

CONTENTS

1/ EXCRETION

Kidneys	...	...	...	1—1
Renal circulation	...	...	...	1—15
Normal renal blood flow	...	...	...	1—18
Measurement of renal blood flow	...	...	...	1—24
Selective reabsorption of kidneys	...	...	...	1—28
Renal Tubular secretion	...	...	...	1—37
Formation of some new substances in kidneys	...	...	...	1—39
Renal function tests	...	...	...	1—40
Urine	...	...	...	1—43
Mechanism of regulation of blood reaction by the kidney	...	...	...	1—51
Glycosuria	...	...	...	1—56, 4—130
Micturition	...	...	...	1—60
Effects of lesion of the autonomic nerves	...	...	...	1—65
Artificial kidney	...	...	...	1—67
Vitamins and kidney	...	...	...	1—67
Skin	...	...	...	1—68
Sweat	...	...	...	1—75
Nails	...	...	...	1—78
Hairs (Pili)	...	...	...	1—78

2/ THE BODY TEMPERATURE

Regulation of body temperature	...	...	...	2—2
Temperature regulation in the new-born infant	...	...	...	2—8
Pyrexia (fever) and Hypothermia	...	...	...	2—9

3/ REGULATION OF REACTION OF BLOOD AND DISTURBANCES IN ACID-BASE REGULATION

Regulation of reaction of blood	...	...	...	3—1
Disturbances in acid-base regulation	...	...	...	3—6
Henderson-Hasselbalch equation	...	...	...	3—9
<i>Assessment of the acid-base status</i>	...	...	...	3—10

4/ ENDOCRINES

General considerations of hormones	...	...	...	4—3
Hypophysis (Pituitary gland)	...	...	...	4—13
Structure and functions of adenohipophysis	...	...	...	4—15
I. Growth hormone or Somatotrophic hormone (GH or STH)	...	...	...	4—20
II. Thyrotrophic hormone or Thyrotrophin (TSH)	...	...	...	4—24
III. Adrenocorticotrophic hormone (ACTH)	...	...	...	4—27
IV. Gonadotrophic hormones (GTH)	...	...	...	4—30
Interrelations of pars distalis with Gonads, Thyroid and Adrenal cortex	...	...	...	4—35

Disorders of the pars distalis	...	...	...	4-37
Dysfunction of the Acidophil cells	...	...	...	4-39
Dysfunction of the basophil cells	...	...	...	4-41
Dysfunction of the chromophobe cells	...	...	...	4-41
Pars intermedia	...	...	...	4-42
Pars tuberalis or Infundibularis	...	...	...	4-44
Structure and Functions of Neurohypophysis	...	...	...	4-45
I. Vasopressin (Pitressin)	...	...	...	4-49
II. Oxytocin (Pitocin)	...	...	...	4-54
Neuroendocrinology	...	...	...	4-57
Thyroid gland	...	...	...	4-64
Thyroid hormones	...	...	...	4-67
Role of iodine	...	...	...	4-75
Investigation of thyroid functions	...	...	...	4-79
Hypothyroidism	...	...	...	4-79
Hyperthyroidism or thyrotoxicosis	...	...	...	4-82
<i>Functions of thyroid gland</i>	...	...	...	4-85
Mode of action of thyroid hormones	...	...	...	4-87
Anti-thyroid compounds	...	...	...	4-89
Thyrocalcitonin	...	...	...	4-90
Parathyroid gland	...	...	...	4-92
Parathormone (PTH)	...	...	...	4-94
Hyperparathyroidism	...	...	...	4-99
Hypoparathyroidism	...	...	...	4-100
Calcium	...	...	...	4-100
Phosphorus	...	...	...	4-104
Endocrine pancreas	...	...	...	4-106
Insulin	...	...	...	4-108
Non-suppressible insulin-like activity (NSILA)	...	...	...	4-113
Glucose tolerance test	...	...	...	4-123
Glucagon	...	...	...	4-123
Regulation of blood sugar level	...	...	...	4-127
Hypoglycaemia	...	...	...	4-130
Hyperglycaemia	...	...	...	4-130
Diabetes mellitus	...	...	...	4-131
Adrenal (suprarenal) glands	...	...	...	4-135
Adrenal cortex	...	...	...	4-138
Hypofunction of adrenal cortex	...	...	...	4-153
Hyperfunction of adrenal cortex	...	...	...	4-154
General adaptation syndrome	...	...	...	4-160
Adrenal medulla	...	...	...	4-163
<i>Catecholamines</i>	...	...	...	4-164
Epinephrine (adrenaline)	...	...	...	4-168
Norepinephrine (noradrenaline)	...	...	...	4-173
Hyperfunction of adrenal medulla	...	...	...	4-176
Gastro-intestinal hormones	...	...	...	4-176
Erythropoietin	...	...	...	4-180
Histamine and Heparin	...	...	...	4-181
Prostaglandins	...	...	...	4-181
Thymus	...	...	...	4-185

