



INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

End-Spring Semester Examination 2022-23

Date of Examination: 26.04.2023

Session: (FN/AN) AN

Duration: 3 hrs.

Full Marks: 100

Subject No.: KS 20203

Subject: Paninian Grammar from Computational Perspective

Department/Center/School: Centre of Excellence for Indian Knowledge System

Specific charts, graph paper, log book etc., required: No

Special Instructions (if any): Nil

Q.I. Answer any two of the following questions in 250-300 words

(20)

Q1. Explain the Paninian approach of analysing the information coded in Sanskrit.

Q2. Explain 6 types of सूत्र (sūtras) found in the अष्टाध्यायी (Aṣṭādhyāyī) with examples.

Q3. What is meant by 'Metalanguage'? Explain various techniques used by Panini for build up his Metalanguage.

Q.II. Answer any Five of the following questions in 100-150 words

(35)

Q1. Describe the recent efforts in computational processing of Sanskrit Language.

Q2. What is IKS? Write your thoughts about relevance of IKS today.

Q3. What is meant by 'Natural Language' and what are the challenges involved in Natural Language Processing.

Q4. Explain how the concepts of 'Data Separation' and 'Data Encapsulation' are embedded in Panini's व्याकरण (vyākaraṇa).

Q5. Explain the salient features of the arrangement of various वर्ण (varṇas) in the वर्णमाला (varṇamālā).

Q6. Explain with an example the role of अनुबन्ध (anubandhas) in the derivational process.

Q7. Explain the relevance of शिवसूत्र (Śivasūtras) in Paninian grammatical system and discuss the significance of the unique arrangement of sounds found in the शिवसूत्र (Śivasūtras).

Q.III. Fill the blanks with appropriate words given in the brackets.

(08)

[सनादि (sanādi) suffix, तद्धित (taddhita) suffix, तिङ् (tiṅ) suffix, सुप् (sup) suffix, समास (samāsa), स्त्री (strī) suffix, सनादि (sanādi) suffix, कृत् (kṛt) suffix]

- धातु (dhātu) + _____ = New धातु (dhātu)
- प्रातिपदिक (prātipadika) + _____ = New धातु (dhātu)
- प्रातिपदिक (prātipadika) + _____ = Feminine प्रातिपदिक (prātipadika)
- प्रातिपदिक (prātipadika) + _____ = New प्रातिपदिक (prātipadika)
- धातु (dhātu) + _____ = प्रातिपदिक (prātipadika)
- धातु (dhātu) + _____ = Verb ready to be used in Sanskrit
- प्रातिपदिक (prātipadika) + _____ = Non-verb ready to be used in Sanskrit
- Non-verb + _____ Non-verb = _____

Q.IV. शब्द (Śabda) that is actually spoken is real. प्रकृति (prakṛtis), प्रत्यय (pratyayas) and transformation-rules leading to the derivation of words are fictitious. Only condition while deciding प्रकृति (prakṛtis), प्रत्यय (pratyayas) and rules is that they should be 'minimal' as they lead us to साधु (sadhu) usages. Following is small

corpus of words provided to you. Make a minimal database of प्रकृतिs (indicating their meanings also), decide upon the minimal प्रत्ययs (indicating their meanings) and prepare a minimal rule-set in such a way that all the words can be derived. Techniques like अनुबन्ध (anubandha) and अनुवृत्ति (anuvṛtti) may also be used while writing the rules. (10)

No.	Word	Meaning	No.	Word	Meaning
1	पठति (paṭhati)	Reads (present tense)	5	पठतु (paṭhatu)	(He must) Read
2	पाठयति (pāṭhayati)	Makes (someone) read (teaches)	6	पाठयतु (pāṭhayatu)	(He must) Teach
3	पठिष्यति (paṭhiṣyati)	Will read	7	अपठत् (apaṭhat)	Read (Past tense)
4	पाठयिष्यति (pāṭhayiṣyati)	Will teach	8	अपाठयत् (apāṭhayat)	Taught

Q.V. Observe the following set of rules and answer the questions given below –

No.	सूत्रs (sūtras)	Meaning
1	उपदेशे अच् अनुनासिकः इत् (upadeśe ac anunāsikaḥ it)	The nasalised vowels are इत् in उपदेश or original enunciation.
2	हल् अन्त्यम् (hal antyam)	In उपदेश, the final consonant is इत्
3	न विभक्तौ तु-स्-माः (na vibhaktau tu-s-māḥ)	The final dental consonants and the final स् and म् are not इत्, in affixes called विभक्ति
4	आदिः त्रि-टु-डवः (ādiḥ tri-tu-ḍavaḥ)	त्रि, टु and डु occurring at the beginning of an उपदेश are called 'इत्'.
5	षः प्रत्ययस्य (ṣaḥ pratyayasya)	The letter ष at the beginning of a प्रत्यय is called 'इत्'
6	चु-टू (cu-ṭū)	The letters - च्, छ्, ज्, झ्, ञ्, ट्, ठ्, ड्, ढ्, ण् - at the beginning of a प्रत्यय are called इत्
7	लशकु अतद्धिते (laśaku ataddhite)	The initial ल् and श् and the gutturals of all affixes, except, तद्धित are called इत्
8	तस्य लोपः (tasya loṣaḥ)	Of this, (namely of that which has been called इत्), there is elision

- Write the form of the following प्रत्ययs (pratyayas) after the removal of their इत् (it) sounds. Also indicate the सूत्रs (sūtras) by which some part of them is removed or not removed
(i) घञ्(ghañ) (ii) तुमुन्(tumu~n) (iii) क्त्वा(ktvā) (iv) जस्(jas) (This is a विभक्ति suffix) (v) तल्(tal) (This is a तद्धित suffix) (10)
- By using the principle of अकाङ्क्षा (akāṅkṣā) re-write all the above सूत्रs (sūtras) along with all their अनुवृत्तिs (7)

Q.VI. (A) Write about the most significant insights that you have gained from the course on Panini's Grammar and the possible areas where they can be applied....OR... (10)

(B) Express your opinion about the following statement by Leonard Bloomfield, "Panini's grammar is one of the greatest monuments of human intelligence..."