

## Syllabus for written examination for Librarian

### **Part 1: Foundation of Library & Information Science.**

#### Unit.1. Library as an Social Institution

- Social & Historical foundations of Library.
  - Different types of libraries- Academic, Public, Special –their distinguishing features and functions.
  - Role of U.G.C. for development of Academic libraries.
  - Role in Library of formal and informal education.
- Shivaji University, Kolhapur

#### Unit.2 Normative Principles of Lib. & Inf. Science

- Five Laws of Library Science.
- Implications of five laws in Lib. & Inf. Science
- Development of Libraries with special reference to India, Baroda Public Library system
- Library Co-operation Resource Sharing and Library Networking.

#### Unit 4. Laws relating to Libraries & Inforamion.

- Library legislation need and essential features.
- Library legislation in India.
- Maharashtra Public Library Act.
- Press and registration act & Delivery of Books act (Public Library).
- Copyright act, Intellectual Property rights.

#### Unit.5 Library and information Profession

- Attribution of profession.
- Librarianship as a profession.
- Professional ethics.
- Professional associations & their role.
- National & International Library Associations- FID, IFLA, LA, ILA, ALA, IASLIC etc.
- Professional education & research.

#### Unit.6 Promoters of Library & Information services

- National level promoters- RRRLF.
- International level promoters- UNESCO

#### Unit 7. Public relations & Extension activities

- Definition
- facets and programs.
- publicity & extension, Out reach activities.
- Library path finders (Guides)
- Factors affecting Library development, Literacy, publishing, Book Trade.

### **Part II : Knowledge Organization, Information Processing & Retrieval.**

#### Unit. 1. Universe of Knowledge

- Structure and attributes.
- Modes of formation of subjects.
- Different types of subjects.
- Universe of subjects as mapped in different schemes of classification.

#### Unit. 2 Bibliographic description

- Catalogue purpose, Structure and types physical forms including OPAC filling rules.
- Normative Principles of cataloguing.
- Overview of principles and practice in document description.
- Current trends in Standardization, description and exchange.
- Standard codes of cataloguing.

#### Unit. 3. Methods of Knowledge Organization

- General theory of Library Classification.
- Normative principles of classification and their application.
- Species of Library Classification.
- Standard Schemes of Classifications and their features, CC, DDC, UDC.
- Notation: Need, Functions, Characteristics
- Design and development of schemes of Library Classification, Standard sub-division Index.
- Trends in Library Classification.

#### Unit.4. Subject Classification

- Principles of Subject Classification.
- Subject heading lists and their feature.

### **Part III: Information Technology: Basic**

#### Unit.1 Information Technology

- Definition, Need, Scope and Objectives.

#### Unit. 2 Computer Basic (Hardware)

- Introduction to Computers
- Overview of Historical Development of Computers.
- Generations of Computers, Classification of Computers.
- Essential Components of Computer system.

#### Unit.3 Computer Architecture-Organization of Computer

- Input and Output devices- Keyboard, Scanner, OCR, Printers, Monitor

#### Unit. 4. Software.

- Operating systems: Single & Multi User Systems, Basic features of MS-DOS, MS Windows, Linux, UNIX, Windows NT etc.
- Programming Languages: Concepts and Tools
- Algorithm & Flowcharting.

#### Unit. 5 Word Processors, Spread Sheet etc.

#### Unit. 6 DBMS Package

- Familiarity with DBASE, FOXPRO, CDS/ISIS, SOUL, MS Access (Basic features)

#### Unit 7. Computer application to library & Information work

- House keeping operations

#### Unit 8. Communication Technology

- Communication Technology Basic Concepts
- Networking: Basic Concepts.
- Internet

### **Part IV: Management of Libraries & Information Centres/Institutions**

#### Unit.1 Management

- Concepts, definition and scope.
- Management styles and approaches.
- Management schools of thought.
- Functions and principles of Scientific Management.

#### Unit.2 Human Resource Management

- Organizational structure.
- Delegation, Communication and Participation.
- Job Description and Analysis, Job evaluation.
- Inter-personal relation.
- Recruitment procedures.
- Motivation, group Dynamics.
- Training and Development.
- Disciplines and Grievances.
- Performance Appraisal.

#### Unit.3. Financial Management

- Resources Mobilization
- Budgeting Techniques and Methods PPBS, Zero Based Budgeting etc.
- Budgetary Control.
- Cost effectiveness and Cost Benefit analysis.
- Outsourcing.

#### Unit. 4 Reporting

- Types of reports, Annual report-compilation, Contents and style.
- Library Statistics etc.

#### Unit 5 System Analysis and Design

- Library as a system
- Project Management PERT/COM
- Decision Tables.
- Performance evaluation standards, MIS.
- Performance Measurement, reengineering, Time and Motion Study

- SWOT ( Strength Weakness Opportunities Threat)

- DFD (Data Flow Diagram)

#### Unit 6. Total Quality Management (TQM)

- Definition, Concept, Element
- Quality Audit, LIS related standards.
- Technology Management.

#### Unit. 7 Library House Keeping Operations.

- Different sections of Library & Information Center and their functions.
- Collection Development and Management Policies Procedures.
- Book Ordering (Acquisition)
- Technical Processing.
- Serials Control, Circulation Control, Maintenance etc.
- Stock Verification- Policies and Procedures.
- Evaluation and Weeding.
- Archiving-conservation-Preservation.
- Restoration including Print, Non-Print and Electronic Materials.
- Unit.8 Planning
- Concept, Definition, Need and Purpose, Types.
- Policies and Procedures, MBO
- Building and Space management in Libraries and Information Centers.
- Library Building, Interior & Exterior, Furniture, Equipment's, Standards & Types.
- Risk Management, Contingency Management.
- Planning of related Infrastructure, Library Standards.
- Unit 9. Management of change.
- Concept of change.
- Changes in Procedures, Methods, Tools and Techniques.
- Problems of Incorporating Change.
- Techniques of Managing Change.

### **Part V: Information Sources & Services**

- Unit 1. Reference and information sources.
- Documentary Sources of Information, Print, Non-Print including Electronic: Special features, Scope, types
- Nature, Characteristic, Utility and evaluation of different types of Information sources: Physical formats, Authority, Content, Utility.
- Non-Documentary Information Sources.
- Reference Sources Categories, Primary, Secondary & Tertiary Information Sources.(Encyclopedia, Dictionary, Periodical, Thesis, Books, Year book, Patents, Trade literature, standards, Monographs, Reference Books, Year Books, Almanac, Atlas, Abstracting & Indexing periodicals, Bibliographies, Handbooks etc.)
- Internet as a Source of Information.
- Unit.2. Reference Service.
- Concept, Definition, Need, Scope and trends.
- Reference Interview and Search Techniques.
- Unit 3. Information Services and Products
- Information services and Products.
- Information services concepts, Definition, Need and trends.
- Need, Techniques and Evaluation of Alerting services (CAS &SDI)
- Bibliographic, Referral, Document Delivery and Translation Services.
- Unit.4. Information System and their Services.
- Study of National, International and Commercial Information Systems and Services- Background, their Services and Products.

