**पाटन स्वास्थ्य विज्ञान प्रतिष्ठान सेवा आयोग**

प्राविधिक सेवा, नाक, कान, घाँटी समूह, अडियोलोजिष्ट पद, तह ७ को

खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**एवं परीक्षा योजना**

<table>
<tr><td colspan="7">१. प्रथम चरण : – लिखित परीक्षा पूर्णाङ्क :– २००</td></tr>
<tr><td>पत्र</td><td>विषय</td><td>पूर्णाङ्क</td><td>उतीर्णाङ्क</td><td colspan="2">परीक्षा प्रणाली</td><td>प्रश्नसंख्या X अङ्क</td><td>समय</td></tr>
<tr><td>प्रथम</td><td rowspan="3">Technical Subject, General Knowledge and Related Legislation</td><td>१००</td><td>४०</td><td>वस्तुगत</td><td>बहुवैकल्पिक प्रश्न</td><td>५० प्रश्न x २ अङ्क</td><td>४५ मिनेट</td></tr>
<tr><td rowspan="2">द्वितीय</td><td rowspan="2">१००</td><td rowspan="2">४०</td><td rowspan="2">विषयगत</td><td>छोटो उत्तर लामो उत्तर</td><td>४ प्रश्न X ५ अङ्क<br>५ प्रश्न X १० अङ्क</td><td rowspan="2">३ घण्टा</td></tr>
<tr><td>समस्या समाधान</td><td>२ प्रश्न x १५ अङ्क</td></tr>
<tr><td colspan="7">२. द्वितीय चरण : – अन्तर्वार्ता</td></tr>
<tr><td colspan="2">विषय</td><td>पूर्णाङ्क</td><td>उतीर्णाङ्क</td><td colspan="2">परीक्षा प्रणाली</td><td></td><td>समय</td></tr>
<tr><td colspan="2">अन्तर्वार्ता</td><td>३०</td><td>-</td><td colspan="2">मौखिक</td><td></td><td></td></tr>
</table>

**द्रष्टव्य :**

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. लिखित परीक्षामा यथासम्भव पाठ्यक्रमका सबै एकाईबाट प्रश्नहरु सोधिनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

८. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

९. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१०. पाठ्यक्रम लागू मिति :–२०७९/१२/२१

**पाटन स्वास्थ्य विज्ञान प्रतिष्ठान सेवा आयोग**

प्राविधिक सेवा, नाक, कान, घाँटी समूह, अडियोलोजिष्ट पद, तह ७ को

खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**प्रथम तथा द्वितीय पत्र :–**

प्राविधिक विषय, सामान्य ज्ञान र सम्बन्धित कानूनहरु

(Technical Subject, General Knowledge and Related Legislation)

## खण्ड (A): Technical Subject

# A HUMAN COMMUNICATION, SPEECH- LANGUAGE DEVELOPMENT AND DISORDERS

**1 History and development of the profession:**

**2 Human communication:**

**3 Interactive bases of communication:**

**4 Specific causes leading to developmental delay:**

**5 Mechanism of speech and language production**

**6 Definition, etiology, characteristics, classification and impact of:**

–Hearing Impairment
–Mental Retardation
–Cerebral palsy
–Seizure disorders
–Assessment procedures, differential diagnosis and management in brief for above mentioned disorders.

**7 Definition, etiology, characteristics and classification of:**

–Autism Spectrum Disorders/ Pervasive Developmental Disorders.
–Attention Deficit Disorder/ Attention Deficit Hyperactivity Disorder.
–Multiple disabilities
–Assessment procedures, differential diagnosis and management in brief for above mentioned disorders.

**8 Definition, etiology, characteristics, classification and impact of:**

–Specific language Impairment
–Learning Disability
–Acquired aphasias in childhood
–Traumatic Brain Injury in childhood
–Assessment procedures, differential diagnosis and management in brief for above mentioned disorders.

# B INTRODUCTION TO AUDIOLOGY

**1 Historical Aspects**

–Origin of Audiology, its growth & development (since World war II)
–History, growth & development of Audiology in Nepal, Neighboring countries and abroad
–Scope of Audiology and branches of audiology
–Take history in detail related with audiology
–Physical and Psychophysical scales, Equal loudness contours, Frequency weighting curves, combined sources, Pitch and Timbre. Fourier analysis of complex tones.
–power and pressure formulae: zero dB reference for pressure and power.
–Calculate actual SPL, reference and dB values with any two given values.
–Calculate overall dB when two signals are superimposed, hearing level and sensation level.
–Depict relationship between phones and sones.

