

DSC – 2014
Category of Post: School Assistant - Physical Sciences
Syllabus

Part – I

GENERAL KNOWLEDGE AND CURRENT AFFAIRS (Marks: 10)

Part - II

CHILD DEVELOPMENT AND PEDAGOGY (Marks: 30)

1. DEVELOPMENT OF CHILD

- Development, Growth & Maturation – Concept & Nature
- Principles of development
- Factors influencing Development – Biological, Psychological, Sociological
- Dimensions of Development and their interrelationships – Physical & Motor, Cognitive, Emotional, Social, Moral, Language relating to Infancy, early Childhood, late Child hood, Adolescence.
- Understanding Development – Piaget, Kohlberg, Chomsky, Carl Rogers
- Individual differences – Intra & Inter Individual differences in the areas of Attitudes, Aptitude, Interest, Habits, Intelligence and their Assessment
- Development of Personality – Concept, Factors effecting development of Personality
- Adjustment, Behavioural problems, Mental Health
- Methods and Approaches of Child Development – Observation, Interview, Case study, Experimental, Cross sectional and Longitudinal
- Developmental tasks and Hazards

2. UNDERSTANDING LEARNING

- Concept, Nature of Learning – input – process – outcome
- Factors of Learning – Personal and Environmental
- Approaches to Learning and their applicability–Behaviourism (Skinner, Pavlov, Thorndike), Constructivism (Piaget, Vygotsky), Gestalt(Kohler, Koffka) and Observational (Bandura)
- Dimensions of Learning – Cognitive, Affective and Performance
- Motivation and Sustenance –its role in learning.
- Memory & Forgetting
- Transfer of Learning

3. PEDAGOGICAL CONCERNS

- Teaching and its relationship with learning and learner
- Learners in Contexts: Situating learner in the socio-political and cultural context
- Children from diverse contexts–Children With Special Needs (CWSN), Inclusive Education
- Understanding of pedagogic methods – Enquiry based learning, Project based learning, Survey, Observation and Activity based learning
- Individual and Group learning: Issues and concerns with respect to organizing learning in class room like Study habits, Self learning and Learning to learn skills
- Organizing learning in heterogeneous class room groups – Socio-economic background, Abilities and Interest
- Paradigms of organizing Learning-Teacher centric, Subject centric and Learner centric
- Teaching as Planned activity – Elements of Planning
- Phases of Teaching – Pre active, Interactive and Post active
- General and Subject related skills, competencies required in teaching and attributes of good facilitator
- Learning resources – Self, Home, School, Community, Technology
- Class room Management: Role of student, teacher, Leadership style of teacher, Creation of non-threatening learning environment, Managing behaviour problems, Guidance & Counselling, Punishment and its legal implications, Rights of a child, Time Management.
- Distinction between Assessment for Learning & Assessment of Learning, School based Assessment, Continuous & Comprehensive Evaluation : Perspective & Practice

1. - Understanding teaching & learning in the context of NCF, 2005 & Right To Education Act, 2009.

Part – III

Language – I Content and Methodology) (Marks: 30)

Optional by the Candidate: Telugu/Urdu/Hindi/Tamil/Kannada/Oriya/Sanskrit

III (a) Language – I Telugu (Content and Methodology) (Marks: 30)

