and contrast Neuroblastoma and Wilms tumour using the following features: **(5)**

i Clinical.

ii Imaging.

iii Microscopic.

b. List the adverse prognostic factors for Neuroblastoma. **(2)**

A 60 year old man presents with an undifferentiated malignancy in his right nasal cavity. The possibility of this tumour being either an Olfactory neuroblastoma or a Sinonasal undifferentiated carcinoma (SNUC) is raised.

c. Compare and contrast the clinical, radiological and Immuno-histochemical features which may assist in making the diagnosis. **(3)**

Question 5

In a patient who presented with pleural effusion and pleural-based nodules. You suspect malignancy.

a. List the methods that can be used to obtain a tissue diagnosis and describe the advantages and disadvantages of each method. **(3)**

b. How would immunohistochemistry help distinguish between a bronchogenic adenocarcinoma from an epithelioid mesothelioma? **(2)**

c. For adenocarcinoma of the lung, describe the key changes in the 2011 IASLC/ATS/ERS classification system. **(2)**

d. For adenocarcinoma of the lung, list the: **(3)**

i Commonly tested driver mutations.

ii The frequency in which they occur.

What is the clinical relevance of these mutations?

Question 6

A 35 year old lady presents with a 4cm palpable nodule in the left lobe of the thyroid gland.

a. List the clinical and radiological features which may suggest this nodule is malignant. **(2.5)**

b.

i Briefly describe the role of fine needle aspiration cytology (FNAC) in assessing a suspicious solitary nodule in the thyroid gland. **(1.5)**

ii List the technical factors that might prevent the pathologist from establishing a diagnosis from the specimen. **(1)**

iii In a technically good specimen, list the factors which may prevent the pathologist from establishing a firm diagnosis. **(1.5)**

c. List the prognostic factors which increases the risk of recurrence and poor survival from well differentiated Papillary and Follicular thyroid cancers **(1.5)**

d. Briefly describe the clinical and histopathological features of anaplastic thyroid carcinoma. **(2)**

The Royal Australian and New Zealand College of Radiologists®

The Faculty of Radiation Oncology

Candidate Number: _____

FRANZCR Examination

Phase 2 Radiation Oncology

Clinical Oncology

July 2017

Time Allowed: 3 Hours

INSTRUCTIONS

ALL QUESTIONS are to be attempted.

There are a total of SIX (6) questions.

All questions are of equal value.

The marks allocated to each sub-part of the questions are indicated in brackets.

Hand **all** papers to the invigilator.

No papers are allowed to be taken from the examination room.

THIS INCLUDES THE QUESTION PAPERS.

Question 1

A 50 year old female has been diagnosed with early stage breast cancer. She is receiving adjuvant radiation therapy to her left breast and supraclavicular fossa.

During treatment review, she is noted to have an erythematous left breast with oedema and moist desquamation. She also complains of left breast pain.

a. Outline the factors that you would consider when deciding on how to manage this situation. **(4)**

b. **(3)**

i Why are toxicity scoring systems used in clinical practice?

ii In general, what are the criteria for an ideal system of grading and reporting normal tissue complications?

c. Give an example a of a toxicity scoring system for radiation dermatitis and provide the clinical description for each grade. **(3)**

Question 2

A 46 year-old man with a past history of melanoma presents with worsening headache and ataxia.

A CT scan shows a solitary 4cm left cerebellar lesion with significant vasogenic oedema and midline shift.

a. What is your initial management? Include what further investigations you would obtain. **(2)**

b. What are the options for management if this is a solitary cerebellar lesion? Include in your answer the rationale for each approach **(4)**

c. In general, what management options are available to patients with multiple (more than 5) brain metastases from metastatic melanoma? **(4)**

What factors would you consider when choosing an option to recommend?

Question 3

A 45 year old consults you to discuss screening for colorectal cancer.

a. What information do you require to determine whether this patient would be a candidate for colorectal cancer screening? **(2)**

b. In the presence of a significant family history of colorectal Cancer. **(2)**

i What are the familial syndromes you would consider?

ii What impact does a family history have on screening schedule?

c. In general, what are the screening modalities for colorectal cancer and the benefit and limitations of each? **(4)**

d. What chemopreventive agent is available to reduce the risk of colorectal cancer? Discuss the controversies surrounding this chemopreventive option. **(2)**

Question 4

A 62 year old male presents with a six month history of increasing shortness of breath.

