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**DEVI AHILYA UNIVERSITY, INDORE**

**SYLLABUS FOR Ph.D. ENTRANCE TEST IN PHYSICAL EDUCATION**

**PART-A**

Part-A shall consist of 50 Multiple Choice Compulsory Questions based on research methodology and Statistics. It shall be of generic nature, intended to assess the research aptitude of the candidate. It will primarily be designed to test reasoning ability, data interpretation, and quantitative aptitude of the candidate.

**1. RESEARCH METHODOLOGY**

Meaning and Definition of Research – Need, Nature and Scope of research in Physical Education. Classification of Research, Location of Research Problem, Criteria for selection of a problem, Qualities of a good researcher. Descriptive Methods of Research; Survey Study, Case study, Introduction of Historical Research, Steps in Historical Research, Sources of Historical Research: Primary Data and Secondary Data, Historical Criticism: Internal Criticism and External Criticism.

Experimental Research – Meaning, Nature and Importance, Meaning of Variable, Types of Variables. Experimental Design - Single Group Design, Reverse Group Design, Repeated Measure Design, Static Group Comparison Design, Equated Group Design, Factorial Design.

Meaning and Definition of Sample and Population. Types of Sampling; Probability Methods; Systematic Sampling, Cluster sampling, Stratified Sampling. Area Sampling – Multistage Sampling. Non- Probability Methods; Convenience Sample, Judgement Sampling, Quota Sampling.

Chapterization of Thesis / Dissertation, Front Materials, Body of Thesis – Back materials. Method of Writing Research proposal, Thesis / Dissertation; Method of writing abstract and full paper for presenting in a conference and to publish in journals, Mechanics of writing Research Report, Footnote and Bibliography writing.

**2. STATISTICS**

Meaning and Definition of Statistics. Function, need and importance of Statistics. Types of Statistics. Meaning of the terms, Population, Sample, Data, types of data. Variables; Discrete, Continuous. Parametric and non-parametric statistics. Data Classification, Tabulation and Measures of Central Tendency Meaning, uses and construction of frequency table.

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Meaning, Purpose, Calculation and advantages of Measures of central tendency - Mean, median and mode. Meaning, Purpose, Calculation and advances of Range, Quartile, Deviation, Mean Deviation, Standard Deviation, and Probable Error.

Meaning, Purpose, Calculation and advantages of scoring scales; Sigma scale, Z Scale, Hull scale. Probability Distributions and Graphs Normal Curve. Meaning of probability- Principles of normal curve - Properties of normal curve. Divergence from normality - Skewness and Kurtosis. Graphical Representation in Statistics; Line diagram, Bar diagram, Histogram, Frequency Polygon, Ogive Curve.

Inferential and Comparative Statistics, Tests of significance; Independent "t" test, Dependent "t" test - chi - square test, level of confidence and interpretation of data. Meaning of correlation - co-efficient of correlation - calculation of co-efficient of correlation by the product moment method and rank difference method. Concept of ANOVA and ANCOVA.

## PART-B

Part-B shall also consist of 50 Multiple Choice Compulsory Questions based on the syllabus of the subjects of Physical Education and Sports at Masters Level which are given below:

### 1. PHYSIOLOGY OF EXERCISE

Macro & Micro Structure of the Skeletal Muscle, Chemical Composition. Sliding Filament theory of Muscular Contraction. Types of Muscle fibre, Muscle Tone, Chemistry of Muscular Contraction, Heat Production in the Muscle, Effect of exercises and training on the muscular system.

Heart Valves and Direction of the Blood Flow. Conduction System of the Heart, Blood Supply to the Heart. Cardiac Cycle: Stroke Volume, Cardiac Output, Heart Rate. Factors Affecting Heart Rate, Cardiac Hypertrophy. Effect of exercises and training on the Cardio-vascular system.

Mechanics of Breathing, Respiratory Muscles. Minute Ventilation: Ventilation at Rest and During Exercise. Diffusion of Gases: Exchange of Gases in the Lungs, Exchange of Gases in the Tissues, Control of Ventilation: Ventilation and the Anaerobic Threshold, Oxygen Debt. Lung Volumes and Capacities. Effect of exercises and training on the respiratory system.