–Know use of phone and sone.
–Know use of phone and sonograph.
–Compute relative loudness of two given sounds using these graphs of phone and sone.
–Define frequency and intensity.
–Psychological correlates of frequency and intensity.
–Calculate and plot DL for frequency and Intensity.
–Theories of hearing.
–Conceptualize advantages of binaural hearing.
–The effects of Head Shadow and Pinna Shadow.
–special role of hearing in visual impaired.
–Curve for threshold of hearing MAP and MAF.

**2 Tuning fork tests**

–Perform different tuning fork tests such as Rinne, Weber, Bing, Schwabach and Absolute Bone Conduction.
–Interpret different tuning fork tests
–Understand merit & demerits of each tests
–Perform audiometric version of Weber and Bing tests.

**3 Pure Tone Audiometry and Orientation to speech audiometry**

**4 Masking**

## C BASIC MEDICAL SCIENCES RELATED TO SPEECH & HEARING

**General Anatomy and physiology**

**1 Embryology:**

–The development of branchial arches and pouches and their derivatives.
–The development of face and its developmental anomalies.
–The development of palate and correlate with cleft lip and cleft palate.
–The development of tongue and thyroid gland and correlate with developmental anomalies.
–The development of external ear, middle ear and inner ear and correlate with developmental anomalies.

**2 Endocrinology:**

–Define hormone and elicit functions of thyroid hormone, growth hormone, androgen and
–Describe regulation of secretion of hormone and its influence in voice disorder.
–Enumerate hormonal controls and changes at puberty.
–Explain hypothyroidism and its effect on voice.

**3 General Pathology, Genetics & immunology :**

–Define inflammation, infection, tumor – benign & malignant, tissue healing.
–Describe the normal structure of chromosome and define karyotyping.
–Enumerate the structural and numerical aberrations of chromosome with appropriate examples.
–Outline the Mendelian Inheritance; define Mendelian trait, autosomal dominant, autosomal recessive, sex linked dominant and recessive diseases.
–Outline pedigree symbols and pedigree lines; build pedigree charting.
–Define genetics and describe significance of medical genetic, its importance in diagnosis and management of Speech & Hearing disorders.
–General outline of immunology related with speech and hearing.

**4 Ear**

–Describe anatomy & physiology of external, middle & inner ear.

–Describe ascending and descending auditory pathways, vestibular pathway.
–Describe mechanism of hearing: peripheral and central.
–Explain the functions of utricle, saccule and vestibular apparatus in relation to posture and equilibrium.
–Enumerate tests for posture and equilibrium.
–Describe and identify diseases of the external middle and inner ear leading to hearing loss: congenital malformations, traumatic lesions, infections, neoplasm, Keratosis obturans, Foreign bodies, wax, etc.
–Describe and diagnose diseases of the middle ear – different types of otitis media namely acute otitis
media, otitis media with effusion and its sequelae, chronic otitis media & complications, otosclerosis, neoplasms, eustachian tube disorders and their management.
–Describe and diagnose diseases of the inner ear such as labyrinthitis, Meniere's disease, prebyacusis,
ototoxicity, noise induced hearing loss, sudden SNHL, BPPV, vestibular neuronitis, differential diagnosis of vertigo and their management.
–List out other causes of hearing loss – tumors of the cerebello- pontine angle, vestibular schwannoma.
–Causes and management of tinnitus.

**5 Nose, Oral cavity & Pharynx**

–Describe anatomy & physiology nose, paranasal sinuses.
–Describe congenital diseases of nose – cleft lip, cleft palate, choanal atresia.
–Describe rhinolalia, rhinosinusitis, deviated nasal septum, sinonasal polyposis.
–Describe anatomy & physiology of oral cavity, oropharynx, nasopharynx, laryngopharynx.
–Explain disorders of oral cavity, nasopharynx, oropharynx, and laryngopharynx and their effect to
causes of speech disorders.
–Describe and diagnose diseases of the tonsils and adenoids.
–Describe in brief the normal structure and function of esophagus.
–Explain the mechanism of swallowing.
–Describe esophageal conditions: Gastroesophageal reflux disorder, congenital abnormality – atresia,
Tracheo-oesophageal fistula, Stenosis, short oesophagus.
–Describe in detail the muscles of palate in terms of their origin, insertion, actions, blood supply and
innervations.