Ten years ago he received chemotherapy and radiation therapy for a diffuse large B cell mediastinal lymphoma.

a. What are the possible causes for his shortness of breath? **(3)**

b. What steps could you take to reduce long term complications from radiation therapy and chemotherapy for mediastinal lymphoma? Justify your answers giving examples. **(5)**

c. In general, what strategies can be used to manage breathlessness in terminal cancer patients? **(2)**

Question 5

a. Discuss the potential causes and manifestations of hypercalcaemia in a lung cancer patient. **(2)**

A 76 year old lady was treated with concurrent chemoradiotherapy (60Gy/30#) two years ago for a Stage IIIA adenocarcinoma of the lung, involving the right main bronchus and subcarinal lymph nodes. She now presents with symptomatic hypercalcaemia.

b. Outline your management for this patient. **(2)**

c. She is found to have widespread bone and liver metastases. What are the systemic treatment options? What factors would you use to decide the most appropriate one? **(3)**

She subsequently presents with shortness of breath and is found to have endobronchial progression with near occlusion of the right main bronchus.

d. Discuss the various local management options, including the advantages and disadvantages of each. **(3)**

Question 6

a. What is meant by the term oligometastatic state? **(2)**

What are the implications for local ablative therapy?

b.

i What is the rationale for aggressive local treatment of oligometastatic liver metastases from colorectal cancer? **(2)**

ii Discuss 3 possible treatment options for patients with oligometastatic liver metastases from colorectal cancer. **(6)**

Include in your answer, the factors you would consider in choosing each option and the advantages and disadvantages of each option.

The Royal Australian and New Zealand College of Radiologists®

The Faculty of Radiation Oncology

Candidate Number: _____

FRANZCR Examination

Phase 2 Radiation Oncology

Radiation Therapy 1

July 2017

Time Allowed: 2.5 Hours

INSTRUCTIONS

ALL QUESTIONS are to be attempted.

There are a total of FIVE (5) questions.

All questions are of equal value.

The marks allocated to each sub-part of the questions are indicated in brackets.

Hand **all** papers to the invigilator.

No papers are allowed to be taken from the examination room.

THIS INCLUDES THE QUESTION PAPERS.

Question 1

A 54 year old man is diagnosed with a rectal adenocarcinoma. Staging shows a mid rectal tumour involving mesorectal fat and a solitary lymph node (cT3N1M0).

a. He is referred for neoadjuvant therapy. What are the options for treatment? Describe a suitable radiation therapy technique and dose fractionation schedule. **(4)**

b. What factors would you consider when deciding on your radiation dose fractionation regimen for neoadjuvant treatment? Justify your answer. **(3)**

c. In general, with patients being treated for rectal cancer with external beam radiation therapy how would you manage: **(3)**

i A hip replacement

ii Excess small bowel dose within the field in a patient requiring neoadjuvant radiation therapy

iii A non healing wound in a patient requiring adjuvant treatment

Question 2

A fit 21 year old female is found to have a mediastinal mass. CT guided biopsy confirms Nodular Sclerosing Hodgkin's Lymphoma. CT and PET staging shows the disease is confined to the mediastinum and left supraclavicular fossa.

a. What factors do you need to consider when deciding on this patient's management? **(3)**

b. The patient has stage 2 disease. Using the specific factors you have outlined above, what are the possible management options for this patient? **(5)**

Include in your answer a suitable radiation therapy technique and dose fractionation schedule for each option, as appropriate.

c. What would you tell this patient about her risk of breast cancer? What practical steps would you advise her to take in regard to this risk? **(2)**

Question 3

An 8 year old girl is referred following gross total resection of a classic, non-WNT (wingless type), non-SHH (sonic hedgehog) posterior fossa medulloblastoma. She has an uncomplicated post-operative course. There is no overt disease elsewhere and no malignant cells in the cerebrospinal fluid.

a. What risk category is this patient in? Outline a management plan for this risk category. **(2)**

b. Describe a suitable radiation therapy technique and dose fractionation regimen for her treatment. Dose constraints to organs at risk are not required to be given. **(5)**

c. What are the potential radiation therapy related side effects of the treatment you have prescribed? **(3)**

Question 4

A 30 year old female presents with headache and diplopia. A CT brain shows a 2.5cm sellar mass with involvement of the cavernous sinus.

a. What further information from her physical examination and investigations do you require to formulate a treatment plan? **(2)**

The patient undergoes debulking of the tumour via transphenoidal excision. The post-operative diagnosis is pituitary adenoma which is non-functioning.

b. In general, following surgery for pituitary tumours, what factors would you take into consideration when recommending postoperative radiation therapy? **(2)**

c. A decision is made to give this patient radiation therapy post-operatively. Describe a suitable radiation therapy technique and dose fractionation schedule. **(4)**

d. What would you tell the patient about the expected outcome of treatment? What potential treatment toxicities would you discuss with her? **(2)**

Question 5

A 26 year old female presents to the emergency department with pain in the back. CT scan shows a destructive lesion in T12 and adjacent 12th rib.

a. What is your immediate management of this patient? **(3)**

b. Biopsy confirms Ewing's Sarcoma. What other investigations would you perform? Justify your answer. **(2)**

c. The lesion is confined to the T12 and the adjacent posterior rib, without any metastasis. **(2)**

What are the management options?

d. A decision has been made to treat this patient with radiation therapy following neo-adjuvant chemotherapy. **(3)**

Describe a suitable radiation therapy technique and dose fractionation schedule.