Metabolism: ATP - PC or Phosphagen System, Anaerobic Metabolism, Aerobic Metabolism. Aerobic and Anaerobic Systems during Rest and Exercise. Short Duration High Intensity Exercises, High Intensity Exercise Lasting Several Minutes, Long Duration Exercises. Variation in Temperature and Humidity:

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Thermoregulation, Sports performance in hot climate, Cool Climate, and high altitude.

Definition of Doping - Side effects of drugs - Dietary supplements - IOC list of doping classes and methods. Blood Doping - The use of erythropoietin in blood boosting - Blood doping control. The testing programmes - Problems in drug detection - Blood testing in doping control - Problems with the supply of medicines Subject to IOC regulations: over the- counter drugs (OTC), prescription only medicines (POMs) - Controlled drugs (CDs). Reporting test results - Education.

## 2. TEST, MEASUREMENT AND EVALUATION IN PHYSICAL EDUCATION

Meaning and Definition of Test, Measurement and Evaluation. Need and Importance of Measurement and Evaluation. Criteria for Test Selection - Scientific Authenticity. Meaning, definition and establishing Validity, Reliability, Objectivity. Norms - Administrative Considerations.

Meaning and Definition of Motor Fitness. Test for Motor Fitness; Indiana Motor Fitness Test (for elementary and high school boys, girls and College Men) Oregon Motor Fitness Test (Separately for boys and girls) - JCR test. Motor Ability; Barrow Motor Ability Test - Newton Motor Ability Test.

Muscular Fitness - Kraus Weber Minimum Muscular Fitness Test. Physical Fitness Test: AAHPERD Health Related Fitness Battery (revised in 1984), ACSM Health Related Physical Fitness Test, Roger's physical fitness Index.

Cardio vascular test; Harvard step test, 12 minutes run / walk test, Multi-stage fitness test (Beep test). Physiological Testing: Aerobic Capacity: The Bruce Treadmill Test Protocol, 1.5 Mile Run test for college age males and females. Anaerobic Capacity: Margaria-Kalamen test, Wingate Anaerobic Test,

Anthropometric Measurements: Method of Measuring Height: Standing Height, Sitting Height. Method of measuring Circumference: Arm, Waist, Hip, Thigh. Method of Measuring Skin folds: Triceps, Sub scapular, Suprailiac. Specific

Spots Skill Test: Badminton: Miller Wall Volley Test. Basketball: Johnson Basketball Test, Harrison Basketball Ability Test. Cricket: Sutcliff Cricket test. Hockey: Friendel Field Hockey Test, Harban's Hockey Test, Volleyball, Russel Lange Volleyball Test, Brady Volleyball Test. Football: Mor-Christian General Soccer Ability Skill Test Battery, Johnson Soccer Test, Mc-Donald Volley Soccer Test. Tennis: Dyer Tennis Test.

## 3. SPORTS BIOMECHANICS AND KINESIOLOGY

Meaning, nature, role and scope of Applied kinesiology and Sports Biomechanics. Meaning of Axis and Planes, Dynamics, Kinematics, Kinetics, Statics

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Centre of gravity, Line of gravity. Plane of the body and axis of motion, Vectors and Scalars.

Origin, Insertion and action of muscles: Pectoralis major and minor, Deltoid, Biceps, Triceps (Anterior and Posterior), Trapezius, serratus, Sartorius, Rectus femoris, Abdominis, Quadriceps, Hamstring, Gastrocnemius.

Definition and objectives of corrective physical Education. Posture and body mechanics, Standards of Standing Posture. Value of good posture, Drawbacks and causes of bad posture. Posture test: Examination of the spine, Normal curve of the spine and its utility, Deviations in Posture: Kyphosis, Lordosis, Flat Back, Scoliosis, Round Shoulders, Knock Knee, Bow leg, Flat foot.

Meaning and definition of Motion. Types of Motion: Linear motion, angular motion, circular motion, uniform motion. Principals related to the law of Inertia, Law of acceleration, and law of counter force. Meaning and definition of force, Sources of force, Force components. Force applied at an angle, Pressure, friction, Buoyancy, Spin, Centripetal force & Centrifugal force.