**6 Larynx**

–Describe the anatomy & physiology of larynx, muscles of larynx in relation to their attachments,
actions and innervations; mention the blood supply of larynx.
–Describe the structure and function of vocal cords and physiology of phonation.
–Elicit difference between an infant and an adult larynx.
–Describe disorders of laryngeal structure – laryngomalacia, laryngeal web, subglottic stenosis, posterior laryngeal cleft, tumors and cysts.
–Describe laryngitis: acute laryngitis, acute laryngotracheobronchitis, acute epiglottitis, laryngotracheal diphtheria, specific laryngitis.

–Explain the causes, management of chronic laryngitis.
–Identify Vocal cord polyps, Reinke's Edema, Vocal nodules.
–Describe neuromuscular dysfunctions of the larynx – vocal cord palsy, spastic dysphonia.
–Differential diagnosis of hoarseness.
–Describe laryngectomy, oesophageal speech, tracheo oesophageal puncture, artificial larynx.

## D INTRODUCTION TO LINGUISTICS

**1 Introduction to Linguistics, Language and Communication**
**2 Phonetics and Fundamentals of acoustic phonetics**
**3 Phonology and Morphology**
**4 Semantics, Syntax and Pragmatics**
**5 Psycholinguistics, neurolinguistics and application of linguistics**

## E BASIC ACOUSTICS AND ELECTRONICS

- **Basic Acoustics**

**1 Vibrating systems, Waves and Resonance of a mass-spring vibrator**

–Conceptualize Simple Harmonic Motion, Simple vibrating systems, systems with two or more masses, systems with many modes of vibration, Complex vibrations, Vibration spectra
–Develop concept regarding what is a wave? different types of wave such as Progressive Waves and
Sound waves, Wave propagation, Doppler effect, Reflection, Refraction, Diffraction, Interference,
Absorption
–Describe standing waves, Partials, harmonics and overtones , Acoustic impedance, Helmholtz resonator, sympathetic vibrations and Couplers

**2 Sound Pressure, Power and Loudness, Pitch, Timbre and Acoustics of Rooms**

–Explain Physical and psycho-physical scales, Critical bands – combined sources
–Describe Physical and psycho-physical scales
–Perform Fourier analysis of complex tones
–Build concept regarding Sound propagation in outdoors and indoors – Direct, early and reverberant
sound
–Calculate reverberation time, Air absorption
–Measure Background noise
Perform Loudspeaker placement and directivity, Acoustic Feedback and equalization
–Detect the Acoustics of small rooms – sound images and multiple sources
–Explain sound field in listening rooms, Quadraphonic sound, listening with earphones.

- **Basic Electronics**

**1 Basics of electricity and Electronics-**
**2 Basic electronic device and its applications**
**3 Microphones as transducers**
**4 Loudspeakers as transducers**
**5 Recording and Reproduction of sound**
**6 Amplifier and Hearing aid**

## F PSYCHOLOGY RELATED TO SPEECH & HEARING

1 **Clinical Psychology**
2 **Mental Disorders**
3 **Methodology in clinical psychology**
4 **Classification of abnormal behavior**
5 **Motor development**
6 **Cognitive development**
7 **Emotional and social development**
8 **Perform assessment of cognitive functions, personality, interpersonal relationships, diagnosis, and tests used and interpretation of test results.**
9 **Learning**
10 **Experimentation in learning**
11 **Theories of conditioning**
12 **Correlates of Learning**
13 **Techniques derived based on operant conditioning**

**G BASIC STATISTICS IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY**
1 **. Introduction**
2 **Data Collection and its Sources**
3 **Tabulation**
4 **Diagrammatic and Graphic Presentation of Data**
5 **Measures of Central Tendencies**
6 **Measures of Dispersion (Variability)**
7 **Probability and Probability Distribution**
8 **Correlation and Regression**
9 **Sampling**
10 **Sampling Distribution and Estimation**
11 **Testing of Hypothesis**

## H SPEECH-LANGUAGE DIAGNOSTICS & THERAPEUTICS

1 **Speech language diagnostics**
2 **Basic terminologies and concepts**
3 **Diagnostic approaches and methods**
4 **Speech Therapeutics-Basic concepts of therapeutics**

## I ARTICULATION AND PHONOLOGICAL DISORDERS

**Oral Anaomalies: Cleft lip and palate**

## VOICE AND LARYNGECTOMY

## DIAGNOSTIC AUDIOLOGY

**Speech Audiometry**
**Audiological Tests to Differentiate Site of Lesion**
**Test, which use pure tone stimuli :**
**Tests, which use Speech Stimulus**
**Automatic Audiometry**
**Immitance Audiometry**