### **Part VI: Library Users**

- Unit 1. Techniques of Library and Information Centres Survey.
- Proforma method.
- Interview method.
- Records analysis method.
- Unit.2. Information users and their information Needs
- Categories of Information users.
- Information needs definition and models.
- Information seeking behaviour.
- Unit.3 User Education
- Goals and Objectives level, Techniques and Methods, Evaluation of Users Education Programmes.
- Unit. 4. User Studies.
- Methods and techniques of User studies.
- Evaluation of User studies.
- Unit 5. User Orientation Programmes:
- Conventional and modern Techniques: Study tour, Newsletters, Handbooks, Leaflets, Powerpoint Presentation, Websites etc

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## Syllabus for written examination for TGT (Art Education)

### DRAWING AND PAINTING

#### HISTORY OF INDIAN ART

##### UNIT 1: Art of Indus Valley

(Harappan and Mohenjo-daro)  
(2500 B.C. to 1500 B.C.)

(1) Introduction

- (i) Period and Location.
- (ii) Extension: In about 1500 miles
  - (a) Harappa & Mohenjo-daro (Now in Pakistan)
  - (b) Ropar, Lothal, Rangpur, Alamgirpur, Kali Bangan, Banawali and Dhaula Veera (in India)

(2) Study of following

Sculptures and Terracottas:

- (i) Dancing girl (Mohenjo-daro)  
Bronze, 10.5 x 5 x 2.5 cm.  
Circa 2500 B.C.  
(Collection : National Museum, New Delhi).
- (ii) Male Torso (Harappa)  
Stone, 9.2 x 5.8 x 3 cms.  
Circa 2500 B. C.  
(Collection : National Museum, New Delhi).
- (iii) Mother Goddess (Mohenjo-daro) terracotta, 22 x 8 x 5 cm.  
Circa 2500 B.C.  
(Collection : National Museum, New Delhi).

(3) Study of following

Seal:

- (i) Bull (Mohenjo-daro)  
Stone, 2.5 x 2.5 x 1.4 cm.  
Circa 2500 B.C.  
(Collection : National Museum, New Delhi).

(4) Study of following

Decoration on earthen wares:

- (i) Painted earthen-ware(Jar)Mohenjo-daro  
(Collection : National Museum, New Delhi).

##### UNIT 2 : Buddishist, Jain and Hindu Art.

(3<sup>rd</sup> century B.C. to 8<sup>th</sup> century A.D.)

(1) General Introduction to Art, during Mauryan, Shunga, Kushana & Gupta Period:

(2) Study of following

Sculptures:

- (i) Lion Capital from Sarnath (Mauryan period)  
Polished sand stone,  
Circa 3<sup>rd</sup> Century B.C.  
(Collection: Sarnath Musseum, U.P.)
- (ii) Chauri Bearer from Didar Ganj (Mauryan period)  
Polished sand – stone  
Circa 3<sup>rd</sup> Century B.C.  
(Collection: Patna Museum, Bihar)
- (iii) Bodhisattva head from Taxila (Gandhara Period)  
Stone, 27.5 x 20 x 15 c.m.  
Circa 2<sup>nd</sup> Century A.D.  
(Collection: National Museum, New Delhi)
- (iv) Seated Buddha from Katra Tila  
Mathura – (Kushan Period)  
(Collection: Mathura Museum)
- (v) Seated Buddha from Sarnath (Gupta Period)  
Stone  
Circa 5<sup>th</sup> Century AD  
(Collection: Sarnath Musseum, U.P.)
- (vi) Jain Tirathankara (Gupta period)  
Stone  
Circa 5<sup>th</sup> Century AD  
(Collection at State Museum, Lucknow U.P.)

- (3) Introduction to Ajanta  
Location, period, No. of caves, Chaitya and Vihara, Paintings and Sculptures subject matters and techniques etc.
- (4) Study of following  
Painting & Sculpture:
  - (i) Padmapani Bodhisattva (Ajanta Cave No. I)  
Mural Painting  
Circa 5<sup>th</sup> Century A.D.
  - (ii) Mara Vijay (Ajanta Cave No. 26)  
Sculpture in stone  
Circa 5<sup>th</sup> Century A.D.

Unit 3: Temples Sculpture, Bronzes and Indo-Islamic Architecture

Artistic aspects of Indian Temples  
(6<sup>th</sup> Century A.D. to 13<sup>th</sup> Century A.D.)

- (1) Introduction to Temple Sculpture  
(6<sup>th</sup> Century A.D. to 13<sup>th</sup> Century A.D.)
- (2) Study of following Temple-Sculptures;
  - (i) Descent of Ganga (Pallava period, Mahabalipuram Tamilnadu), Stone Circa 7<sup>th</sup> Century A.D.
  - (ii) Ravana Shaking Mount Kailash (Rashtrakuta period, Ellora,
  - (iii) Trimurti (Elephanta, Maharashtra)  
Stone  
Circa 9<sup>th</sup> Century A.D.
  - (iv) Lakshmi Narayana (Kandariya Mahadev Temple) (Chandela; Period, Khajuraho, M.P.)  
Circa 10<sup>th</sup> Century A.D.
  - (v) Cymbal Player Sun Temple (Ganga Dynesty, Konark, Orissa)  
Circa 13<sup>th</sup> Century A.D.
  - (vi) Mother & Child (Vim la-Shah Temple, Solanki Dynesty, Dilwara, Mount Abu, rajastahn ) White marble.  
Circa 13<sup>th</sup> Century A.D.
- (3) Bronzes
  - (i) Introduction to Indian Bronzes
  - (ii) Method of casting (solid and hollow)
- (4) Study of following south Indian Bronzes:
  - (i) Nataraj (Thanjavur Distt., Tamilnadu)  
Chola period (12<sup>th</sup> Centry a.D.)  
(Collection: National Museum, New Delhi)
  - (ii) Devi (Uma)  
Chola Period(12<sup>th</sup> Centry a.D.)  
(Collection: National Museum, New Delhi)
- (5) Artistic Aspects of the Indo-Islamic Architecture
  - (i) Introduction
- (6) Study of following architectures:
  - (i) Qutab Minar, Delhi
  - (ii) Taj Mahal, Agra
  - (iii) Gol Gumbaj of Bijapur

Unit 4: The Rajasthani and Pahari Schools of Miniature painting (16<sup>th</sup> Century A.D to 19<sup>th</sup> Century A.D.)

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani, Mughal, Central India, Deccan and Pahari.

- (A) The Rajasthan; Schools
  - (1) Original and Development
  - (2) Schools-Mewar, Bundi, Jodhpur, Bikaner, Kishangarh and Jaipur
  - (3) Main features of the Rajasthani Schools
  - (4) Study of the following Rajasthani Paintings:

Title	Painter	School
Maru-Ragini	Sahibdin	Mewar
Raja Ajniruddha Singh Heera	Utkal Ram	Bundi
Chaugan Players	Dana	Jodhpur
Krishna on swing	Nuruddin	Bikaner
Radha (Bani – Thani)	Nihal Chand	Kishangarh
Bharat meets Rama at Chitrakut	Guman	Jaipur

- (B) The Pahari Schools:
- (1) Origin and development
  - (2) Schools-Basohli and Kangra
  - (3) Main features of the Pahari School
  - (4) Study of the following pahari Paintings

Title	Painter	School
Krishna with Gopies		Basohli
Raga Megha		Kangra

Unit 5 The Mughal and Deccan Schools of Miniature Painting (16<sup>th</sup> Century AD to 19<sup>th</sup> Century A.D.)