Content

1. కవులు - రచయితలు - కావ్యాలు - రచనలు
పాత్రలు - నేపథ్యం - పూర్వపాత్రలు - ఇతివృత్తాలు - సందర్భవాక్యాలు - విశేషాంశాలు
2. ప్రక్రియలు - లక్షణాలు - వివరణలు
ఇతిహాసం - పురాణం - ప్రబంధం - శతకం - నవల - కథ - కథానిక - గల్పిక - సంపాదకీయం -
వార్తావ్యాఖ్య - లేఖ - వ్యాసం - పీఠిక - జీవితచరిత్ర - స్వీయచరిత్ర - విమర్శ - నాటకం
3. ఆధునిక సాహిత్యం - ధోరణులు - ఉద్యమాలు - జానపద సాహిత్యం
భావకవిత్వం - అభ్యుదయ కవిత్వం - విప్లవ కవిత్వం - దిగంబర కవిత్వం - స్త్రీ వాద కవిత్వం -
దళితవాద కవిత్వం - మైనార్టీ వాద కవిత్వం - అనుభూతివాద కవిత్వం
4. తెలుగు భాషా సాహిత్యాలపై ఇతర భాషా సాహిత్యాల ప్రభావం
సంస్కృతం - ఆంగ్లము - ఉర్దూ - పాఠశాల - ఒరియా - తమిళం - కన్నడం - మళయాళం - మరాఠీ
5. భాషారూపాలు
శాసనభాష - గ్రాంథిక భాష - వ్యవహారిక భాష - మాండలిక భాష - ఆధునిక ప్రామాణిక భాష -
ప్రసారమాధ్యమాల భాష
6. సాహిత్య విమర్శ
కవి - కావ్యం - నిర్వచనాలు - కావ్యప్రయోజనం - శైలి - అలంకారాలు
7. భాషాంశాలు
ఉచ్చారణ - ధ్వని - ధ్వన్యత్పత్తి స్థానాలు - పదం - ప్రాతిపదిక - ప్రత్యయం - భాషాభాగాలు - పదం -
అర్థాలు - నానార్థాలు - పర్యాయపదాలు - వ్యుత్పత్త్యర్థాలు - పదం - పరిణామం - ప్రకృతి వికృతులు -
అర్థపరిణామం - తత్వమం - తద్భవం - దేశ్యం - గ్రామ్యం - అన్యదేశ్యం - వాక్యం - భేదాలు - నిర్మాణం
- సంధులు - సమాసాలు - ఛందస్సు - వ్యాకరణ పరిభాష
8. భాష - సమాజం - సంస్కృతి పరస్పర ప్రభావాలు
9. అనువాదం - ఆవశ్యకత - రీతులు
10. పఠనావగాహనం (Comprehension)

తెలుగు భాష బోధన పద్ధతులు

1. భాష - వివిధ భావనలు
2. భాషానైపుణ్యాలు
3. ప్రణాళిక రచన - పాఠ్యగ్రంథాలు
4. విద్యాసాంకేతిక శాస్త్రం - సహపాఠ్య కార్యక్రమాలు
5. సాహిత్య ప్రక్రియలు - బోధన పద్ధతులు
6. మూల్యాంకనం పరీక్షలు

III (b) Language – I Urdu (Content and Methodology) (Marks: 30)

Content

- I- ادیبوں، شاعروں کی سوانح حیات۔ ادبی کارنامے اور ان کے کرداروں کا جائزہ۔
- II- اصناف ادب کا تفصیلی مطالعہ۔
(نثر۔ مضمون نگاری۔ داستان افسانہ۔ ناول۔ ڈرامہ۔ خطوط نوہیسی۔ انشائیہ۔ خاکہ نگاری۔ نظم۔ غزل۔ مثنوی۔ رباعی۔ مرثیہ۔ قصیدہ۔ دوہے۔ ماہیے، قطعات۔
- III- اردو زبان و ادب کی ترقی کے مختلف ادوار۔
- IV- زبان کی مختلف شکلیں اور حیثیتیں۔
- (a) مادری زبان (b) دوسری زبان (c) سرکاری زبان (d) قومی زبان (e) رابطہ کی زبان، اشاروں کی زبان، تحریری زبان۔
علامتوں کی زبان۔
- V- اردو زبان پر دیگر زبانوں کے اثرات۔
(پنجابی۔ ہندی۔ فارسی۔ عربی۔ انگریزی وغیرہ)
- VI- اردو کے اسلیب بیان۔
- VII- اردو زبان کے عناصر۔
کلمہ، مستقل کلمہ وغیرہ مستقل کلمہ اور ان کے اقسام جملہ۔ جملے کے اقسام۔ الفاظ۔ مفرد و مرکب الفاظ۔ سابقہ۔ لاحقے واحد جمع۔ مونث و مذکر محاورے۔ ضرب النثل رموز و اوقاف۔ صنائع و بدائع۔ تلفظ۔ مخارج۔ اعراب۔
- VIII- زبان سنج اور کلچر (باہمی اثر)
- IX- ترجمہ۔ تکنیک اور ضرورت۔
- X- ان دیکھامتن (Comprehension)۔