The Royal Australian and New Zealand College of Radiologists®

The Faculty of Radiation Oncology

Candidate Number: _____

FRANZCR Examination

Phase 2 Radiation Oncology

Radiation Therapy 2

July 2017

Time Allowed: 2.5 Hours

INSTRUCTIONS

ALL QUESTIONS are to be attempted.

There are a total of FIVE (5) questions.

All questions are of equal value.

The marks allocated to each sub-part of the questions are indicated in brackets.

Hand **all** papers to the invigilator.

No papers are allowed to be taken from the examination room.

THIS INCLUDES THE QUESTION PAPERS.

Question 1

A fit 55 year old man is diagnosed with nasopharyngeal carcinoma. PET/CT shows intracranial extension of the tumour and right sided level 2-4 lymphadenopathy. He has no distant metastases (cT4N3M0).

a. In general, what treatment strategies are available for locoregionally advanced nasopharyngeal carcinoma? Include in your answer the rationale of each approach. **(2)**

b. The recommendation from the MDT is to treat the patient with definitive chemoradiotherapy. **(3)**

Describe your target volumes, radiation therapy technique and dose fractionation schedule.

c. Two years later the patient is found to have a 1.5cm recurrence in the lateral wall of the nasopharynx. **(2)**

What further information do you require to formulate a management plan for this patient?

d. There are no distant metastases. The decision is made to offer this patient re-irradiation with radical intent. **(3)**

Describe a suitable radiation therapy treatment and dose fractionation schedule, including critical normal tissue tolerances.

Question 2

A 23 year old woman presents with a mass in the left sternomastoid muscle. She has paraesthesia radiating down the left arm. Core biopsy of this lesion confirms a desmoid tumour.

a. What factors do you need to take into account when deciding on her management? **(2)**

b. The decision is made to offer definitive radiation therapy. Describe a suitable radiation therapy technique and dose fractionation schedule. **(3)**

c. What would you tell her about the expected outcome of treatment? What are the potential late toxicities? **(3)**

d. What are the options if there is unequivocal local progression after treatment? **(2)**

Question 3

A man with intermediate risk prostate cancer is referred for definitive external beam radiation therapy.

a. Describe a suitable radiation therapy technique and dose fractionation schedule. **(3)**

b. In general, in the treatment of localised prostate cancer, what options are available for increasing the biologically equivalent dose? Discuss the advantages and disadvantages of each option. **(4)**

You see a man previously treated with radical external beam radiation therapy for intermediate risk prostate cancer.

He has a slowly rising PSA. Current PSA 3.8mcg/L. PSMA scan shows isolated recurrence in the left base of prostate.

Biopsy confirms recurrent prostate adenocarcinoma.

c. What are the available management options? What factors would you consider when choosing treatment? **(3)**

Question 4

a. In general, what is the benefit of adjuvant radiation therapy in a patient who has undergone local excision of ductal carcinoma in situ (DCIS)? **(3)**

What factors need to be considered when deciding upon optimal management in such patients? Justify your answer.

A 46 year old lady has breast conserving treatment for DCIS and a decision is made to offer her adjuvant radiation therapy. She has large, pendulous breasts. Standard tangents result in unacceptable exposure to heart and lung.

b. What are the options to circumvent this problem? Discuss the potential advantages and disadvantages of each option. **(5)**

c. What is the role, if any, for sentinel lymph node biopsy for DCIS? **(2)**

Question 5

A 72 year old woman presents with vaginal bleeding. Clinical examination reveals a 5cm ulcerative mass in the right lateral inferior third of the vagina. Biopsy confirms a squamous cell carcinoma consistent with a primary vaginal carcinoma.

a. Describe how you would further assess the patient, giving justifications for your answer. **(2)**

b. The decision is made to treat the patient with curative intent using radiation. Describe a suitable radiation therapy technique and dose fractionation schedule **(5)**

c. What are the potential acute and late side effects of the radiation therapy you have prescribed? **(3)**