- (A) The Mughal School
- (1) Origin and development
  - (2) Main features of the Mughal School
  - (3) Study of the following Mughal paintings

Title	Painter	School
Krishna lifting mount	Goverdhan	Miskin Akbar
Babur Crossing the river sone	Jaganath	Akbar
Jahangir holding the picture of Madona	Abul Hassan	Jahangir
Falcon on a bird rest	Ustafd Mansoor	Jahangir
Kabir and Raidas	Ustad Faquirullah Khan	Shahjahan
Marriage procession of Dara Shikoh	Haji Madni	Provincial Mughal (Oudh)

- (B) The Deccan School
- (1) Origin and development
  - (2) Main features of the Deccan School
  - (3) Study of the following Deccan paintings

Title	Painter	School
Raga Hindola		Ahmednagar
Chand Bibi Playing Polo (Chaugan)		Gol Konda

Unit 6 : The Bengal school and the Modern trends in Indian Art

- (A)
- (1) A. New Era in Indian Art- an introduction  
B. Study of the following painting
    - (i) Rama Vanquishing the pride of the ocean-Raja Ravi Verma
  - (2) Evolution of the Indian national Flag (First – 1906, Middle – 1921 and Final 1947 stages): Study of the form and the colour scheme
- (B)
- (1) Introduction to the Bengal School of painting
    - (i) Origin and development of the Bengal School
    - (ii) Main Features of the Bengal school
  - (2) Contribution of Indian artists in the struggle for National Freedom Movement
  - (3) Study of the following paintings of the Bengal School
    - (i) Jouney's End – Rabindranath Tagore
    - (ii) Parthasarathi – nandlal Bose
    - (iii) Radhika – M.a.R. Chughtai
- (C) The Modern Trends in Indian Art
- Introduction
- (1) Study of the following Paintings:
    - (i) Magician-Gaganendranath Tagore
    - (ii) Mother and child-Jamini Roy
    - (iii) Woman face-Rabindranath Tagore
    - (iv) Tree Girls-Amrita Sher gill
  - (2) Study of the following pieces of Sculpture:
    - (i) Triumph of labour- D.P. Roychowdhury
    - (ii) Santhal Family-Ramkinker Vaij
  - (3) Study of the following work of contemporary Indian Art' Paintings
    - (i) Mother Teresa-M.F. Hussain.
    - (ii) Birth of Poetry- K.K. Hebbar
    - (iii) Gossip-N.S. Bendre
    - (iv) Untitled G.R. Santosh
    - (v) Diagonal – Tyeb Mehta

- (4) Graphic Prints
  - (i) Whirl Pool-Krishna Reddy
  - (ii) Children-Somnath Hore
  - (iii) Devi-Jyoti Bhatt
  - (iv) Of Walls-Anupam Sud
  - (v) Man, Woman and Tree K. Laxman Goud
- (5) Sculptures
  - (i) Standing Woman-Dhanraj Bhagat
  - (ii) Cries Un-heard-Amar nath Sehgal
  - (iii) Ganesha-P.V. Jankiram
  - (iv) Figure- sankho Chaudhuri
  - (v) Chatturmukhi – Aekka Yada Giri Rao

Note: The names of artists and their art work as listed above are only suggestive and in no way exhaustive.

Practical

Unit 1: Nature and Object Study

Study of two or three natural and geometric forms in pencil with light and shade from a fixed point of view. Natural forms like plants, Vegetables, fruits and flowers etc., are to be used. Geometrical forms of objects based on geometrical forms like cubes, cones, prisms, cylinders and sphere should be used.

Unit 2: Painting composition

- (i) Simple exercises of basic design in variation of linear geometric and Rhythmic shapes in primary and secondary colours to understand designs as organized visual arrangements.
- (ii) Sketches from Life and nature  
Imaginative painting based on subject from Life and or Nature in water and poster colours with colour values.
- (iii) Imaginative painting based on subject from Life and or Nature in water and poster colours with colour values.

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## Syllabus for written examination for PRT (Music)

### **Science of Music and Studies of Shruties**

Vibration and frequency; pitch and its relation with Vibrator, Vocal and Instrumental ranges of sound; Amplitude, Timber, Qualities and musical and unmusical overtones (Swayambhu Swar); consonance and Dissonance; Main types of chords; Absorption, Echo; Reverberation and Resonance of sound, concept of Shruti (different opinions on it). Placement of suddha and Vikrit Swars on different shruties according to Lochan, Ahobal, Pundarik, Ramamatya, Somnath etc. Comparative study of Vyankat-Mukhi's 72 melas, Bhatkhade's Ten That's and Modern thirty-two That's.

Study of Ragas and Tals

Critical, detailed and comparative study of the following Ragas:- SUDHAKALYAN, DESHKAR, KAMOD, CHHAYANAT, GOUDSARANG, JAIJAIWANTI, RAMKALI, POORIYA, MARWA, SOHANI and SHANKARA, illustrations of Nyas, Alpatva, Bahutva, Avirbhava and Tirobhava in the above Ragas by means of notes.

Knowledge of the following Tals with different types of Layakaries and writing of the Tals in Dugun, Tigun, Chougun and Ada:- Trital, Ektal, Rupak, Teevra, Sooltal, Jhoomra, Dhamar and Jat tal.

Writing the songs in notation in the above ragas with Alaps. Tans, Boltans in Khayals and Dugun, Tigun etc., in dhruvapad and Dhamar. Identification of Ragas from given notes.

### **Instrumental Music**

### **Science of Music and Studies of Shruties**

Vibration and frequency, pitch and its relation with vibrator Vocal and Instrumental ranges of sound. Amplitude, Timber, qualities of musical, unmusical overtones (Swaymbhu-Swar) consonance and Dissonance. Main types of chords, Absorption, Echo, Reverberation and resonance of sound, concept of shruti (different opinions on it) placement of sudh and vikrit swara according to lochan, Ahobal, Pundarik Rammamatya, somnath etc. Comparative study of Swaras of Northern and Southern saptak, critical study of Vyankatmukhu's 72 Melas. Bhatkhade's Ten Thats and Modern thirty two thats.

Study of Ragas and Tals

Critical, detailed and comparative study of the following Ragas:- SUDHAKALYAN, DESHKAR, KAMOD, CHHAYANAT, GOUDSARANG, JAIJAIWANTI, RAMKALI, POORIYA, MARWA, SOHANI and SHANKARA.

Illustrations of Nyas, Alpatva, Bahutva, Tirobhav and Avirbhava in the above Ragas by means of notes. Knowledge of the following Tals with different types of Layakaries and writing of the Tals in Dugun, Tigun, Chougun and Ada:- Trital, Jhaptal, Choutal, Keharwa, Dadra, Tilwada, Rupak, Teevra, sool - Tal, Dhamar and Jat-Tal.

Writing the Gats in notation in the above ragas with Alaps, Todas, Jhalas, Identification of Ragas from the given notes.

Candidates offering percussion Instruments must have critical detailed and comparative study of the following Tals:- TEENTAL, JHAPTAL, RUPAK, CHOUTAL, SOOLTAL, TEEVRA, TILWADA, DADRA, KAHARWA, PANJABI, JATTAL.

They should also know the different types of Laykaries, Tukaras, paranas, Peshkara, Quada, Avartan, Bant, Kisim, Palta, Rela, Laggi, Ladi, etc. where applicable in the abovementioned talas, writing in notation of all the matter in above talas and identified - for given Bols.

### **Vocal Music**

### **Notation system, scales and study of Bio-graphics of Musicians.**

Notation system of Bhatkhade and vishnudigambar and western Music, writing of simple songs in these notations. Western Note, various types of intervals of notes. Time signature, different Musical scales, Dia-tonic scale, comparative study of scales of Bhatkhade and western Music. Harmony and Melody, placement of notes on veena according to Pt. Srinivas, comparative study of Northern and Southern Tal paddhaties, contribution of various scholars and musicians to the Indian Music.

