

**RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**  
**SYLLABUS FOR SCREENING TEST FOR THE POST OF**  
**ASSISTANT PROFESSOR (Super Speciality)**  
**MEDICAL ONCOLOGY**  
**MEDICAL EDUCATION DEPARTMENT**

**1. INTRODUCTION TO ONCOLOGY**

- Principles of oncology
- Cell proliferation, differentiation , cell cycle
- Hallmarks of cancer
- Cancer genome- Oncogenes , tumor suppressor genes
- Tumor angiogenesis and microenvironment
- Invasion and metastases
- Tumor Immunity
- Molecular Methods in Oncology-Applications, Specimen requirements, Testing Process, Technologies

**2. CANCER EPIDEMIOLOGY**

**A. ETIOLOGY OF CANCERS**

- Tobacco
- Oncogenic viruses
- Inflammation
- Chemical agents
- Physical agents
- Nutritional factors and obesity /Physical Activity

**B. EPIDEMIOLOGY OF CANCER**

- Basic epidemiological methods – Trends in Cancer mortality
- Cancer screening methods and recommendations
- Cancer registries and databases
- Cancer prevention
- National and international cancer programmes

**3. CANCER GENETICS**

- Diagnostic methods in cancer genetics
- Genetic counselling

**4. BIostatistics & CLINICAL TRIALS**

- Basics of biomedical statistics
- Data collection and organization
- Survival analysis
- Clinical trial design and conduct of clinical trials
- Quality of life assessment
- Phase 1 trials
- Phase 2 trials
- Phase 3 trials
- Metaanalysis

## **5. CANCER THERAPEUTICS**

### **A. RADIATION ONCOLOGY**

- Biologic Aspects of Radiation Oncology
- Factors that Affect Radiation Response
- Drugs that Affect Radiation Sensitivity
- Radiation Physics
- Treatment Planning techniques
- Other Treatment Modalities
- Clinical Applications of Radiation Therapy
- Treatment dosing strategies
- Fractionation biology and applications
- Adverse Effects
- Principles of Combining Anticancer Agents with Radiation Therapy
- Latest advances

### **B. SURGICAL ONCOLOGY**

- Principle of surgery
- Surgical techniques
- Role of surgery in cancer prevention
- Laparoscopic oncological surgery
- Robotic surgery advances

### **C. PRINCIPLES OF CHEMOTHERAPY**

- Cell cycle and kinetics
- Pharmacokinetics
- Pharmacodynamics
- Pharmacogenomics
- Alkylating agents
- Platinum analogs
- Antimetabolites
- Topoisomerase inhibitors
- Antitubule agents
- Hypomethylating and Histone deacetylating agents
- Proteasome Inhibitors
- PARP inhibitors
- Miscellaneous agents
- Hormonal agents
- Anti angiogenesis agents
- Kinase Inhibition
- Monoclonal antibodies
- Assessment of Clinical response

### **D. RESPONSE ASSESSMENT IN CANCER THERAPY**

### **E. CANCER IMMUNOTHERAPY**

- Principles of tumor immunity
- Tumor antigens
- Immune evading mechanisms
- Immune tolerance
- Immune diagnostics
- Check point inhibitors

- Cancer vaccines
- Response assessment in immunotherapies
- Adverse effects and management
- Clinical trial end points in immunotherapy
- Future trends
- Dendritic cells
- CDRT Cells and Other Cellular Therapies

## **F. CONCEPTS OF METRONOMIC CHEMOTHERAPY**

## **G. IMAGING IN CANCERS**

## **H. DIAGNOSTIC PATHOLOGY IN ONCOLOGY**

- Histological techniques
- Immunohistochemistry
- Cytology
- Circulating tumor cells
- Molecular pathology techniques -PCR, NGS , WGS
- Cytogenetics
- Flow cytometry
- Clinicopathological correlation

## **I. VASCULAR ACCESS IN CANCER PATIENTS**

## **J. BIOMARKERS IN ONCOLOGY**

## **K. TISSUE CULTURE AND TISSUE BANKING**

## **L. CANCER BIOINFORMATICS**

## **M. INFORMATION TECHNOLOGY AND ARTIFICIAL INTELLIGENCE**

## **6. SYSTEMIC ONCOLOGY**

### **A. NEOPLASMS OF HEAD AND NECK**

- Molecular biology of head neck cancers
- Cancer of head and neck
- Rehabilitation of a patient with head neck cancer

### **B. NEOPLASMS OF THORACIC CAVITY**

- Molecular biology of lung cancer
- Non small cell lung cancer
- Small cell lung cancer
- Neoplasms of mediastinum

### **C. NEOPLASMS OF GASTROINTESTINAL TRACT**

- Molecular biology of Esophageal and gastric cancers
- Esophageal cancer
- Gastric cancer
- Molecular biology of pancreatic cancer
- Pancreatic cancer
- Genetic testing in gastric and pancreatic cancers
- Molecular biology of liver cancer
- Liver and biliary cancers
- GIST
- Molecular biology of colorectal cancer
- Genetic testing in colon cancer
- Cancer colon