Freely falling bodies: Projectiles, Equation of projectiles. Stability: Factors influencing equilibrium, Guiding principles for stability, Static and Dynamic Stability. Meaning of work, power, energy, kinetic energy and potential energy. Leverage: classes of lever, practical application. Water resistance, Air resistance, Aerodynamics.

Analysis of Movement: Types of analysis: Kinesiological, Biomechanical. Cinematographic. Methods of analysis - Qualitative, Quantitative, Predictive.

#### 4. SCIENTIFIC PRINCIPLES OF SPORTS TRAINING

Sports training: Definition - Aim, Characteristics, Principles of Sports Training, Over Load: Definition, Causes of Over Load, Symptoms of Overload, Remedial Measures - Super Compensation - Altitude Training - Cross Training.

Strength-Methods to improve Strength: Weight Training, Isometric, Isotonic, Circuit Training. Speed-Methods to Develop Speed: Repetition Method, Downhill Run, Parachute Running, Wind Sprints. Endurance-Methods to Improve Endurance: Continuous Method, Interval Method, Repetition Method, Cross Country, Fartlek Training. Flexibility-Methods to Improve the Flexibility: Types of flexibility exercises (i.e. dynamic, static), Stretch and Hold Method, Ballistic Method, PNF. Relaxation Techniques and Core Training. Safety techniques (stretching protocol; breathing and relaxation techniques) Develop basic competency in relaxation and breathing techniques. Pilates, Yoga.

Special Type Training: Plyometric Training. Training for Coordinative abilities: Methods to improve Coordinative abilities: Sensory Method, Variation in

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Movement Execution Method, Variation in External Condition Method, Combination of Movement Method, Types of Stretching Exercises.

Training Plan: Macro Cycle, Meso-Cycle. Short Term Plan and Long Term Plans, Periodisation: Meaning, Single, Double and Multiple Periodisation, Preparatory Period, Competition Period and Transition Period.

## 5. SPORTS MEDICINE

Meaning and Concept of Sports Medicine, Scope of sports medicine in Physical Education and Sports, Brief history of sports medicine, Injuries: acute, sub-acute, chronic. Role of athletic care providers in sports medicine.

Tissue response to injuries, Concept of PRICE therapy, General Rehabilitation process in sports medical problems: Goals of Rehabilitation, steps of Rehabilitation Management. Strapping /Tapping in sports injuries. Therapeutic Principles: Principles of injuries prevention, Principles of diagnosis, Principles of treatment. Exercise: Stretching, Strengthening, Coordination and Balance training exercise.

Soft tissue and musculo - skeletal injuries: Abrasion, Laceration, Contusion, Sprain. Stress related injuries: Strain, Tendinitis, Stress fracture, Shin Splint. Injuries of head and face: Hematoma, Hemorrhage, Concussion, Skull Fracture, Facial Cuts, Knocked out teeth, Nosebleeds, Eye Injuries, Bleeding from Ears. Visceral injuries: Visceral Blunt trauma includes abdominal wall injuries, Spleen injuries, Liver injuries, Kidney injuries, Testicular and penile injuries.

Sports Medical Extension Services: Low back problem and their management. Sex problems in athletes. Role of exercise, before and after the pregnancy. Common old age problems. Obesity and its management. Management of Heart Problem and Diabetes.

Brief history of massage, Massage as an aid for relaxation, Points to be considered in giving massage, Physiological , Chemical, Psychological effects of massage. Indication /Contra indication of Massage. Massage and their specific uses in the human body. Classification of massage manipulation: Stroking, Effleurage, Pressure manipulation: Petrissage Kneading (Finger, Kneading, Circular) ironing Skin Rolling - Percussion manipulation: Tapotement, Hacking, Clapping, Beating, Pounding, Slapping, Cupping, Poking, Shaking Manipulation, Deep massage.

## 6. SPORTS PSYCHOLOGY

Meaning, Definition, History, Need and Importance of Sports Psychology. Present Status of Sports Psychology in India. Motor Learning: Basic Considerations in Motor Learning - Motor Perception : Factors Affecting Perception - Perceptual Mechanism.