Biographies of Bhatkhade, Vishnudigamber, Tansen, Ameer Khusroo, Faiyyaz Khan, Pt. Ravi Shankar, Pt. Ram Sahay, Ahmadjan Thirakwas, Kudau Singh, Nana Sahib panse.

Study of Musical Styles and Ragas



Geet, Gandharva, Gan, Deshi Sangeet, Sthaya, Mukhachalan, akshiptika, Nibadha and Anibadh Gan, Raglakshan, Ragalap, Alapti swasthan Niyam, prachalit Alap, Tan; Meend.

Critical detail and comparative study of the following Ragas with illustration of Nyas, Alapatva, Bahutva, Tirobhav and Avirbhav in them.

Lalit, Darbari, Adana, Mia-Malhar, Goudmalhar, Bahar, Todi, Multani, Deshi, Jogiya and Vibhas.

Knowledge of the following Tals with different types of Layakaries and writing of the Talas in Dugun, Tigun, Chougun and Ada:

Trital, Ektal, Jhaptal, Choutal, Kaharwa, Dadra, Tilwada, Rupak, Teevra, Sooltal, Jhoomra, Dhamar and Jattal and pancham Sawari.

Comparative and detail study with the descriptions of different styles of Indian Music viz. Dhruvad, Dhamar, Khayal, Thumri, Tappa, Chaturang, Taranas, Trivat, etc. and their evolution, writing of notation of songs in the above Ragas with alaps, Tans Boltans etc. and with different Layakaries in Dhruvapad and Dhamar, Identification of Ragas from given notes. A short essay on any musical subject.

#### Instrumental Music

Notation system of Bhatkhande, Vishnudigamber and western Music. Writing of simple gats in these notations. Western notes. Various types of intervals of notes. Time signature, different Musical scales Dia-tonic scale, pythagorain scale, Tempered scale, Major scale, Minor scale etc. Comparative study of scales of Bhatkhande and Western Music. Harmony and Melody, placement of notes on Veena according to Pt. Srinivas.

Comparative study of Northern and southern Tal paddhaties contribution of various scholars and Musicians to the Indian Music.

Biographies of Bhatkhande, Vishnudigamber, Tansen, Ameer Khusro Faiyyaz Khan, Onkarnath Thakur, Allauddin Khan, Pt. Ravishankar, Pt. Ram Sahai, Ahmad Jan Thirakwa, Kudau Singh, Nana Saheb Panse.

#### Study of Styles, Baj, Ragas and Tals

Geet, Gandharv, Gan, Deshi Sangeet, Sthaya Mukhchalan, Akshiptika Nibadha and Anibadha gan, Raglakshan, Raga-Alap, Rupakalap, Alpati Swasthan-Niyam, Prachalit Alap and Tan, Zamzama, Meend, Sootghaseet, Jor Alap, Toda.

Critical detailed and comparative study of the following Ragas with illustrations of nyas, Alpatva, Bahutva, Tirobhava and Avirbhav in them.

Vibhas, Lalit, Darbari Kanhda, Adana, Miyan Malhar, Goud Malhar, Bahar, Todi, Multani, Deshi and Jogiya.

Identification of Raga from given notes. Knowledge of following tals:

Ada chartal, Ektal, Deepchandi, Dhamar, Farodast, Pancham Sawari, Kumbh, Sikhar.

Candidates offering percussion instruments must have critical detailed and comparative study of the following tals:

Adachartal, Ektal, Pancham Sawari, Farodast, Dhamar, Kumbh, Shikhar, Matt Tal, Dhumali, Deepchandi, Addha tal.

They must also know, Tukras, parans, Tihai, Kayadas, Paltas, Relas, Peshkaras, Mukharas, Tipallis, chaupalli, Chakkardar bols, Farmaishi, Paranas, Lom - Bilom, Charbagh, Stuti ke bol, Jhulna ke bol. Dhamar and Bedamdar tihais in the above mentioned tals.

Ability to recognize tals by given bols, writing of all the matters in notations.

A short essay on any Musical subject. Knowledge of Baithaks, styles of playing and Gharanas. Ability to writ tals in different layakaries knowledge of different types of Musical instruments and their system of classification.

#### Vocal Music

#### **History of Music and Classification of Rags and Tals**

Short history of Music of Ancient periods up to 13th century A.D. with classification of Rags and Tals. Evolution of jatis Ragas, short history of Music of Medieval and Modern periods, prabandh. Revival of Indian Classical Music, comparison of the Hindustani and Karnataka Music systems. Impact of Modern Science in the development and propagation of Music. Essay on any general topic of Music.

## Study of Musical Styles and Ragas

Critical, detailed and comparative study of the following Ragas with illustrations of Nyas, Alpatva, Bahutva, Avirbhava and Tirobhav.

Shree, Pooria-Dhanashree, Basant, Paraj, Hindol, Chandrakauns, Suddhasarang, Madhuwanti, Bageswari, Jaunpuri, Malgunji.

Critical study of different styles of Music of North and South, various Gharanas of Music, Gram, Moorchana, various kinds of Gamak, writing of notation of songs. Ability to compose any song in any Raga.

Knowledge of the following Tals with different types of Layakaries Ada - Choutal, Brahma, Lakshmi, Rudra, Shikhar, Pancham Sawari.

## Practical (Stage Demonstration)

One Drut Khayal in each raga and at least five Vilambit Khayals in the following Ragas: Shree, Basant, Paraj, Puriya-Dhanashri, Hindol, Chandra Kauns, Suddhasarang, Madhuwanti, Bageshwari, Jaunpuri, Malgunji.

The candidates will have to give stage performance of his or her own choice of Raga of the Courses for half an hour. They will have to sing a Thumri composition too.

## Instrumental Music

### **History of Music and Classification of Ragas and Tals**

Short history of Music of ancient period up to 13th century A.D. with particular reference to Natyashastra, Brihadhesi, Sangeet Ratnakar. Classification of Ragas and Tals. Evolution of jatis, Ragas. Short History of Music in Medieval period. Revival of Indian classical Music. Comparison of the Hindustani and Karnataka Music system. Impact of Modern science in the development and propagation of Music. Essay on any general topic of Music.

Critical, comparative and detailed study of Musical styles and the following Ragas with illustration of Nyas, Alpatva, Bahutva, Avirbhav and Tirobhav: Shree, Pooria - dhanashree, Basant, Paraj, Hindol, Chandrakauns, Suddh Sarang, Madhuwanti, Bageshree, Jaunpuri, Malgunji.

Critical study of the different styles of Music of North and South. Various Gharanas of Music, Gram, Moorchana, various kinds of Gamaks, Writing of Notation of gats. Ability to compose any gat in any Ragas.

Knowledge of the following Tals with different types of layakaries and writing of Tals in Dugun, Tigun, Chougun, Ada. and Kuad, and Biyad.

Basant, Rudra, Laxmi, Gajjhampa, Pashto, Brahma. Candidates offering percussion instruments should also know the various kinds of Baj and styles of Table and Pakhawaj and should also know Peskharas, Paran, Tihais, Tukaras, Kishime, Kyadas, Paltas, Relas, Mukhras, Tripalli, Choupallies, Chakkardar, Bols, Farmaishi paran, Kamali paran, Lom-Bilom, Charbagh, Stuti ke bole, Jhulan ke bole, Jababi Paran, Navahakka, Damdar and Bedam ki tihai where applicable in the following Talas, along with their critical, detailed and comparative study:

Rudra, Badi swari, Jattal, Basant, Laxmi, Gaj Jhampa, Brahma tal, Asth Mangal, Ganesh Tal, Mani Tal, Pashto.