The pineal body	...	...	...	4-190
Gonads and Reproduction	...	...	...	4-195
Puberty	...	...	...	4-195
Genetic basis of sex differentiation	...	...	...	4-196
Heredity	...	...	...	4-201
Testis	...	...	...	4-203
Androgens	...	...	...	4-208
Life history of Spermatozoa (Sperma)	...	...	...	4-214
Spermatogenesis	...	...	...	4-216
Spermiogenesis	...	...	...	4-219
Control of spermatogenesis	...	...	...	4-222
Fate of spermatozoa	...	...	...	4-223
Fertilisation of the ovum	...	...	...	4-224
Semen (Seminal plasma or fluid)	...	...	...	4-224
Physiologic basis of impotence	...	...	...	4-227
Prostate	...	...	...	4-228
Ovary	...	...	...	4-230
Vesicular or Graafian follicles: ovarian cycle	...	...	...	4-233
Control of ovulation	...	...	...	4-239
Corpus luteum	...	...	...	4-243
Oestrogens	...	...	...	4-246
Progesterone	...	...	...	4-254
Relaxin	...	...	...	4-258
Androgens	...	...	...	4-258
Menstruation	...	...	...	4-260
Gravid cycle	...	...	...	4-264
Anovulatory cycle	...	...	...	4-264
Vaginal cycle	...	...	...	4-264
Menopause	...	...	...	4-265
Summary of changes and influences of hormones during the menstrual cycle	...	...	...	4-265
Oestrous cycle	...	...	...	4-266
Role of the central nervous system in hypophyseal-ovarian axis	...	...	...	4-267
Hormones and sexual behaviour	...	...	...	4-269
Pregnancy	...	...	...	4-271
Placenta	...	...	...	4-274
Chorionic gonadotrophin (CG) or human chorionic gonadotrophin (HCG)	...	...	...	4-279
Pregnant mare's serum	...	...	...	4-280
Chorionic growth hormone prolactin (CGP) or human chorionic somatomammotrophin (HGS) or human placental lactogen (HPL)	...	...	...	4-280
Uterine-relaxing factor (URF) or Relaxin	...	...	...	4-281
Hormonal regulation in pregnancy	...	...	...	4-281
Parturition	...	...	...	4-284
Twins and multiple births	...	...	...	4-286
Interrelation of steroid hormone biosynthesis and metabolism in the foetus and placenta	...	...	...	4-287

Foetal endocrine system	...	...	...	4-288
Foetal circulation	...	...	...	4-289
Challenges of new existence	...	...	...	4-293
Inborn errors of metabolism in the new-born	...	...	...	4-295
Hormones excreted in the urine	...	...	...	4-296
Development of Breast and Lactation	...	...	...	4-296
Control of breast development shil	...	...	...	4-299
Colostrum	...	...	...	4-303
Hormone and cancer	...	...	...	4-303
Regulation of growth	...	...	...	4-304
Factors controlling sexual growth	...	...	...	4-305
Controlled reproduction and a planned family	...	...	...	4-306