Methodology

- I - ہندوستان میں اردو۔
 - a۔ ہندوستانی دستور اور آندھراپردیش میں اردو کا مقام و موقوف۔
 - b۔ سرلسانی فارمولہ کے تحت ثانوی مدارس میں اردو کی تدریس۔
- II - زبان کی مہارتیں۔ سننا۔ بولنا۔ پڑھنا، لکھنا، اور سکھانے کے طریقے۔
- III - اردو کے تدریسی مقاصد۔
 - a۔ اردو کے تدریسی مقاصد بہ حیثیت زبان اول اور زبان زائد
 - b۔ بلوم کی تعلیمی مقاصد کی تقسیم
 - c۔ تدریسی مقاصد اور تصریحات۔
 - d۔ جزوی (Micro) تدریسی اور مختلف مہارتیں۔
- IV - معلم اردو اور تدریس۔
 - a۔ اردو معلم کی خصوصیات اور تدریسی وسائل۔
 - b۔ اردو زبان کے تدریس کے طریقے۔ (نثر، نظم، قواعد)
- V - تدریس اور اسباق کی منصوبہ بندی۔
 - a) سالانہ منصوبہ بندی۔ اکائی منصوبہ بندی، سبق کی منصوبہ بندی (نثر، نظم، قواعد، سرسری مطالعہ)
- VI - نصابی اور ہمہ نصابی مشاغل۔
 - a۔ اردو نصاب کے تدوین کے اصول۔
 - b۔ درسی کتاب اور خصوصیات اور تنقیدی جائزہ۔
 - c۔ ہمہ نصابی وزائد نصابی مشاغل کا انعقاد۔
 - d۔ تدریسی آلات، اقسام اہمیت و تیاری۔
 - e۔ اردو زبان کی ایباریٹری۔

III (c) Language – I Hindi (Content and Methodology) (Marks: 30)

Content

1. अवबोध (Comprehension)
 1. अपठित गद्य
 2. अपठित पद्य
2. कवि, काव्य - रचनाकार (लेखक) रचनाएँ
3. अकर्मक - सकर्मक क्रियाएँ
वाक्य - वाक्य भेद, कर्तृवाच्य, कर्मवाच्य, भाववाच्य, वाक्य और प्रयोग, वाक्य क्रम, घटना क्रम
4. वर्णमाला, शब्द भेद, वचन, लिंग, कारक, काल, विराम चिह्न, संधि, समास, विलोम शब्द, समान अर्थ, भिन्नार्थ, मुहावरे, कहावतें, लोकोक्तियाँ
5. भारतीय काव्य शास्त्र - काव्य लक्षण, रस, छंद, अलंकार

Methodology

(B) भाषा - शिक्षण - विधियाँ

1. भाषा का स्वरूप - भाषा की प्रकृति
अर्थ - परिभाषा ध्वनि विज्ञान, शब्द, वाक्य विज्ञान, विविध स्तरों पर हिन्दी शिक्षण के लक्ष्य और उद्देश्य प्रथम भाषा के रूप में हिन्दी, द्वितीय भाषा के रूप में हिन्दी त्रिभाषा - सूत्र
2. भाषा - कौशलों का विकास
सुनना, बोलना, पढ़ना, लिखना
3. हिन्दी अध्यापक और शिक्षण - विधियाँ
अच्छे शिक्षक और अच्छे शिक्षण की विशेषताएँ
भाषा - शिक्षण के सामान्य सिद्धांत,
भाषा - शिक्षण की प्रणालियाँ
भाषा - शिक्षण की पद्धतियाँ (प्रत्यक्ष, परोक्ष, खेल, मॉन्टेसरी, निदर्शित स्वाध्याय, डाल्टन, प्रायोजना, प्रश्नावली, आगमन, निगमन, क्रियात्मक, सूक्ष्म शिक्षण)
4. पाठ्यक्रम और सहगामी क्रियाएँ
पाठ्यक्रम, पाठ्यपुस्तक, पुस्तकालय, दृश्य-श्रव्य उपकरण (शिक्षण उपकरण), भाषा की दृष्टि से उपयोगी सहगामी क्रियाएँ
5. शिक्षण और योजना
आवश्यकता, उपयोगिता,
इकाई योजना, पाठ्य योजना
6. मूल्यांकन
मूल्यांकन की धारणा, निरंतर समग्र मूल्यांकन, उत्तम परीक्षा की विशेषताएँ, प्रश्न पत्र का निर्माण, उपलब्धि परीक्षा अभिलेख
7. आंध्रप्रदेश में हिंदी शिक्षण में आनेवाली समस्याएँ व उनका निराकरण
8. ध्वनि, वर्ण, शब्द, वाक्य रचना व शुद्धाशुद्ध वर्तनी व वाक्य ज्ञान

III (d) Language – I Tamil (Content and Methodology) (Marks: 30)

Content

I. சிளிவிறிஸிணிபிணிழிஷிமிளிழி (புரிந்துகொள்ளுதல்.)

1. கண்டிராத பத்தி.

2. கண்டிராத செய்யுள்.

