

Department of Anatomy, BMU

MS Phase-A Part-I Block-1 / Paper-I

Topics for testing teaching ability

(These are topics that call for conception and understanding rather than rote memorisation, and that usually need to be taught by the teachers. Any 25 of these topics have to be selected covering all the subdivisions for the exams of each session and the list should be provided to the students before the exams to help them in preparing for the exams.)

Introductory

Contributions of Aristotle in anatomical knowledge

Galen's misconceptions about Anatomy

Prefixes can add meanings to anatomical words and word-roots

Suffixes can change the meanings of anatomical terms in specific ways

General Anatomy

Epiphyseal plate– locations, structure and significance (functional and clinical)

Different types of epiphysis– definitions, examples and reasons for development

Intra-membranous ossification– why, where and how it occurs

Intra-cartilaginous ossification– why, where and how it occurs

Forms and architecture of bone– descriptions, factors determining them and significance (functional and clinical)

Arterial supply of long, short and irregular bones

Prime movers and antagonists– definitions, examples and significance

Synergists and fixators– definitions, examples and significance

Pennate and strap muscles- characteristics, utilities and examples

“Muscles can act from their origins and from their insertions”- which muscles, when and for what purposes

“Direction of muscle fibres determines the movements produced”- examples and mechanisms involved

Red muscles and white muscles– definitions, examples and significance

Nomenclature of muscles according to shape- examples and significance of particular shapes

Swing (spurt) muscles, shunt muscles and spin muscles- definitions, examples and significance

Rules of segmental nerve supply to the muscles acting on a joint with examples

Gravity line and anti-gravity action– significance and muscles and ligaments involved
Type of synovial joint– definitions, examples and functional significance
Maintenance of stability of joints– definition, factors with examples and significance (functional and clinical)
Planes and axes of movements at a joint– definitions, examples and significance
Bursae around joints – formation, examples and significance (functional and clinical)
Retinacula and synovial sheaths– formation, examples and significance (functional and clinical)
Simple, compound and complex joints– definitions, examples and significance
Fibrous, cartilaginous and synovial joints- structural and functional distinctions with examples
Hilton's law– the law, its significance and examples
Cartilaginous discs in joints– locations and significance

Portal circulation and its functional significance
Porto-caval anastomoses and their functional and clinical significance
Factors influencing venous return – explanations with examples
Portal systems– definitions, types, locations functional significance
Lymphoid structures and lymphatics– overall organisation in different parts of the body
End arteries– definition with explanation, locations and clinical significance
Venous valves – formation plus examples and significance of their presence and absence
Collateral circulation – definition, examples and significance (functional and clinical)

Skin lines- types, characteristics, reasons and significance
Ideal embalming fluid– characteristics and components responsible for those characteristics
Postmortem changes in human remains- description and reasons
Pilosebaceous unit of skin- organization and functional significance specializations of skin and its appendages
in different parts of the body organization and functional and clinical significance
Characteristics of a synovial joint and their functional and clinical significance
Shapes of articular surfaces of synovial joints and their functional significance (any three may be selected)
Roles of ligaments in joints and relevant structure-function relationships

Cell Biology

Cell degeneration
Metaplasia
Cell necrosis
Cell hypertrophy

Cell membrane proteins
 Exocytosis: mechanism and significance
 Endocytosis: mechanism and significance
 The fluid mosaic model of a cell membrane
 Functions of the cell membrane
 Nucleolus
 Cell organelles vs inclusions
 Functions of the Golgi complex
 Energy production by the mitochondria
 Ribosomal participation in protein synthesis
 Intermediate filaments
 Functions and dysfunctions of the cytoskeletal components
 Smooth endoplasmic reticulum: structure function relationship
 Cell cycle and its synthetic phase
 G₀ phase of a cell cycle
 Objectives and characteristics of a mitotic division
 Objectives and characteristics of a meiotic division
 Numerical anomalies of chromosome
 Non-disjunction and its implication
 Totipotency
 Pluripotent and multipotent cells
 Semi-permeable membrane
 Gap junction
 Lysosome-related pathologies
 Post-translational modification
 Cell surface modification
 Glycocalyx coat: organization and functional significance
 Checkpoints in cell cycle, and their functional and clinical significance
 Different stages of mitosis- why different events occur
 Different stages of meiosis- why different events occur
 Cell cycle and its synthetic phase
 G₀ phase of a cell cycle
 Totipotency
 Pluripotent cell vs totipotent cell
 Objective and characteristics of a mitotic division
 Objectives and characteristics of a meiotic division
 Numerical anomalies of chromosome

Non-disjunction and its implications.

Comparative anatomy

- Homology vs analogy
- Explain the saying: “Phylogeny repeats in outogeny”
or “Outogeny repeats phylogeny”
or “Phylogeny is repeated in outogeny”
- Natural selection in the theory of evolution
- Two, three and four chambered heart, and the significance of their differences
- Apes vs man: functional significance of the structural differences.