Various kinds of chands in the Tals where applicable and writing of different layakaries, Dugun, Tigun, Chougun, Ada, Kuad and Biyad.

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**Syllabus for written examination of TGT (Work Experience)**  
**(Electrical Gadget and Electronics)**

**Unit: I**

<b>a.</b>	<b>CIRCUIT FUNDAMENTALS</b>
<b>b.</b>	<b>RESISTIVE CIRCUITS</b>
<b>c.</b>	<b>KIRCHHOFF'S LAW</b>
<b>d.</b>	<b>NETWORK THEOREMS</b>
<b>e.</b>	<b>PASSIVE CIRCUITS ELEMENTS</b>
<b>f.</b>	<b>ENERGY SOURCES</b>
<b>g.</b>	<b>MAGNETISM AND ELECTROMAGNETISM</b>

**(a) Circuit Fundamentals**

Zero Reference Level - Chassis Ground - Ohm's Law - Formula Variations of Ohm's Law - Graphical Representation of Ohm's Law - Linear Resistor - Non-linear Resistor - Cells in Series and Parallel - Conventional Problems

**(b) Resistive Circuits**

Series Circuit - Characteristics of a Series Circuit - The Case of Zero IR Drop - Polarity of IR Drops - Total Power - Series Aiding and Series Opposing Voltages - Proportional Voltage Formula in a Series Circuit Series Voltage Dividers - 'Opens' in a Series Circuit - 'Shorts' in a Series Circuit - Parallel Circuits - Laws of Parallel Circuits - Special Case of Equal Resistances in all Branches - Special Case of Only Two Branches Any Branch Resistance -Proportional Current Formula - 'Opens' in a Parallel Circuit - 'Shorts' in a Parallel Circuit - Series-Parallel Circuits Analysing Series Parallel Circuits - 'Opens' in Series-Parallel Circuits 'Shorts' in Series-Parallel Circuits - Voltage Division in a Complex Series-Parallel Circuit - Conventional Problems

**(c) Kirchhoff's Laws**

General - Kirchhoff's Current Law - Kirchhoff's Voltage Law - Determination of Algebraic Sign - Assumed Direction of Current Flow - Conventional Problems.

**(d) Network Theorems**

General - Superposition Theorem - Ideal Constant-Voltage Source - Ideal Constant-current Source - Thevenin's Theorem - How to Thevenize a Circuit? - Norton's Theorem - How to Nortonise a Given Circuit - Maximum Power Transfer Theorem - Conventional Problems

**(e) Passive Circuit Elements**

General - Resistors - Resistor Types - Wire-wound Resistors - Carbon Composition Resistors - Carbon Film Resistors - Cermet Film Resistors .Metal Film Resistors - Power Rating - Value Tolerance - Variable Resistors - Potentiometers and Rheostats - Fusible Resistors - Resistor Colour Code - Resistance Colour Bands - Resistors under Ten Ohm - Resistor Troubles - Checking Resistors with an Ohmmeter - Inductor - Comparison of Different Cores - Inductance of an Inductor - Another Definition of Inductance - Mutual Inductance - Coefficient of Coupling - Variable Inductors - Inductors in Series or Parallel without M - Series Combination with M - Stray Inductance - Energy Inductance - Energy Stored in a Magnetic Field - DC Resistance of a Coil - Troubles in Coils - Reactance Offered by a Coil - Impedance Offered by a Coil - Q-Factor of a Coil - Capacitors - Capacitor Connected to a Battery - Capacitance -Factors Controlling Capacitance - Types of Capacitors - Fixed Capacitors - Variable Capacitors - Voltage Rating of Capacitors - Stray Circuit Capacitance Leakage Resistance - Capacitors in Series - Two Capacitors in Series Capacitors in Parallel - Two Capacitors in Parallel - Energy stored in a Capacitor - Troubles in Capacitors - Checking Capacitors with Ohmmeter - Charging of a Capacitor - Capacitor Connected Across an AC Source Capacitive Reactance

**(f) Energy Sources**

Primary and Secondary Cells - Cell and Battery - Voltage and Current of a Cells - Cell life - Different Types of Dry Cells - Carbon Zinc Cell Alkaline Cell - Manganese Alkaline Cell - Nickel Cadmium Cell - Mercury Cell - Silver Oxide Cell - Lead Cells - Battery Rating - Testing Dry Cells - Photoelectric Devices - Photovoltaic Cell - Solar Cell Conventional Problems

**(g) Magnetism and Electromagnetism**

Magnetic Materials- Ferrites - Types of Magnets - Demagnetising or Degaussing -Magnetic Shielding - Magnetic Terms and Units - Ohm's Law for Magnetic Circuit - Transformer - Transformer Working - Transformer Impedance - Can a Transformer Operate on DC ? - RF Shielding - Autotransformer - Impedance Matching - Conventional Problems.

**Unit – II:**

<b>a)</b>	<b>A.C. FUNDAMENTALS</b>
<b>b)</b>	<b>SERIES A.C. CIRCUITS</b>
<b>c)</b>	<b>TIME CONSTANTS</b>
<b>d)</b>	<b>TUNING CIRCUITS AND FILTERS</b>
<b>e)</b>	<b>SOLID STATE PHYSICS</b>
<b>f)</b>	<b>THE P-N JUNCTION</b>
<b>g)</b>	<b>P-N JUNCTION DIODE</b>

**(a) A.C. Fundamentals**

Introduction – Types of Alternating Waveforms - The Basic AC Generator -Some Definitions - Characteristics of a Sine Wave - Audio and ,Radio Frequencies - Different Values of Sinusoidal Voltage and Current - Phase of an AC - Phase Difference - Vector Representation of an Alternating Quantity - AC Through Pure Resistance Only - AC Through Pure Inductance Only - AC Through Pure Capacitance Only - Non-sinusoidal Waveforms - Harmonics -Conventional Problems

**(b)Series A.C. Circuits**

R-L Circuit - Q Factor of a Coil - Skin Effect - R-C Circuit - Coupling Capacitor - R-L-C Circuit - Resonance in an R-L-C Circuit - Resonance Curve - Main Characteristics of Series Resonance - Bandwidth of a Tuned Circuit - Sharpness of Resonance - Tuning - Tuning Ratio - RaGio Tuning Dial - Parallel Resonance -Conventional Problem

**(c) Time Constant**

Rise and Fall of Current in Pure Resistance - Time Constant at an R-L Circuit - Circuit Conditions - Inductive Kick - Time Constant of an RC Circuit - Charging and Discharging of a Capacitor - Decreasing Time Constant - Flasher - Pulse Response of an RC Circuit - Effect of Long and Short Time Constants - Square Voltage Wave Applied to Short A. RC Circuit - Square Voltage Wave Applied to Long A,'E.C Circuit - Conventional Problems

**(d) Timing Circuits and Filters**

What-is. a Tuning Circuit ? - Tuned Circuit - Operating Characteristics of a Tuning Circuit - Resonance - Actual Series Resonance - Is it Series or Parallel Resonance ? - Tuned Transformers - Double Tuned Transformers - Parallel Circuit - Coupled Circuits - Simple Coupled Circuits - Coefficient of Coupling - Filters - Filter Definitions - Types of Filter Circuits - Low-pass Filter - Highpass Filter - Bandpass Filter - Bandstop Filter - Multisection Filter Circuits - Uses of Filters - Conventional Problems