II. கவிஞர்கள் , காப்பியங்கள் / படைப்பாளிகள் , படைப்புகள்,
(உரைநடை, செய்யுள் , கதை , நாடகம்)

III. வினைச்சொல் , பெயர்ச்சொல் ,வாக்கிய வகைகள், தன்வினை , பிறவினை,
செய்வினை, செயப்பாட்டுவினை , நேர்க்கூற்று, அயர்கூற்று, வாக்கியம்
அமைத்தல் , வாக்கியங்களை வரிசைப்படுத்துதல்.

IV. அகரவரிசை , மூவிடப்பெயர்கள், ஒருமை - பன்மை , காலங்கள்,
வேற்றுமை , நிறுத்தற்குறிகள், பகுபத உறுப்பிலக்கணம் ,
அருஞ்சொற்பொருள் , எதிர்ச்சொல், புணர்ச்சி , காரணப்பெயர் , மரபுத்தொடர்
கொண்டு வாக்கியம் அமைத்தல்.

Methodology

I. மொழி-தாய்மொழி :- , மும்மொழி போதனை , பேச்சுத் தமிழ்,
இலக்கியத்தமிழ்,

II. தாய்மொழி: - நோக்கம் , குறிக்கோள், மற்றும் சிறப்பு அம்சங்கள்,

III. கற்பிக்கும் முறைகள் :- செய்யுள் , உரைநடை , இலக்கணம்,
துணைப்பாடம், கட்டுரை ,

IV. கற்பித்தலில் நவீன உத்திகள் :- விளையாட்டு வழிக்கல்வி, மாண்டிச்சோரி
,கிண்டர்கார்டன், டால்டன், செயல்முறைக்கல்வி, நாடக உத்திமுறை,

V. மிகுதி . திட்டமிடுதல் :- பாடத்திட்டம், வருடாந்திரத்திட்டம், பாட ஏடு ,
இலக்கண ஏடு, துணைப்பாடம், ஆசிரியர் கை ஏடு, க்ஷி. கல்வி சார்ந்த தொழில்
நுட்பங்கள்:- பாடத்துடன் தொடர்புடைய இதர செயல்பாடுகள், மொழிசார்ந்த
விளையாட்டுகள் , பேச்சுப்போட்டி, கட்டுரை எழுதுதல், கல்விச் சுற்றுலா,
சொல்லி எழுதுதல், பத்திரிகை , நூலகக் கல்வி,

VI. க்ஷிமி. மதிப்பீடு செய்தல் :- மதிப்பிடுதலின் இன்றியமையாமை , சிறு
மற்றும் பெரிய தேர்வுகள் , மதிப்பிடுதலில் கையாளப்படும் பல்வேறு
ஆதாரங்கள் , மதிப்பீட்டின் அளவு, மதிப்பீட்டு முறைகள், பிழைகளைத்
திருத்தும்முறையில் கற்பித்தல் , பயிற்ச்சி வேலை கொடுத்தல் , நோக்க
அடிப்படையில் மதிப்பீடு செய்தல்,

III (e) Language – I Kannada (Content and Methodology) (Marks: 30)

Content

I. Comprehension (ಅವಗಾಹನ)

1. ಅಪರಿಚಿತ ಗದ್ಯ

2. ಅಪರಿಚಿತ ಪದ್ಯ

II. ಕವಿಗಳು, ಕಾವ್ಯಗಳು / ಲೇಖಕರು, ಕೃತಿಗಳು

III. ಆಕರ್ಮಕ, ಸಕರ್ಮಕಕ್ರಿಯಾಪದಗಳು, ವಾಕ್ಯಗಳು, ವಾಕ್ಯಪ್ರಕಾರಗಳು, ಕರ್ತೃ, ಕರ್ಮಣಿ ವಾಕ್ಯಗಳು, ಪ್ರತ್ಯಕ್ಷ ಪರೋಪಕ್ವ ವಾಕ್ಯಗಳು, ವಾಕ್ಯರಚನೆ.

IV. ವರ್ಣಮಾಲೆ, ಪ್ರತ್ಯಯಗಳು, ವಚನಗಳು, ಲಿಂಗಗಳು, ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು, ಕಾಲಗಳು ವಿರಾಮ ಚಿಹ್ನೆಗಳು. ಸಂಧಿಗಳು, ಸಮಾಸಗಳು, ಅಲಂಕಾರಗಳು, ತತ್ಸಮಗಳು, ವಿರುದ್ಧಪದಗಳು, ಪರ್ಯಾಯಪದಗಳು, ನಾನರ್ಥಗಳು, ಗಾದೆಗಳು, ಲೋಕೋಕ್ತಿಗಳು, ನುಡಿಮುತ್ತುಗಳು, ಸ್ವಂತವಾಕ್ಯಗಳು, ಒಗಟುಗಳು.