- Cancer rectum
- Cancer anal region
- D. NEOPLASMS OF GENITOURINARY TRACT**
- Molecular biology of Kidney cancer
- Cancer of the Kidney
- Cancer of bladder
- Molecular biology of prostate cancer
- Cancer of the prostate
- Cancer of testis
- E. GYNAECOLOGICAL NEOPLASMS**
- Molecular biology of Gynaecological malignancies
- Cancer cervix , vagina , vulva
- Cancer of uterine body
- Cancer of the ovary
- Gestational trophoblastic neoplasia
- F. NEOPLASMS OF THE BREAST**
- Molecular biology of breast cancer
- Breast cancer
- Genetic testing of breast cancer
- G. NEOPLASMS OF THE ENDOCRINE SYSTEM**
- Molecular biology of endocrine cancers
- Genetic testing in endocrine cancers
- Thyroid tumors
- Parathyroid tumors
- Adrenal tumors
- Pancreatic neuroendocrine tumors
- Carcinoid tumors
- Multiple endocrine neoplasia
- H. BONE AND SOFT TISSUE NEOPLASMS**
- Molecular biology of sarcomas
- Soft tissue sarcoma
- Bone tumors
- I. SKIN TUMORS**
- Cancer of the skin
- Molecular biology of melanoma
- Malignant melanoma
- J. NEURO-ONCOLOGY**
- Molecular biology of CNS tumors
- Tumors of CNS
- K. HEMATOLYMPHOID CANCERS**
- Molecular biology of acute leukemias
- Molecular biology of lymphomas
- Acute leukemias
- Management of acute leukemias
- Non Hodgkin lymphoma
- Hodgkins lymphoma
- Plasma cell neoplasms

- Chronic leukemias
- Myelodysplastic syndromes
- Myeloproliferative neoplasms

#### **L. HAEMATOPOIETIC STEM CELL TRANSPLANTATION**

- Autologous transplantation
- Allogeneic transplantation
- Complications of HSCT
- Haplo Transplant
- Transplant/Registry

#### **M. CELLULAR THERAPIES FOR CANCER MANAGEMENT**

- CAR-T cell therapy
- NK-T cell therapy
- Cytotoxic T cell therapies
- Mesenchymal stromal cell therapies

#### **N. CANCER OF UNKNOWN PRIMARY SITE**

#### **O. MESOTHELIOMA**

#### **P. TRANSFUSION MEDICINE IN ONCOLOGY**

#### **Q. IMMUNO SUPPRESSION RELATED MALIGNANCIES**

- HIV associated cancers
- Transplantation related cancers

#### **7. ONCOLOGICAL EMERGENCIES**

- Superior vena cava syndrome
- Raised intracranial tension
- Tumor lysis syndrome
- Spinal cord compression
- Metabolic emergencies

#### **8. MANAGEMENT OF A PATIENT WITH METASTATIC CANCER**

- Liver metastases
- Lung metastases
- Brain metastases
- Bone metastases
- Malignant ascites
- Pleural and pericardial effusions
- Paraneoplastic syndromes

#### **9. MANAGEMENT OF ADVERSE EFFECTS ON ANTICANCER THERAPY**

- Infections in cancer patients
- Neutropenia and thrombocytopenia
- Anemia in a cancer patient
- Cancer associated thrombosis
- Nausea and vomiting
- Hair and skin complications
- Oral complications
- Neurological complications
- Cardiac toxicity
- Pulmonary toxicity
- Gonadal dysfunction

- Cancer fatigue
- Neurocognitive dysfunction
- Bowel complications

**10. SECOND MALIGNANCIES**

**11. GERIATRIC ONCOLOGY**

**12. CANCER SURVIVORSHIP**

**13. CHILDHOOD CANCERS**

- Molecular biology of childhood cancers
- Solid tumors in childhood
- Hematological malignancies in childhood
- Late adverse effects of cancer therapies

**14. CANCER PAIN MANAGEMENT**

**15. PALLIATIVE CARE**

**16. NUTRITIONAL SUPPORT IN CANCER PATIENTS**

**17. SEXUAL PROBLEMS IN CANCER PATIENTS**

**18. COMMUNICATION WITH CANCER PATIENTS**

**19. END OF LIFE CARE**

**20. REHABILITATION OF CANCER PATIENTS**

**21. ALTERNATIVE AND COMPLEMENTARY MEDICINES IN CANCER**

**22. MEDICOLEGAL ASPECTS OF CANCER CARE**

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**Pattern of Question Papers:**

1. **Objective Type Paper**
2. **Maximum Marks: 180**
3. **Number of Questions: 180**
4. **Duration of Paper : Three Hours**
5. **All Questions carry equal marks**
6. **Medium of Screening Test: English**
7. **There will be Negative Marking**  
(1/3 part of the mark(s) of each question will be deducted for each wrong answer)