**(e) Solid State Physics**

Definition of Matter - Crystalline Solids - Unit Cell - Forms of Matter - Atom and Molecule - Atomic Structure - Atomic Number (Z) - Atomic Mass Number (A) - Electron Orbits or Shells - Electron Distribution of Different Atoms - Electron Sub orbits or Subshells - Valence Electrons Orbital Energy. - Normal, Excited and Ionised Atom. - Orbital Energies in Hyrogen Atom - Energy Levels in an Isolated AtolW- Energy Bands in Solids - Bonds in Solids - Valence and Conduction Bands - Conduction in Solids - Hole Formation and its Movement - Conductors, Semiconductors and Insulators - Types of Semiconductors - Intrinsic Semiconductors Extrinsic Semicon'ductors - Majority and Minority Charge Carriers - Mobile Charge Carriers and Immobile Ions - Drift Current in Good Conductors Drift Current in Intrinsic Semiconductors - Intrinsic Conduction -Conventional Problems

**(f) The P-N Junction**

The P-N Junction - Formation of Depletion Layer - Junction or Barrier Voltage (V B) - Effect of Temperature on Barrier Voltage - Forward Biased P-N Junction - Forward VfI Characteristics -Reverse Biased P-N Junction - Reverse Saturation Current (Is or  $1_0$ ) - Reverse V/ I Characteristic Combined Forward and Reverse VII Characteristics - Junction Breakdown - Junction Capacitance

**(g) P-N Junction Diode**

P-N Junction Diode - Diode Ratings or Specifications - Diode Testing The Ideal Diode - The Real Diode - Diode Circuits with DC and AC Voltage Sources - Diode Fabrication - Grown Junction - Alloy Junction \_ Diffused Junction - Epitaxial Junction - Point Contact Junction - Clippers and Clampers - Clippers - Some Clipping Circuits - Clampers -, - Summary of Clamping Circuits - Conventional Problems , Questions.

### Unit – III

a)	<b>SPECIAL DIODE</b>
b)	<b>OPTOELECTRONIC DEVICES</b>
c)	<b>D.C POWER SUPPLIES</b>
d)	<b>THE BASIC TRANSISTOR</b>
e)	<b>TRANSISTOR CHARACTERISTICS AND APPROXIMATION</b>
f)	<b>LOAD LINES AND DC BIAS CIRCUITS</b>
g)	<b>TRANSISTOR EQUIVALENT CIRCUITS AND MODELS</b>

#### (a) Special Diodes

Zener Diode - Voltage Regulation - Zener Diode as Peak Clipper - Meter Protection - Tunneling Effect - Tunnel Diode - Tunnel Diode Oscillator - Varactor - PIN Diode - Schottky Diode - Step Recovery Diode Thermistors -Conventional Problems

#### (b) Optoelectronic Devices

Introduction - Spectral Response of Human Eye - Light Emitting Diode (LED) - Photoemissive Devices - Photomultiplier Tube - Photovoltaic Devices - Bulk Type Photoconductive Cells - Photodiodes -P-N Junction Photodiode - PIN Photodiode - Avalanche Photodiode -

#### (c) DC Power Supplies

Introduction - Unregulated Power Supply - Regulated Power Supply Steady and Pulsating DC Voltages - Rectifiers - Half-wave Rectifier Full-wave Rectifier - Full-wave Bridge Rectifier - Filters - Series Inductor Filter - Shunt Capacitor Filter - Effect of Increasing Filter Capacitance - LC Filter - The CLC or Pi Filter - Bleeder Resistor - Voltage Regulation Zener Diode Shunt Regulator - Transistor Series Voltage Regulator - Controlled Transistor Series Regulator - Transistor Shunt Voltage Regulator Transistor Current Regulator - Voltage Dividers - Complete Power Supply - Voltage Multipliers - Half-wave Voltage Doubler - Full-wave Voltage Doubler - Voltage Tripler and Quadrupler Circuits - Troubleshooting Power Supplies - Controlled Rectification - Output Waveforms for Different Firing Angles - Output Voltage and Current Values in Controlled Rectifiers Average Values for FW Controlled Rectifier - Silicon Controlled Rectifier (SCR) - Pulse Control of SCR -  $90^\circ$  Phase Control of SCR -  $180^\circ$  Phase Control of SCR - SCR Controlled Circuit - UJT Controlled Circuit Conventional Problems

#### (d) The Basic Transistor

The Bipolar Junction Transistor - Transistor Biasing -Important Biasing Rule - Transistor Currents - Summing Up - Transistor Circuit Configurations - CB Configuration - CE Configuration -Relations between  $\alpha$  and  $\beta$  - CC Configuration - Relations between Transistor Currents - Leakage Currents in a Transistor - Thermal Runaway - Conventional Problems

#### (e) Transistor Characteristics and Approximations

Transistor Static Characteristics - Common Base Test Circuit - Common Base Static Characteristics - Common

Emitter Test Circuit - Common Emitter Static Characteristics - Common Collector Static Characteristics -

Different Ways of Drawing Transistor Circuits - Common Base Formulas Common Emitter Formulas -

Common Collector Formulas - The Beta Rule - Importance of  $V_{CE}$ - Cut-off and Saturation Points - Normal DC

Voltage Transistor Indications - Transistor Fault Location - Solving Universal Stabilization Circuit

- Notation for Voltages and Currents - Increase / Decrease Notation - Applying AC to a DC Biased Transistor

- Transistor AC/DC

Analysis -Conventional problems

#### (f) Load Lines and DC Bias Circuits

DC Load Line - Q-point and Maximum Undistorted Output - Need for Biasing a Transistor - Factors Affecting

Bias Variations - Stability Factor - Beta Sensitivity - Stability Factor for CB and CE Circuits - Different

Methods for Transistor Biasing - Base Bias - Base Bias with Emitter Feedback - Base Bias with Collector

Feedback - Base Bias with Collector and Emitter Feedbacks - Voltage Divider Bias - Load Line and Output

**(g) Transistor Equivalent Circuits and Mode**

General - DC Equivalent Circuit - AC Equivalent Circuit - Equivalent Circuit of a CB Amplifier - Effect of Source Resistance  $R_S$  on Voltage Gain - Equivalent Circuit of a CE Amplifier - Effect of Source Resistance  $R_S$  - Equivalent Circuit of a CC Amplifier - Small-Signal Low-frequency Model or Representation - General - T-Model - Formulas for T-Equivalent of a CB Circuit - T-Equivalent of a CE Circuit - T-Equivalent of a CC Circuit - What are h-parameters ? - The h-parameter Formulas for Notation for Transistors - The h-parameters of an Ideal Transistor -, The h-parameters of an Ideal CB Transistor - The h-parameters of an Ideal CE Transistor - Approximate Hybrid Equivalent Circuits - Typical Values of Transistor h-parameters - Hybrid Formulas for Transistor Amplifier - Approximate Hybrid Formulas -Conventional Problems

**Unit – IV**

<b>a)</b>	<b>SINGLE STAGE TRANSISTOR AMPLIFIER</b>
<b>b)</b>	<b>MULTISTAGE AMPLIFIER</b>
<b>c)</b>	<b>DECIBELS AND FREQUENCY RESPONSE</b>
<b>d)</b>	<b>FEEDBACK AMPLIFIERS</b>
<b>e)</b>	<b>FIELD EFFECT TRANSISTORS</b>
<b>f)</b>	<b>BREAKDOWN DEVICES</b>
<b>g)</b>	<b>SINUSOIDAL OSCILLATORS</b>
<b>h)</b>	<b>NON SINUSOIDAL OSCILLATORS</b>