5/ NERVOUS SYSTEM

Histogenesis of nerve tissue	...	...	...	5-2
Central or Somatic nervous system	...	...	...	5-5
General principles of the nervous system	...	...	...	5-10
Histological structure of the nervous system	...	...	...	5-12
Gray matter and White matter	...	...	...	5-18
Myelin sheath	...	...	...	5-19
Myelination in the peripheral nerve fibre	...	...	...	5-19
Myelinogenesis in the peripheral nerve fibre	...	...	...	5-20
Chemical composition of the nervous system	...	...	...	5-21
Histological properties of the nerve fibre	...	...	...	5-22
Classification of the nerve fibre	...	...	...	5-30
Synapse	...	...	...	5-39
Properties of synapse	...	...	...	5-48
Myoneural junction	...	...	...	5-53
Synopsis of the neurophysiological mechanism	...	...	...	5-56
Reaction of degeneration	...	...	...	5-59
Effects of nerve section (<i>degeneration and regeneration of the nerve fibre</i>)	...	...	...	5-58
Degeneration and Regeneration of the nerve endings	...	...	...	5-61
Transneuronal degeneration	...	...	...	5-61
Nerve endings	...	...	...	5-61
Receptors	...	...	...	5-61
Motor end-plates and Acetylcholine	...	...	...	5-66
Classification and varieties of nerve endings	...	...	...	5-67
Reflex action	...	...	...	5-74
General characteristics of reflex action	...	...	...	5-76
Unconditioned reflexes	...	...	...	5-81
Electrophysiology of spinal reflexes	...	...	...	5-87
Motor unit and Electromyogram (EMG)	...	...	...	5-90
Sensations	...	...	...	5-92
Classification of sensations	...	...	...	5-95
Arrangement of gray and white matter in the spinal cord	...	...	...	5-102
Tracts	...	...	...	5-107
Ascending tracts (Afferent tracts)	...	...	...	5-109
Descending tracts (Efferent tracts)	...	...	...	5-121

<i>Intersegmental fibres</i>	5—137
Effects of section of Anterior root	5—138
Effects of section of Posterior root	5—138
Effects of section of Mixed Spinal nerve	5—138
<i>Hemisection of spinal cord</i>	1—141
Applied considerations on spinal transections	5—143
Effects of lesions at various levels of the central nervous system	5—144
Lemniscus or Fillet	5—145
Midbrain (Mesencephalon)	5—148
Pons varolii	5—150
Medulla oblongata (spinal bulb)	5—155
Cerebellum	5—157
<i>Archicerebellum</i>	5—157
Palaeocerebellum	5—158
<i>Neocerebellum</i>	5—165
<i>Functions of cerebellum</i>	5—168
Cerebellar lesions	5—169
Thalamus	5—173
Summary of functions of thalamus	5—174
Mammillary bodies	5—174
Internal capsule	5—175
Basal ganglia	5—177
Corpus striatum	5—179
Red nucleus	5—180
Substantia nigra	5—180
Body of Luys or Corpus Luysi (Subthalamic nucleus)	5—181
<i>Clinical manifestations associated with diseases of basal ganglia</i>	5—182
Subthalamus	5—185
Reticular formation	5—188
<i>Feedback theory for maintenance of activation of the reticular activating system</i>	5—192
Muscle tone and Posture	5—209
Vestibular apparatus	5—212
Semicircular canals	5—217
Otolithic organ	5—222
Cerebrum	4—225
Cerebral cortex	5—231
Areas and centres in the cerebral cortex	5—231
Frontal lobe	5—236
Parietal lobe	5—237
Temporal lobe	5—239
Occipital lobe	5—239
Limbic lobe and Limbic system	5—243
Orbital-insular-temporal cortex	5—243
Insular area (island of Reil)	5—244
Functions of the cerebrum	5—246
Electrical activity of cerebral cortex	5—246
Electroencephalography	5—252
Physiological basis of EEG	5—254
Speech	

Learning	...	...	...	...	5-257
1. Classical conditioning of Pavlov	...	...	...	...	5-257
2. Instrumental conditioning or learning	...	...	...	...	5-262
3. Discrimination learning	...	...	...	...	5-263
Physiological basis of conditioned reflexes and learning	...	...	...	...	5-263
Memory and its neurophysiological basis	...	...	...	...	5-264
Sleep	...	...	...	...	5-265
Desynchronisation of EEG and deep sleep	...	...	...	...	5-269
Emotion	...	...	...	...	5-270
Cerebrospinal fluid (CSF)	...	...	...	...	5-272
Lumbar puncture	...	...	...	...	5-275
Ventriculography	...	...	...	...	5-275
Hydrocephalus	...	...	...	...	5-273
Blood-cerebrospinal fluid and Brain barrier	...	...	...	...	5-276
Autonomic nervous system (ANS)	...	...	...	...	5-278
Sympathetic (Thoracolumbar) system	...	...	...	...	5-283
Parasympathetic (Craniosacral) system	...	...	...	...	5-287
Sympathetic and Parasympathetic actions	...	...	...	...	5-291
Humoral mechanism of transmission of nerve impulses by autonomic nerves	...	...	...	...	5-295
Norepinephrine (NE)	...	...	...	...	5-295
Drugs that act on the release of NE from nerve terminals	...	...	...	...	5-297
<i>Sympathin</i>	...	...	...	...	5-298
Acetylcholine (ACh)	...	...	...	...	5-298
Control of autonomic nervous system	...	...	...	...	5-301
Hypothalamus	...	...	...	...	5-302
Neurosecretion	...	...	...	...	5-311
Cranial nerves	...	...	...	...	5-315

