

**DETAILED SYLLABUS FOR THE POST OF ASSISTANT
PROFESSOR IN REPRODUCTIVE MEDICINE IN MEDICAL
EDUCATION - DIRECT RECRUITMENT**

(Cat. Nos: 568/2023)

1	Basic Sciences relating to Reproductive medicine and Surgery	20
2	Principles of Reproductive Medicine and Laboratory Techniques	30
3	Fertility associated Medical and Surgical Diseases, Genetics, Counselling, Ethical and Legal issues related to ART	30
4	Recent advances in Assisted Reproductive Medicine and Surgery	20
	Total marks	100

DETAILS OF SYLLABUS ARE GIVEN BELOW:

I. Basic Science Relating to Reproductive Medicine and Surgery

1. Reproductive tract anatomy

Female:

Uterine anatomy and histology:

- Normal anatomy
- Histology of myometrium
- Different types of congenital abnormalities, their impact on fertility and their management

Endometrial histology:

- Histological appearance of normal and abnormal endometrium
- Developmental stages of the endometrium (dating)
- Endometrial factors that affect implantation in early pregnancy

Tubal anatomy and histology:

Normal anatomy

- Different types of congenital abnormalities

Vaginal and cervical anatomy and histology:

- Normal anatomy and histology
- Possible consequences of antenatal hormone exposure
- Effects of various hormones on the vagina and cervix

Ovarian anatomy and histology:

- Different compartments of the Graafian follicle (e.g. granulosa cells, theca and adjacent stroma) and the primordial, pre-antral, antral and Graafian follicles, including the dynamic changes which occur in the ovary from embryo to menopause.
- Specific staining techniques and cellular ultrastructure as related to function.
- Gross and microscopic findings and the development of gonadal structures.

Pelvic anatomy, blood, nerve and lymphatic supply

Embryology:

- Development of embryo and abnormalities in development of genital tract
- Embryology of the urological system
- Embryology of hypothalamic-pituitary and other pertinent endocrine systems

Male:

Male Genital Organs

Penis

- Anatomy and histology, blood, nerve and lymphatic supply

Testes

- Normal anatomy and development of the testis
- Stages of normal spermatogenesis.

Accessory structures

- Normal anatomy and development of epididymis, vas deferens, seminal vesicle and other accessory organs

2. Reproductive Endocrinology

Female

Neuroendocrine anatomy and physiology

- Neuroendocrine function: central nervous system, hypothalamic-pituitary system in normal and disease states
- Neuroendocrine regulation of menstrual cycle and ovulation
- Neuroendocrine control of fetus and placenta
- Hypothalamic and pituitary disorders
- Thyroid function and disease states
- Adrenal function and disease states

Disorders of androgen secretion

- Evaluation and management of a hirsute women
- Polycystic ovary syndrome

Male:

- Endocrine profile of male
- Physiology of Spermatogenesis
- Physiology of ejaculation
- Hypothalamo-pituitary-thyroid axis function

3. Reproductive Pharmacology

Pharmacokinetics and pharmacodynamics of drugs used in reproductive medicine:

■ Drugs used for ovulation induction:

Anti-estrogens
Aromatase inhibitors
Gonadotrophin therapy
Metformin/insulin sensitisers

■ Drugs used for HRT

Oestrogens
Progesterone
Aspirin

- Drugs used for Hirsutism
- Drugs used for treatment of endometriosis
- Oral contraceptive pills
- Antibiotics in ART
- Drugs used in treatment of precocious puberty
- Drugs used in treatment of hyperprolactinemia

- GnRH analogues and antagonists
- Steroids and infertility
- Drugs for sexual function

4. Reproductive Pathology

Female:

Uterine pathology:

- Impact of intrauterine adhesions
- Impact of fibroids and adenomyosis
- Current data relating estrogens with endometrial hyperplasia and adenocarcinoma
- Acute and chronic endometritis
- Gross and microscopic findings of endometriosis
- Gross and microscopic findings of adenomyosis, leiomyoma and other myometrial lesions related to reproduction
- Relationships of leiomyoma to infertility, including each of the different types (e.g. subserosal, intramural and submucosal)

Tubal pathology:

Gross and microscopic findings of diseases of the oviduct (e.g. acute and chronic salpingitis, granulomatous salpingitis, endometriosis)

Tubal factors of infertility:

- Natural history and clinical course of acute and chronic salpingitis and relate these to subsequent fertility
- Hydrosalpinx – etiology and management

Ovarian pathology:

- Ovarian cyst and tumours
- Gross and microscopic findings and natural history of ovarian tumours related to reproductive function (e.g. follicular cysts, luteoma, corpus luteum, polycystic ovary Syndrome, endometrioma, granulosa-theca cell tumour, Sertoli-Leydig cell tumour, gynandroblastoma, cystic teratoma, dysgerminoma, gonadoblastoma and mixed germ cell or gonadal tumours)