**(a) Single-Stage Transistor Amplifiers**

Classification of Amplifiers - Common Base (CB) Amplifier - Various Gains of a CB Amplifier - Characteristics of a CB Amplifier - Common Emitter (CE) Amplifier - Various Gains of a CE Amplifier - Characteristics of a CE Amplifier - Common Collector (CC) Amplifier - Various Gains of a CC Amplifier - Characteristics of a CC Amplifier - Uses - Comparison of Amplifier Configurations - Amplifier Classification Based on Biasing Condition - Graphic Representation - Class-A Amplifiers - Power Distribution in a Class-A Amplifier - Power Rectangle - Power Efficiency Maximum AC Power in Load - Transformer-coupled Class-A Amplifier Class-B Amplifier - Power Relations for Class-B Operation - Maximum Values - Class-B Push-Pull Amplifier - Crossover Distortion - Power Efficiency of Push-Pull Amplifiers - Complementary Symmetry Push-Pull Class-B Amplifier - Class-C Amplifier - Tuned Amplifier - Distortion in Amplifier - Non-linear Distortion - Intermodulation Distortion - Frequency Distortion - Phase or Delay Distortion - Noise

**(b) Multistage Amplifiers**

General - Amplifier Coupling - RC-coupled Two-stage Amplifier - Advantages of RC Coupling ~ Impedance-coupled Two-stage Amplifier -Advantages of Impedance Coupling - Transformer-coupled Two Stage Amplifier - Advantages of Transformer Coupling - Frequency Response - Applications - Direct-coupled Two-stage Amplifier Using Similar Transistors - Direct-coupled Amplifier Using Complementary Symmetry of Two Transistors - Darlington Pair - Advantages of Darlington Pair - Comparison between Darlington Pair and Emitter Follower - Special Features of a Differential Amplifier - Common Model Input - Differential Amplifier -Conventional Problems

**(c) Decibels and Frequency Response**

The Decibel System - Other Expressions for Power Gain - Voltage and Current Levels - Characteristics of the Decibel System - Value of 1 dB Zero Decibel Reference Level - Variations in Amplifier Gain with Frequency - Changes in Voltage and Power Levels - Causes of Gain Variations Miller Effect - Cut-off Frequencies of Cascaded Amplifiers - Transistor Cut-off Frequencies - Alpha Cut-off Frequency - Beta Cut-off Frequency - The  $f_t$  of a Transistor - Relation Between  $f_{\alpha}, f_{\beta}$  and  $f_T$  - Gain-Bandwidth Product - Conventional Problems

**(d) Feedback Amplifier**

Feedback Amplifiers - Principle of Feedback Amplifiers - Advantages of Negative Feedback - Gain Stability - Decreased Distortion - Increased Bandwidth - Forms of Negative Feedback - Shunt-derived Series-fed Voltage Feedback - Current-series Feedback Amplifier - Voltage-shunt Negative Feedback Amplifier - Current-shunt Negative Feedback Amplifier -Conventional Problems

**(e) Field Effect Transistor**

What is a FET ? - Junction FET (JFET) - Static Characteristics of a JFET - JFET Drain Characteristic with  $V_{GS} = 0$  - JFET Characteristic with External Bias - Transfer Characteristic - Small Signal JFET Parameters DC Biasing of a JFET - DC Load Line - Common Source JFET

Amplifier - JEFT on an IC Chip - Advantages of FETs - MOSFET or IGFET DE MOSFET - Schematic Symbols for a DE MOSFET - Static Characteristics of a DE MOSFET - Enhancement-only N-channel MOSFET Transfer Characteristic - FETs as Switches - FET Applications - MOS-FET Handling

**(f) Breakdown Devices**

What are Breakdown Devices ? - Unijunction Transistor - UJT Relaxation Oscillator - Silicon Controlled Rectifier - 90° Phase Control - Theft Alarm - Triac -Diac - Silicon Controlled Switch (SCS) -

**(g) Sinusoidal Oscillators**

What is an Oscillator? - Comparison between an Amplifier and an Oscillator - Classification of Oscillators - Damped and Undamped Oscillations - The Oscillatory Circuit - Frequency of Oscillatory Current - Frequency Stability of an Oscillator - Essentials of a Feedback LC Oscillator - Tuned Base Oscillator - Tuned Collector Oscillator - Tuned Drain Oscillator (FET) - Hartley Oscillator - FET Hartley Oscillator - Colpitts Oscillator - Clapp Oscillator - FETCo]pitts Oscillator - Crystals - Crystal Controlled Oscillator - Transistor Pierce Crystal Oscillator - FET Pierce Oscillator - Phase Shift Principle - Phase Shift Oscillator - Wien Bridge Oscillator

**(h) Noninusoidal Oscillators**

Nonsinusoidal Waveforms -Classification of Nonsinusoidal Oscillators Pulse Definitions - Basic Requirements of a Sawtooth Generator -UJT Sawtooth Generator - Multivibrators (MV) - Uses of Multivibrators - Astable Multivibrator - Monostable Multivibrator (MMV) - Bistable Multivibrator (BMV) - Schmitt Trigger -Transistor Blocking Oscillator

**Unit – V**

<b>a)</b>	<b>MODULATION AND DEMODULATION</b>
<b>b)</b>	<b>INTEGRATED CIRCUITS</b>
<b>c)</b>	<b>NUMBER SYSTEMS</b>
<b>d)</b>	<b>LOGIC GATES</b>
<b>e)</b>	<b>BOOLEAN ALGEBRA</b>
<b>f)</b>	<b>LOGIC FAMILIES</b>
<b>g)</b>	<b>TRANSDUCERS</b>
<b>h)</b>	<b>ELECTRONIC INSTRUMENTS</b>

**(a) Modulation and Demodulation**

Introduction - What is a Carrier Wave? - Radio Frequency Spectrum Sound - Need for Modulation - Radio Broadcasting - Modulation Methods of Modulation - Amplitude Modulation - Per cent Modulation Upper and Lower Side Frequencies - Upper and Lower Sidebands - Mathematical Analysis of a Modulated Carrier Wave - Power Relations in an AM Wave - Forms of Amplitude Modulation – Generation of SSB - Methods of Amplitude Modulation - Block Diagram of an AM Transmitter - Modulating Amplifier Circuit - Frequency Modulation - Frequency Deviation and Carrier Swing - Modulation Index'-Deviation Ratio - Per cent Modulation - FM Sidebands ;- Modulation Index and Number of Sidebands - Mathematical Expression for FM Wave - Demodulation or Detection - Essentials of AM Detection - Diode Detector for AM Signals - Transistor Detectors for AM Signals - FM Detection - Quadrature Detector - Frequency Conversion - Superheterodyne AM Receiver - FM Receiver - Comparison between AM and FM - The Four Fields of FM - Conventional Problems

**(b) Integrated Circuits**

Introduction - What is an Integrated Circuit? - Advantages of ICs - Drawbacks of ICs - Scale of Integration - Classification of ICs by Structure Comparison between Different ICs - Classification of ICs by Function Linear Integrated Circuits (UCs) - Digital Integrated Circuits - IC Terminology - How Monolithic ICs are Made? - Ie Symbols - Fabrication of IC Components - Complete Monolithic Integrated Circuits - Popular Applications of ICs - MOS Integrated Circuits - What is an OP-AMP ? OP-AMP Symbol - Polarity Conventions - Ideal Operational Amplifier - Virtual Ground and Summing Point - Why Vi is Reduced to almost Zero ? - OP-AMP Applications - Linear Amplifier - Unity Follower - Adder or Summer - Subtractor - Integrator - Differentiator – Comparator