**Vestibular Function Tests**
**Tests to detect Pseudo-hypoacusis:**

## AMPLIFICATION AND ASSISTIVE DEVICES FOR THE HEARING IMPAIRED

**Hearing impaired & development of technologies**
**Types and Classification**
**Classification and type of hearing aids**
**Electro-acoustic Characteristics & measurements for hearing aids**
**Hearing Aid selection**
**Ear Mold**
**Hearing devices other than Hearing aid**

## EDUCATIONAL AUDIOLOGY

### RESEARCH METHODS IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY

## CLINICAL PRACTICUM IN SPECH-LANGUAGE PATHOLOGY

**Carry out informal and formal procedures for assessment of following aspects of speech and language: -**
**Analyze and interpret information obtained during assessment to arrive at a provisional diagnosis.**
**Make differential diagnosis of**
a) Childhood communication disorders
b) Articulation and phonological disorders.
**Plan and execute intervention programs for**
a) Delayed speech and language development.
b) Deviant speech and language development.
c) Deficient speech and language skills.
d) Misarticulations.
e) Cleft lip and palate.
f) Phonological disorders.
**–Compile a comprehensive report for appropriate referral of clients.**
**–Communicate relevant test findings to clients and significant others in a professional manner.**
**–Obtain information about different types of set-ups dealing with communication disorders.**
**Clinical Practicum Work:**
**–Complete informal and formal assessment of all aspects of speech and language in children and**
**adults (emphasis on childhood communication disorder and articulation and phonological disorders), under supervision.**
**Familiarization with checklists, tests, scales such as:**
**Familiarization with general guidelines about counseling clients with communication disorders and significant others.**
**Visits to centers such as**

a) School for the HI
b) School for the MR
c) School for the LD
d) District Rehabilitation Centre
e) Centre for the Cerebral Palsied
f) Centre for laryngectomee and head-neck cancer rehabilitation.
g) Centre for the autistic
h) School for deaf-blind.

## FLUENCY & ITS DISORDERS

## NEUROGENIC LANGUAGE DISORDES IN ADULTS

**General and specific neurological examination procedures:**
**Neurological investigations:**
**Assessment of speech, language and cognitive behavior:**

**Describe etiology, clinical profile, assessment and management of other language disorders in adults**:

## NEUROMOTOR SPEECH DISORDERS

**Neuroanatomical correlates of speech**
**Childhood motor speech disorders**
**Cerebral Palsy**
**Other neuromotor developmental disorders**
**Developmental dyspraxia**
**Adult motor speech disorders**
**Dysarthria**
**Acquired apraxia**
**Swallowing disorders**

## REHABILITATIVE AUDIOLOGY

**Manage hearing impaired children with special needs**
**Speech reading**
**Auditory learning**

## NOISE MEASUREMENT AND HEARING CONSERVATION

**Describe Noise in the environment in term of**
**Describe Effects of Noise**
**Describe & interpret Audiometry in NIHL**
**Perform & interpret Noise Measurement**
**Describe Ear Protective Devices (EPDs)**
**Conduct Hearing Conservation**
**Familiarize with Legislations related to noise**

# PAEDIATRIC AUDIOLOGY

## Specific Objectives:

**Development of Auditory system**

**1. Describe development of the human auditory system with reference to**

–Embryology of the auditory system (Recall from first year learning)

–Relevance of the information with special reference to syndromes.

**2. Explain development of auditory behavior at different stages such as (8 hrs.)**

–Prenatal hearing

–New born hearing

–Auditory development from 0-2 yrs.

**Causes of Hearing loss**

–**Classify causes of hearing loss in children based on**

a. Genetic: - Congenital

- Late onset, Progressive

- Syndromic/Non-syndromic

b. Non -Genetic: Congenital / Acquired

c. Importance of case history

**Behavioral Hearing Tests in Children**

**Describe need Early Identification of Hearing Loss - with specific reference to –**

–Conductive hearing loss

–Sensori-neural hearing loss.

**Carry out Screening for hearing loss based on**

–Using High risk registers.

–Behavioral Tests: stimuli, procedure, recording of responses, interpretation of result.

–Objective Tests: Immittance Screening, BERA, Otoacoustic Emission (OAE).

**Build up Concept of Universal hearing screening Program**

**Describe Objective Hearing screening for School going children**

a. Objectives screening tests: Immitance, Evoked potentials, OAE, ASSR

b. School screening: Screening for hearing sensitivity, screening for middle ear effusion.

c. Need, criteria, instrumentation,

d. Tests: Individual and Group screening/ Mass Media screening tests.

e. Importance of follow up.