PELVIC INFLAMMATORY DISEASE (PID)

Pelvic Tuberculosis

Paraovarian cyst Endometriosis

- Pathogenesis and aetiology of endometriosis
- Symptoms
- Mechanisms by which minimal and mild endometriosis may impair fertility.
- Investigations: Ultrasound/computed tomography/magnetic resonance imaging.
- Effects on fertility
- Disturbances in the peritoneal fluid environment
- Diagnosis, staging / grading of disease and prognosis
- Place of expectant management, medical and surgical treatment in the management of endometriosis
- Role, possible benefits and potential adverse effects of pharmacological agents, e.g.
 - Oral Contraceptives, progestogens, danazol, gestrinone, Gonadotrophin Releasing Hormone (GnRH) analogues, in the management of endometriosis
 - Role of assisted reproduction in the management of endometriosis.
- Pain management

Male:

- Gross and microscopic findings in testicular disease (e.g. teratoma, seminoma, Leydig and Sertoli cell tumours)
- Diseases of accessory organs - seminal vesicle and epididymis
- Absence of vas deferens - diagnosis and management
- Testicular biopsy - its interpretation
- Varicocele - Aetiology, diagnosis, symptoms, grading and management.
- Infections of male genital organs

5. Reproductive Immunology

Female:

- Immunology of pregnancy
- Allo- and auto- immunological failures
- Repeated pregnancy loss and implantation failure

Male:

- Immunological reproductive failure in men/sperm antibodies.

6. Pediatric and Adolescent Gynaecology

Development of gonads

- Factors controlling development of the gonadal primordia, internal duct system and external genitalia in male and female, Normal sequence of pubertal changes in the female and male and their chronology
- Hormonal changes and gametogenesis relative to the reproductive cycle: from intrauterine life to the development of normal reproductive cycles (e.g., gonadotrophin secretion in the fetus and the neonate, sensitivity of the feedback system during fetal and neonatal life and childhood; role of adrenal androgens).
- Delayed puberty including differential diagnosis, evaluation and appropriate therapy
- Developmental abnormalities of the genital tract including ambiguous genitalia, imperforate hymen and vaginal septa
- Uterine anomalies: Müllerian and Wolffian dysgenesis
- Rokitansky syndrome
- Gonadal dysgenesis
- Effects of hormones on bone growth and epiphyseal closure
- Sexual precocity including differential diagnosis, evaluation and appropriate therapy.
- Ambiguous genitalia: Differential diagnosis and its evaluation
- Involvement in the assignment of sex of rearing of infant with ambiguous genitalia,
- Techniques for surgical reconstruction (e.g. vaginoplasty, clitoridectomy and clitoral resection)
- Indications and techniques for gonadectomy
- Delayed puberty and primary amenorrhea • Androgen insensitivity syndrome
- Congenital Adrenal hyperplasia.

7. Menopause and premature Menopause

Predictors of Ovarian reserve

Premature menopause:

- Causes of premature ovarian failure: congenital endocrine disorders (e.g. Turner Syndrome, complete androgen insensitivity syndrome, ovarian agenesis, polyglandular endocrinopathy and Fragile X syndrome) and acquired disorders (postsurgery, chemo/radiotherapy)
- Management of the post-menopausal woman

- Interpretation of tests used to evaluate amenorrhoea
- A rational diagnostic and therapeutic approach to patients with amenorrhoea
- Choice of hormone replacement therapy (HRT)
- Advantages and disadvantages, risks and benefits of HRT
- Treatment options for young women with ovarian failure, with particular regard to future fertility

II. Principles of Reproductive Medicine and Laboratory Techniques

1. Assisted Reproductive Techniques - Clinical perspectives

Normal ranges in:

- semen parameters
- endocrine profile: female and male

Ovulation induction

- anti-estrogens and aromatase inhibitors
- gonadotrophins

Hyperprolactinemia

Stimulation Protocols:

- Long Gonadotrophin-Releasing Hormone (GnRH) protocol
- Short GnRH protocol
- Ultra Short and microflare protocol ○ Stop protocol ○ Newer protocols
- GnRH antagonist cycles
- In vitro Fertilisation (IVF).
- Intra cytoplasmic sperm injection (ICSI)
- Frozen embryo replacement:
- Natural cycle
- HRT cycle
- Luteal support
- Donor-recipient cycle
- Donation of Oocyte and Sperm
- Screening of potential egg donors
- Surrogacy
- Egg sharing
- Cryo preservation of gamete, embryo, tissue.
- In Vitro oocyte maturation

- Management of complications including Ovarian Hyper Stimulation Syndrome.