6/ SPECIAL SENSES

Taste (goustation)	...	...	...	...	6-1
Sense of smell (olfaction)	...	...	...	...	6-6
Vision	...	...	...	...	6-13
Conjunctiva	...	...	...	...	6-13
Lacrimal apparatus	...	...	...	...	6-14
Eyeball	...	...	...	...	6-15
Cornea	...	...	...	...	6-17
Aqueous humour	...	...	...	...	5-19
Crystalline lens	...	...	...	...	6-23
Vitreous humour (Vitreous body)	...	...	...	...	6-24
Control of eye movements	...	...	...	...	6-25
Iris	...	...	...	...	6-29
Pupil	...	...	...	...	6-32
Pupillary reflexes	...	...	...	...	6-33
Accommodation	...	...	...	...	6-35
Hypermetropia (<i>long-sightedness</i>)	...	...	...	...	6-39
Myopia (<i>short-sightedness</i>)	...	...	...	...	6-39
Astigmatism	...	...	...	...	6-40
Contact lens	...	...	...	...	6-40

CONTENTS

7

Retina	6-42
Rods and cones	6-47
Neurophysiology of vision	6-54
Spectral sensitivity: Scotopic vision and Photopic vision ...	6-56
Light and Dark adaptation	6-57
Visual acuity	6-58
Ophthalmoscopy	6-60
Retinoscopy	6-63
Field of vision	6-64
Visual path	6-68
Colour vision	6-78
Colour blindness	6-82
After-image	6-84
Contrast phenomenon	6-84
Hearing	6-85
Ear	6-85
<i>Organ of Corti</i>	6-90
Properties of sound and range of hearing	6-92
Auditory acuity	6-94
Deafness	6-95
Transmission of sound wave	6-96
I. Mechanics of cochlear duct (Cochlear partition) ...	6-98
II. Electrical potentials of the cochlea	6-100
Path of auditory impulses	6-103

7/ ATOMIC RADIATION AND ITS EFFECTS

Ionising radiation	7-1
Cosmic rays	7-2
Effects of Gamma rays	7-4

8/ PHYSIOLOGICAL EFFECTS OF SPACE FLIGHT

Weightlessness in the space	8-1
Temperature in the space	8-2
Acceleration exposure	8-2
Physiological changes in bodily processes	8-2

9/ EMBRYOLOGY

Maturation of germ cells and fertilisation	9-1
Germ layers and their derivatives	9-6
Development of gastro-intestinal system	9-7
Development of important endocrine glands	9-8
Development of cardiovascular system	9-11
Urogenital system	9-13
Genital system	9-16

10/ MEDICAL STATISTICS

Probability	...	...	...	...	10-1
Frequency distribution	...	...	...	...	10-3
Averages	...	...	...	...	10-6
Deviations or scatters	...	...	...	...	10-7
Sampling	...	...	...	...	10-10
Regression	...	...	...	...	10-17
Correlation	...	...	...	...	10-20
Analysis of variance	...	...	...	...	10-21
Experimental design	...	...	...	...	10-22
Nomogram	...	...	...	...	10-24

11/ BIOMEDICAL MEASUREMENT SYSTEMS

11/PRINCIPLES OF BIOMEDICAL
MEASUREMENT SYSTEMS

... 11-1-11-15

MULTIPLE-CHOICE QUESTIONS

... A-1-A-27

UNITS AND MEASURES

... A-28-A-33

Recommended daily dietary allowance

... A-34-A-35