**(c) Number Systems**

Number of Systems -The Decimal Number System - !3inary System Binary to Decimal Conversion - Binary Fractions - Double-Dadd Method - Decimal to Binary Conversion - Shifting the Place Point - Binary Operations - Binary Addition - Binary Subtraction - Complement of a Number - 1 's Complemental Subtraction - 2's Complemental Subtraction - Binary Multiplication - Binary Division - Shifting a Number to Left or Right - Representation of Binary Numbers as Electrical Signals - Octal Number System - Octal to Decimal Conversion -

Decimal to Octal Conversion - Binary to Octal Conversion - Octal to Binary Conversion - Advantages of Octal Number System - Hexadecimal Number System - How to Count beyond F in Hex Number System? ---, Binary to Hexadecimal Conversion - Hexadecimal to Binary Conversion - Conventional Problems

#### **(d) Logic Gates**

Definition - Positive and Negative Logic - The OR Gate - Equivalent Relay Circuit of an OR Gate - Diode OR Gate - Transistor OR Gate OR Gate Symbolizes Logic Addition - Three Input OR Gate - Exclusive OR Gate - The AND Gate - Equivalent Relay Circuit of an AND Gate. Diode AND Gate ~ Transistor AND Circuit - AND Gate Symbolizes Logic Multiplication - The NOT Gate - Equivalent Circuits for a NOT Gate The NOT Operation - Bubbled Gates -. The NOR Gate - NOR Gate is a Universal Gate - The NAND Gate - NAND Gate is a Universal Gate The XNOR Gate - Logic Gates at a Glance - Adders and Subtractors Half Adder - Full Adder - Parallel Binary Adder - Half Subtractor - Full Subtractor - Conventional Problems

#### **(e) Boolean Algebra**

Introduction - Unique Feature of Boolean Algebra - Laws of Boolean Algebra - Equivalent Switching Circuits - De Morgan's Theorems - Duals - Conventional Problems

#### **(f) Logic Families**

Main Logic Families - Saturated and Non-saturated Logic Circuits - Characteristics of Logic Families - RTL Circuit - DTL Circuit ---'- TTL Circuits - TTL Subfamilies - ECL Circuit - I<sup>2</sup>L Circuit - MOS Family - PMOS Circuit - NMOS Circuit - CMOS Circuit

#### **(g) Transducer**

What is a Transducer? - Classification of Transducers - Classification based on Electrical Principle Involved - Resistive Position Transducer - Resistive Pressure Transducer ---:- Inductive Pressure Transducer - Capacitive Pressure Transducer - Self-generating Inductive Transducers - Linear Variable Differential Transformer (LVDT) - Piezoelectric Transducer - Strain Gauge Temperature Transducers - Resistance Temperature Detectors - Thermistor - Thermocouples - Ultrasonic Temperature Transducers - Photoelectric Transducers - Various Types of Microphones - Carbon Microphone Ribbon Microphone - Moving-Coil (Me) Microphone - Crystal Microphone - Ceramic Microphone - Capacitor Microphone - The Electret Microphone - The Loudspeaker

#### **(h) Electronic Instruments**

Introduction - Analog and Digital Instruments - Functions of Instruments - Electronic versus Electrical Instruments - Essentials of an Electronic Instrument - Measurement Standards - The Basic Meter Movement - Characteristics of Moving Coil Meter Movement - Variations of Basic Meter Movement - Converting Basic Meter to DC Ammeter - Multirange Meter - Measurement of Current - Converting Basic Meter to DC Voltmeter Multirange DC Voltmeter - Loading Effect of a Voltmeter - Ohmmeter The Multimeter - Rectifier Type AC Meter - Electronic Voltmeters - The Direct Current VTVM - Comparison of VOM and VTVM - Direct Current FET VM - Electronic Voltmeter for Alternating Currents - The Digital Voltmeter (DVM) - Cathode Ray Oscilloscope (CRO) - Cathode Ray Tube (CRT) - Deflection Sensitivity of a CRT - Normal Operation of a CRO Triggered and Non-triggered Scopes - Dual Trace CRO - Dual Beam CRO - Storage Oscilloscope - Sampling CRO - Digital Readout CRO - Lissajous Figures - Frequency Determination with Lissajous Figures - Applications of a CRO



## Syllabus for written examination for TGT (Physical & Health Education)

### Physical Education Theory

#### Part – A

1. Concept of Physical Education

(Meaning and definition of Physical Education-its aim and objectives, Modern concept and scope of Physical Education, Need and importance of Physical Education, Place of Physical Education in the total education process)

2. Physiological Aspects of Physical Education

Effect of exercise on :

Muscular System, Circulatory System, Respiratory System, Digestive System

3. Psychological Aspects of Physical Education

Definition of Psychology and Sports Psychology, Achievement and Motivation in Sports,

Sportsmanship and Sports Ethics

4. Physical Fitness and Wellness

Meaning and Importance of Physical Fitness and Wellness, Components of Physical Fitness and Wellness, Factors affecting Physical Fitness and Wellness, Principles of Physical Fitness development, Means of fitness development, Aerobic Activities- Jogging, Cycling Calisthenics and Rhythmic exercises, Participation in Games and Sports, Circuit Training

5. Training Methods

Meaning and Concept of Training, warming up, Limbering down and their importance, Methods of Training, Methods of Strength Development-Isometric, and Isokinetic Exercises, Methods of Endurance Development-Continuous Method, Interval Training and Fartlek, Methods of Speed Development-Acceleration Runs and Pace Races.

6. Sociological Aspects of Physical Education

Meaning of Sociology and its importance in Physical Education and Sports. Games and

Sports as man IS Cultural Heritage. Development of leadership qualities and group

dynamics.

#### Part – B

History of the game/sport (Anyone game/ sport of student's choice), Latest general rules of the game/ sport (Anyone game/ sport of student's choice), Measurement of play fields and specifications of sports equipment, Fundamental skills of the game/ sport, Related sports terminologies, Important tournaments and venues, Sports personalities, Sports Awards.

#### Part – C

1. Health Education

Concept and objectives of Health Education, Importance of Health Education, Principles of Health Education, Importance of community participation for health promotion and welfare of individual, family and community

2. Communicable Diseases

Meaning of Communicable Diseases, Essential conditions for Communicable Diseases to occur and disease process, Common alert signals indicating on set of Communicable Diseases, Mode of transmission, common symptoms and prevention of spread (transmission) of AIDS, Hepatitis B and Hepatitis C

3. Contemporary Health Problems

Abuse of alcohol, tobacco and drugs and the effect of abuse on individual, family and community, Effect of alcohol, tobacco and drugs on sportsperson., Eating habits that cause obesity and its effect on health of individual

4. Healthful living

Concept of environment, Scope of environment – living environment, work place environment and environment for leisure activities, Essential elements of healthful environment – safe water, low levels of noise, clean air, sanitary surroundings, low levels of radio active radiations and absence of hazards responsible for accidents in (i) home and neighborhood in rural and urban areas (ii) school and work place (iii) during leisure time activities recreation and sports, Role of individual in improvement of environment for health promotion and prevention of accidents related to transportation swimming and water sports, Disaster preparedness and health care during disasters.

5. Family Health Education

Meaning and functions of family and its importance as a social institution, Needs and problems of adolescents and their management, Human reproduction – menstruation, conceptional and prenatal care, Problems associated with pre-marital sex and teenage pregnancies, Preparation of marriage, Role of parents in child care.

6. Prevention and first aid for common sports injuries

Soft Tissue injuries – sprain and strain, Bone Injuries, Joint Injuries

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