2. Imaging Techniques in Infertility

Uterine and tubal imaging

- Hysterosalpingography
- Hysterosalpingo-contrast-sonography
- Saline sonosalpingohysterogram
- Computed tomography (CT) / magnetic resonance imaging (MRI)

Evaluation of pituitary fossa: X-ray skull, MRI and CT Ultrasound

imaging: Abdominal and TVS:

- Follicular tracking: natural / simulated cycles
- Tracking IVF endometrial development
- Uterine abnormalities eg: fibroids, adenomyosis, anomalies
- Endometrial assessment, including normal cyclical changes, changes associated with hormone replacement, hyperplasia and malignancy
- Ovarian pathology
- Early pregnancy assessment
- Oocyte retrieval

Ovarian and uterine Doppler in Infertility

Selective Fetal reduction

Hysterosalpingography

Contrast sonohysterosalpingogram

CT/MRI

3. Andrology and Applied Urology

- Appropriate history and investigations
- Assessing sperm function
- Intrauterine insemination
- Investigation of male infertility
- Assessment and management of Erectile dysfunction
- Ejaculatory dysfunction
- Varicocele
- Reconstructive andrology

Methods of sperm retrieval

- Microsurgical epididymal sperm aspiration
- Percutaneous epididymal sperm aspiration
- TESA/TESE
- Open testicular biopsy

Medical treatment of male infertility:

- Antioxidant therapy
- Aromatase therapy
- Anti - estrogens
- Endocrine therapy
- Effect of aging on sperm function
- Genetic causes for male infertility
- Sperm banking

4. Embryology and ART laboratory

Clinical Embryology

- Cell biology
- History and overview of ART
- Instruments used in IVF

Introduction to embryology

- Fertilization and Embryo development
- Control of early follicular development
- Control of terminal follicular development
- Oocyte maturation - *In vivo*
- IVM
- Gamete transport
- Implantation
- Endocrinology of implantation
- Molecular basis of fertilization
- Gene expression in early embryos
- Epigenetic events in early embryos

ART laboratory

- Maintenance of ART lab
- Media for ART procedures
- Semen preparation techniques
- Collection and culture of oocytes and embryos
- Grading of oocytes and embryos
- IVF and ICSI, TESE
- IVM

- Embryo transfer techniques
- Cryopreservation of embryo, gametes, tissue
- Assisted hatching

Regulation and Ethics in Embryology

- ART and law
- Semen banks and donor sperms
- Ethics – case studies
- Counseling

5. Early Pregnancy Problems

Ectopic pregnancy:

- Causes
- Investigations
- Medical management
- Surgical management

Miscarriage, Recurrent miscarriage

- Causes
- Investigations
- Medical management
- Surgical management

Molar pregnancy

Multiple pregnancy

III. Fertility associated Medical and Surgical Diseases, Genetics, Counseling, Legal and Ethical issues related to ART

1. Fertility associated Medical and Surgical Diseases

- Anatomical systems in relation to human reproduction.
- Medical diseases associated with fertility.
- Basics of surgery (laparotomy)
- Basics of laparoscopy
- Basics of hysteroscopy
- Role of endoscopic and open surgery in the treatment of fertility-related conditions
- Indications for diagnostic and operative laparoscopy
- Indications for diagnostic and operative hysteroscopy
- Complications of endoscopy & open surgery

- Tubal Recanalization – laparoscopic and open surgery method
- Principles of microsurgery
- Post operative adhesion preventive measures
- Role of fertility enhancing surgery in men
- Role of reconstructive microsurgery surgery for male infertility
- Varicocelelectomy– diagnosis, indications and complications
- Methods of surgical sperm retrieval
- Surgical management of ectopic pregnancy

2. **Reproductive Genetics:**

- Genetic history and counseling
- Cell cycle and biology
- Approach to chromosome analysis
- International System for Human Cytogenetic Nomenclature

Normal variation:

- Banding techniques
- Prenatal diagnosis
- Cell culture and processing
- Preimplantation genetic diagnosis
- Preimplantation genetic screening

Basis of genetic inheritance and transmission of genetic disease:

- Single gene disorders: recessive and dominant
- Sex-linked disorders
- Late-onset disorders and disease susceptibilities
- Chromosome rearrangements: Robertsonian reciprocal translocations and their consequences
- Aneuploidy, sporadic aneuploidy and important aneuploidy syndromes (e.g. Edwards, Turner, Patau).

Tools for genetic diagnosis

- Cytogenetics
- Molecular cytogenetics: Principles and application

3. **Ethical and legal issues**

ICMR guidelines in ART

1. Staff
2. Facilities

3. Assessing Clients, Donors and Welfare of the Child
 - Confidentiality
 - Assessment of potential gamete donors
4. Information
5. Consent
6. Use of gametes and embryos
7. Storage and handling of gametes and embryos
8. Third party reproduction: rules & guidelines
9. Cross border reproduction: problems and guidelines
10. Adoption Guidelines

4. Patient Counseling and Management

- Information counseling
- Therapeutic counseling
- Research
- Audit

IV. Recent Advances in Reproductive Medicine and Surgery

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.

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