Methodology

1. ಭಾಷೆ – ವಿವಿಧ ಭಾವನೆಗಳು : ಭಾಷೆ – ಮಾತೃ ಭಾಷೆ , ತ್ರಿಬಾಷ ಸೂತ್ರ, ವ್ಯವಹಾರಿಕ ಭಾಷೆ, ಪ್ರಾಥೇಶಿಕ ಭಾಷೆ, ಪ್ರಮಾಣೀಕ ಭಾಷೆ,
2. ಕನ್ನಡ ಬೋಧನೋದ್ದೇಶಗಳು – ಉದ್ದೇಶಗಳು – ಸ್ಪಷ್ಟೀಕರಣ – ಧ್ವನಿತಿಯ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ ಬೋಧನೆ . ಭಾಷಾ ನೈಪುಣ್ಯಗಳು – ಶ್ರವಣ – ಭಾಷಣ – ಪಠಣ – ಬರವಣಿಗೆ :ಭಾಷಾ ನೈಪುಣ್ಯಗಳು – ಆಂತರಿಕ ಸಂಭಂದಗಳು.
3. ಬೋಧಾನ ಪದ್ಧತಿಗಳು : ಪದ್ಯ , ಗದ್ಯ , ವ್ಯಾಕರಣ, ಪ್ರಬಂಧ, ಉಪಪತ್ಯ ಕಥೆ, ನಾಟಕ , ಸಂಭಾಷಣೆಯಿಂದ ಬೋಧನೆಗಳು.
ಬೋಧನೆಯ ಹೊಸ ಧೋರಣೆಗಳು : ಕ್ರೀಡೆ , ಮಾಂಟಿಸೊರಿ, ಕಿಂಡರ್ ಗಾರ್ಡನ್, ಪ್ರಾಜೆಕ್ಟು ಡಾಲ್ಫಿನ್, ಚಟುವಟಿಕೆ ಆಧಾರ, ನಾಟಕೀಕರಣ ಪದ್ಧತಿಗಳು,
ಬೋಧನ ನೈಪುಣ್ಯಗಳು : ಪ್ರಯೋಗಾತ್ಮಕ ಬೋಧನೆ, ಸಮುಹ ಬೋಧನೆ, ಸೂಕ್ಷ್ಮ ಬೋಧನೆ, ಪರಿವೀಕ್ಷಣಾತ್ಮಕ ಅಧ್ಯಯನ.
4. ಶೈಕ್ಷಣಿಕ ಯೋಜನೆ , ವಿಷಯ ಯೋಜನೆ ವಾರ್ಷಿಕ ಯೋಜನೆ, ಭಾಷೆಯ ಸಮಗ್ರ ಯೋಜನೆ – ಪತ್ಯ ಯೋಜನೆ, ಪತ್ಯ ಪುಸ್ತಕಗಳು, ಉಪಪತ್ಯಪುಸ್ತಕ ಶಿಕ್ಷಕದರ್ಶಿ.
5. ಶೈಕ್ಷಣಿಕ ಸಾಂಕೇತಿಕ ಶಾಸ್ತ್ರ : ಬೋಧನೋಪಕರಣಗಳು, ಸಹಪತ್ಯ ಕಾರ್ಯಕ್ರಮಗಳು, ಭಾಷಾಕ್ರೀಡೆಗಳ ರಚನೆ – ಪ್ರಬಂಧ ರಚನೆ ಪತ್ರಕಾ ನಿರ್ವಣೆ . ಭಾಷಾ ಪ್ರವಾಸ , ಭಾಷಾ ಸಂಘಗಳು, ಗ್ರಂತಾಲಯಗಳು. ವಾಚನಾಲಯಗಳು, ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು, ಮೂಲಗ್ರಂಥಗಳು.
6. ಮೌಲ್ಯಮಾಪನದ ಅವಶ್ಯಕತೆ, ಚಿಕ್ಕಪರೀಕ್ಷೆಗಳು, ಪರೀಕ್ಷೆ ಮತ್ತು ಚಿಕ್ಕಪರೀಕ್ಷೆಗಳ ವ್ಯತ್ಯಾಸ ಅಂತರ್ಗತ ಮೌಲ್ಯಮಾಪನ , ಲಕ್ಷಾಧಾರ ಮೌಲ್ಯ ಮಾಪನ, ಮೌಲ್ಯಮಾಪನೋಪಕರಣಗಳು, ಮೌಲ್ಯಮಾಪನ ವಿಧಾನ, ಲಕ್ಷಾಧಾರ ಚಿಕ್ಕಪರೀಕ್ಷೆ ದೋಷಗಳ ವಿಶ್ಲೇಷಣೆ, ದೋಷನಿವಾರಣಾ ಬೋಧನೆ ನಿರ್ದೇಶನಗಳು.