## Behavioral Observation Audiometry (BOA)

**Speech Audiometry in Children**

**<u>Electrophysiological Tests</u>**

**Evoked Response Audiometry**

**ABR in pediatric population**

**Otoacoustic Emission (OAE)**

**Auditory Steady State Response (ASSR)**

**Tests to detect Central Auditory Processing Disorders in children and Adult**

## COMMUNITY ORIENTED PROFESSIONAL PRACTICES IN SPEECH LANGUAGE

## PATHOLOGY AND AUDIOLOGY

## CLINICAL AUDIOLOGY

Familiarization of instrumentation for pure tone and speech special tests, Imminence audiometry. Holistic audiological assessment for differential diagnosis:

**Routine pure tone & speech audiometry**

a) Administering special tests using pure tone: TDT, STAT, SISI, ABLB, MLB, Stenger
b) Speech: PIPB Function, Stenger, CAD tests.
c) Noise: SAL, SPIN (20 cases)

**Immittance audiometry**. Basic tests, Acoustic reflex decay, Eustachian tube function

**ABR & OAE testing**

–Preparation of the patient. Informing caregiver/patient with respect to preparation. Electrode montage.
–Observing the procedure with respect to test protocol (5 cases each)

**Hearing Aid Trial:**

a) Functional gain, REIG, other methods with:
–Monaural fitting.
–Binaural fitting
Programmable hearing aid - Analog and Digital
b) Explaining the benefits of the hearing aid to the patient/caregiver.
c) Counseling for care & maintenance of hearing aid, preparation of harness, cleaning the ear moulds.
–Calibration of pure tone audiometer (AC, BC and Speech).
–Noise measurement and attenuation measurement of ear protection devices

## खण्ड (B): General Knowledge and Related Legislation

1. **सामान्य ज्ञान तथा ऐन, नियमहरु**
   - 1.1 नेपालको भौगोलिक, ऐतिहासिक, आर्थिक, सामाजिक, सांस्कृतिक र राजनैतिक अवस्था सम्बन्धी सामान्य जानकारी ।
   - 1.2 राष्ट्रिय र अर्न्तराष्ट्रिय महत्वका समसामयिक घटनाहरु : राजनैतिक, आर्थिक, वैज्ञानिक, खेलकूद, सूचना प्रविधि, पुरस्कार, स्वास्थ्य
   - 1.3 पाटन स्वास्थ्य विज्ञान प्रतिष्ठान ऐन, २०६४
   - 1.4 पाटन स्वास्थ्य विज्ञान प्रतिष्ठानको कर्मचारी सेवाका शर्त र सुविधा सम्वन्धी नियमावली, २०६७
   - 1.5 पाटन स्वास्थ्य विज्ञान प्रतिष्ठान आर्थिक प्रशासन नियमावली, २०६७
   - 1.6 पाटन अस्पताल संचालन विनियमावली, २०६७
   - 1.7 नेपाल स्वास्थ्य सेवा ऐन, २०५३ र स्वास्थ्य सेवा नियमावली, २०५५
   - 1.8 नेपाल मेडिकल काउन्सिल ऐन, २०२० र नियमावली
   - 1.9 नेपाल नर्सिङ परिषद् ऐन, २०५२
   - 1.10 नेपाल स्वास्थ्य व्यवसायी परिषद् ऐन, २०५३

प्रथम तथा द्वितीय पत्रमा यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

| प्रथम पत्र | | | |
|---|---|---|---|
| खण्ड | अङ्कभार | प्रश्न संख्या | |
| | | वस्तुगत | विषयगत |
| A | ८० | ४० प्रश्न X २ अङ्क = ८० | - |

**पाटन स्वास्थ्य विज्ञान प्रतिष्ठान सेवा आयोग**

प्राविधिक सेवा, नाक, कान, घाँटी समूह, अडियोलोजिष्ट पद, तह ७ को

खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

| | | | |
|---|---|---|---|
| **B** | २० | १० प्रश्न X २ अङ्क = २० | - |
| **जम्मा** | | ५० प्रश्न X २ अङ्क = १०० | **-** |
| **द्वितीय पत्र** | | | |
| **खण्ड** | **अङ्कभार** | **प्रश्न संख्या** | |
| | | **विषयगत** | **समस्या समाधान** |
| **A** | १०० | ४ प्रश्न X ५ अङ्क = २०<br>५ प्रश्न X १० अङ्क = ५० | २ प्रश्न x १५ अङ्क = ३० |
| **B** | - | **-** | - |
| **जम्मा** | | ४ प्रश्न X ५ अङ्क = २०<br>५ प्रश्न X १० अङ्क = ५० | २ प्रश्न x १५ अङ्क = ३० |

--- The end ---