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Personality: Meaning, Definition, Structure - Measuring Personality Traits. Effects of Personality on Sports Performance. Meaning and Definition, Types of Motivation: Intrinsic, Extrinsic. Achievement Motivation: Meaning, Measuring of Achievement Motivation.

Anxiety: Meaning and Definition, Nature, Causes, Method of Measuring Anxiety. Competitive Anxiety and Sports Performance. Stress: Meaning and Definition, Causes. Stress and Sports Performance. Aggression: Meaning and Definition, Method of Measurement. Aggression and Sports Performance. Self-Concept: Meaning and Definition, Method of Measurement. Meaning and Definition, Process of Goal Setting in Physical Education and Sports.

Psychological Tests: Types of Psychological Test: Instrument based tests: Pass-along test - Tachistoscope-Reaction timer - Finger dexterity board - Depth perception box - Kinesthesiometer board. Questionnaire: Sports Achievement Motivation, Sports Competition Anxiety.

Defining competition, determinants of competitive behavior, psychological characteristics of pre-competition, during competition and post competition. Selected psycho regulative techniques technique for relaxation and activation. Psychological aspects of long term and short term preparation for competition, Psychological care of injuries, sports person, responses to injuries, prevention and coping techniques. Presence of others, co action effect and audience effect in sports. Factors mediatingsocial facilitations. Volitional regulation actions in sports: Meaning, Characteristicsand Factors affecting volitional regulated behavior. Development of volitional qualities.

## 7. HEALTH EDUCATION AND SPORTS NURTITION

Concept, Dimensions, Spectrum and Determinants of Health Definition of Health, Health Education, Health Instruction, Health Supervision Aim, objective and Principles of Health Education Health Service and guidance instruction in personal hygiene.

Communicable and Non Communicable Diseases Obesity, Malnutrition, Adulteration in food, Environmental sanitation, Explosive, Population, Personal and Environmental Hygiene for schools Objective of school health service, Role of health education in schools Health Services -Care of skin, Nails, Eye health service, Nutritional service, Health appraisal, Health record, Healthful school environment, first- aid and emergency care etc. Meaning of Hygiene, Type of Hygiene, dental Hygiene, Effect of Alcohol on Health, Effect of Tobacco on Health, Life Style Management, Management of Hypertension, Management of Obesity, Management of Stress.

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Nutrition Meaning and Definition of Sports Nutrition, Role of nutrition in sports, Basic Nutrition guidelines, Nutrients: Ingestion to energy metabolism (Carbohydrate, Protein and Fat), Role of carbohydrates, Fat and protein during exercise. Nutrients; Nutrition labelling information, Food Choices, Food Guide Pyramid, Influences on food choices-social, economic, cultural, food sources, Comparison of food values. Weight Management-proper practices to maintain, lose and gain. Eating Disorders, Proper hydration, the effects of performance enhancement drugs.

Concept of BMI (Body mass index), Obesity and its hazard, Dieting versus exercise for weight control Maintaining a Healthy Lifestyle, Weight management program for sporty child, Role of diet and exercise in weight management, Design diet plan and exercise schedule for weight gain and loss.

## 8. SPORTS MANAGEMENT

Meaning and Functions, The skills of management, the universal nature of the management process, Management and Administration, Principles and Theories of Management. Classical Principles, Bureaucracy; Bureaucracy in Democracy and in sports organizations. Open systems perspectives. The constitution of a national sports organization, office holders of an organization and their functional meetings.

Definition & Aspect of HRM, Job analysis and its process. Human resource planning, Recruitments, Manpower Planning, Personal Management and its principles, Appraisals & Public Relation in physical education. Evaluation and its techniques in physical education.

Sports competition and its system, Training structure & performance. Injury management, Ethics of sports. Financial administration in sports and physical education, Sources of funds in sports. Budgeting in sports and games, purpose and principles of budgeting. Material Management: Improvisation and Standardization of Sports equipments and materials. Scientific purchasing. Storekeeping, inventory control and value analysis. Facility (outdoor and indoor) Planning, Construction and maintenance of sports facilities.

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