III (f) Language – I Oriya (Content and Methodology) (Marks: 30)

Content

୧. କବି, ଲେଖକ, କାବ୍ୟ, ରଚନା
ଚରିତ୍ର, ଉଦ୍ଦେଶ୍ୟ, ପୂର୍ବାପର ପ୍ରସଙ୍ଗ
ଇତିବୃତ୍ତ, ସମ୍ଭବ ବାକ୍ୟ, ବିଶେଷାଂଶ
୨. ପ୍ରକ୍ରିୟା, ଲକ୍ଷଣ, ବିଦରଣ
ଇତିହାସ, ପୁରାଣ, ପ୍ରବନ୍ଧ, କାବ୍ୟ, ଉପନ୍ୟାସ
ପ୍ରସ୍ତାବନା, କଥା, ସାଦକୀୟ, ନିବନ୍ଧ, ପତ୍ରଲେଖନ
ଜୀବନ-ଚରିତ୍ର, ଆତ୍ମକଥା, ନାଟକ, ସମୀକ୍ଷା
୩. ଆଧୁନିକ ସାହିତ୍ୟର ବିଷୟବସ୍ତୁ
ଭାବକବିତା, ଅଭ୍ୟୁଦୟ କବିତା, ସାହିତ୍ୟ କ୍ଷେତ୍ରରେ କ୍ରାନ୍ତି
ସ୍ତ୍ରୀ ବାଦ, ଦଳିତବାଦ, ସଂଖ୍ୟାଲଘୁଗୋଷ୍ଠୀ
୪. ଓଡ଼ିଆ ଭାଷା ଉପରେ ଅନ୍ୟ ଭାଷାର ପ୍ରଭାବ-
ସଂସ୍କୃତ, ଇଂରାଜୀ, ବଂଗାଳୀ, ତେଲୁଗୁ, ହିନ୍ଦୀ
୫. ଭାଷାରୁପ-ଶିଳାଲେଖ ଭାଷା, ଗ୍ରାହିକ, ବ୍ୟବହାରିକ, ପ୍ରାଦେଶିକ, ଆଧୁନିକ, ପ୍ରସାର ମାଧ୍ୟମ ଭାଷା
୬. ସାହିତ୍ୟ ବିମର୍ଶ
କବି, କାବ୍ୟ, ନିର୍ବାଚନ, ପ୍ରୟୋଜନ, ଶୈଳୀ, ଅଳଙ୍କାର
୭. ଭାଷା-ଅଂଶ
ଉଚ୍ଚାରଣ, ଧ୍ୱନି, ଧ୍ୱନି-ଉତ୍ପତ୍ତି, ଶବ୍ଦ, ଅର୍ଥ, ନାନାର୍ଥ ପର୍ଯ୍ୟାୟ ପଦ, ବ୍ୟୁତ୍ପତ୍ତି, ଶବ୍ଦ-ପରିଣାମ, ଅର୍ଥ-ପରିଣାମ ଚମ୍ପୂ, ଚଉବ, ସେଶ, ବାକ୍ୟ, ବାକ୍ୟ ଭେଦ, ନିର୍ମାଣ, ସନ୍ଧି, ସମାସ, ଛନ୍ଦ, ବ୍ୟାକରଣ-ପରିଭାଷା
୮. ଭାଷା, ସମାଜ, ସଂସ୍କୃତି, ପାରସ୍ପରିକ ପ୍ରଭାବ
୯. ଅନୁବାଦ (ଇଂରାଜୀ ରୁ ଓଡ଼ିଆ), ଆବଶ୍ୟକତା, ରୀତି
୧୦. ପଠନ-ଅବଗାହନ (Comprehension)

Methodology

୧. ଭାଷା-ବିବିଧ ଭାବନା
୨. ଭାଷା କୌଶଳ
୩. ଯୋଜନା ଓ ପାଠ୍ୟକ୍ରମ
୪. ବିଦ୍ୟା ଚକ୍ର ଏବଂ ସହପାଠ୍ୟ କାର୍ଯ୍ୟକ୍ରମ
୫. ସାହିତ୍ୟ ପ୍ରକ୍ରିୟା : ବୋଧନ ପଦ୍ଧତି
୬. ମୂଲ୍ୟାଙ୍କନ ଓ ପରୀକ୍ଷା

III (g) Language – I Sanskrit (Content and Methodology) (Marks: 30)

Content

- १ - कवयः रचयितारः काव्यम रचनाः
- २ - प्रक्रिया - लक्षणः तथा विवरणः इतिहासः पुराणः, खण्डकाव्यम, कथा, निबन्ध रचना, नाटकम, आत्मकथा, जीवन - चरितम.
- ३ - आधुनिक - साहित्य परम्परा , गतिकाव्य आधुनिक कविता, आधुनिक कथा
- ४ - संस्कृत साहित्यस्य उपरि अन्य भाषाणां प्रभावः :
वैदिक संस्कृते प्राकृत शब्द , आधुनिक संस्कृत साहित्ये भारतीय भाषाणा प्रभावः :
- ५ - भाषा - रूपम्
अभिलेख तथा शिलालेख भाषा , ग्रन्थिक भाषा, व्यवहारिक भाषा
- ६ - साहित्यविमर्शः : कवि, काव्य, लक्षणम् प्रयोजनम् शैली अलंकारः :
- ७ - भाषांशाः
उच्चारण ध्वनिः ध्वन्युत्पत्ति, ध्वनि उत्पत्ती स्थानं, शब्दः प्रातिपदिकम् प्रत्ययः :
(कृदन्ताः तद्धिताः) कारक तथा विभाकि, अर्थः, नानाथीः पर्यायवाचिनः वाक्यम
वाक्यभेदः सुबन्तः तिङन्तः सन्धयः समासाः छन्दः अलंकारः
- ८ - भाषा , समाजः संस्कृतिः एतयोः
पारस्परिकः प्रभावः
- ९- अनुवादः - (आङ्ग भाषातः संस्कृत भाषा)
आवश्यकता, रीतिः
- १० - पठनावमाहनम (Comprehension)

Methodology

- १ - भाषा - विविधताः भावनाः :
- २ - भाषा - नैपुण्यम्
- ३ - पाठ्यक्रम योजना पाठ्यग्रन्थः :
- ४ - विद्या सांकेतिक - शास्त्रम् सहपाठ्य कार्यक्रमः :
- ५ - साहित्य - प्रक्रियाः बोधन पद्धतीः
- ६ - मूल्यांकनम् - परिक्षा च ।

Part – IV

Language – II (English) (Content and Methodology) (Marks: 30)

Content

(1) Parts of Speech (2) Tenses (3) Active voice & Passive voice (4) Prepositions and Articles (5) Degrees of comparison (6) Clauses (7) Verbs – Main Verbs – Auxiliary Verbs (8) Adverbs – Types of Adverbs (9) Conjunction – coordinating conjunction – subordinating conjunction. (10) Direct and Indirect speech (11) Questions and question tags (12) Types of sentences – simple, compound and complex – synthesis of sentences (13) Phrases – uses of phrases. (14) Composition – letter writing – précis writing (15) Comprehension (16) Vocabulary – Antonyms, Synonyms and Spellings

Methodology

1. Aspects of English:- (a) English language – History, nature, importance, principles of English as second language. (b) Problems of teaching / learning English.
2. Objectives of teaching English.
3. Phonetics / Transcription.
4. Development of Language skills:- (a) Listening, Speaking, Reading & Writing (LSRW). (b) Communicative skills – Imparting values through Communication.
5. Approaches, Methods, Techniques of teaching English:- (a) Introduction, definition & types of Approaches, Methods & Techniques of teaching English (b) Remedial teaching.
6. Teaching of structures and vocabulary.
7. Teaching learning materials in English.
8. Lesson Planning.
9. Curriculum & Textbooks – Importance and its need.
10. Evaluation in English language.

Part – V

Mathematics and Science (Content and Methodology) (Marks: 100)

V(a) Physical Science (Content and Methodology) (Marks: 70)

CONTENT

1. MEASUREMENT, UNITS AND DIMENSIONS: Systems of Measurement, Units of Measurements, Measurement of Length, Triangulation Method, Measuring Instruments, Vernier calipers, Screw Gauge Measurement of Area, Volume, Time, Measurement of Mass and Density, Measuring instruments. Units and Dimensions Fundamental and derived physical quantities, Systems of units, Multiples and submultiples of SI units. Dimensions Dimensional formulae and dimensional equations, dimensional constants and dimensionless quantities, principle of homogeneity of dimensions. Application of dimensional method of analysis. Conversion of one system of units into another, derivation of relationship between different physical quantities.
2. NATURAL RESOURCES AIR AND WATER: Air, Composition of air, Measurement of Atmospheric Pressure, Air Pollution, Volumetric Composition of Water, Hardness of Water, Drinking Water and Supply Water Pollution, Cyclone, Pascal's Law, Archimedes' Principle, Boyle's Law, Bernoulli's Principle, Wind, Rainfall.
3. OUR UNIVERSE: Constellations, Zodiac, Solar System, Stars, Meteors and Comets, Light year, Life on the Planet – Earth.
4. NATURAL PHENOMENA
 - A. Light - Sources & Nature of Light, Propagation of Light, Reflection, Refraction, Laws of Reflection, Image formed by Plane Mirror, Reflection on Spherical Mirrors, Refraction of Light through Prism and lenses (convex, concave), camera and the human eye, Refractive index of material of prism,

critical angle, Total Internal Reflection – Relation between Critical angle and Refractive Index, application of total internal reflection to Optical fibers. visual photometry, LASERS. Newton's Corpuscular Theory, Huygens' Wave Theory, Electromagnetic spectrum. Huygens' Explanation of Reflection, Refraction, interference and diffraction of plane waves at a plane surface, Optical Instruments-Microscope, Telescope, Formula for magnification of microscope, Astronomical and Terrestrial Telescopes.

B. Sound-Wave motion :Wave Motion, Longitudinal and transverse waves, Equation for a progressive wave, principle of superposition of waves, reflection of waves, Formation of waves on stretched string. Sound - Propagation of sound, Musical Instruments, Velocity of Sound in Gases, Solids & Liquids, Progressive & stationary waves, Characteristics of sound. Forced Vibrations, Natural Vibrations – Resonance with examples, standing waves in Organ Pipes, Open Pipes, Closed Pipes. Sound Reflection, Echoes, Absorption of sound waves, Reverberation – Reverberation Time. Fundamentals of building Acoustics, Sound Pollution.

C. Heat - Sources of Heat, Transmission of Heat, Heat and Temperature its Units, Measurement of Temperature, Fahrenheit and Centigrade scales, Different types of thermometers, Effects of Heat Expansion of solids, liquids, gaseous, Change of state, Calorimetry – specific heat of solids and liquids, calorific values of fuels, latent heat of fusion and latent heat of vaporization, Change of density with temperature, Examples in daily life. Expansion of liquids-coefficients of real and apparent expansion of liquids. Determination of coefficient of apparent expansion of liquid by specific gravity bottle method. Anomalous expansion of water, its significance in nature. Expansion of Gases-Volume and pressure coefficients of gases. Kelvin scale of temperature, Boyle's and Charles's laws. Ideal gas equation. Heat capacity, specific heat, experimental determination of specific heat by method of mixtures. Specific heat of gas (C_p and C_v), External work done by a gas during its expansion. Relation between C_p and C_v (derivation) Latent heat, Determination of latent heat of vaporization of water.

5. KINEMATICS AND DYNAMICS

Kinematics: Motion-Types of Motion, Speed, Velocity, Velocity-time and position-time graphs, Scalars and Vectors, laws of addition of vectors, subtraction of vectors. Acceleration, Newton's law's of Motion, Newtons Universal Gravitation, Centre of Gravity, Stability, Applications, Equations of Motion, Motion of a body under gravity – Acceleration due to Gravity "g", Equations of Motion for a Freely falling body, Equations of Motion for a body thrown upwards. Equations of Motion, applications and problems. DYNAMICS - Work, Power, Energy, Conservation of Energy and Transformation of Energy, Renewable and Non-Renewable sources of Energy, Impulse, Law of conservation of linear momentum, Potential Energy (PE), Kinetic Energy (KE). Relation between KE and Linear momentum. Circular Motion, uniform circular motion, angular displacement, angular velocity, and angular acceleration, relationship between linear velocity and angular velocity, centripetal and centrifugal force, torque, couple, vector representation of torques, Banking of Roads & Rail Tracks, Simple Harmonic Motion, Simple Pendulum, Law of conservation of energy in case of a simple pendulum. Elasticity - Elasticity and plasticity, stress and strain, Hooke's law, Moduli of elasticity. Fluid Mechanics Laws of Floatation, Principle of Buoyancy, pressure in a fluid. Stream line flow Bernoulli's theorem and its applications. Simple Machines and Moments Moment of a Force, Wheel and Axle, Screw Jack, Gears, Friction, Causes of friction, advantages of friction, disadvantages of friction, methods of reducing friction.

6. **MAGNETISM** - Natural and Artificial Magnets, Properties of Magnets, Magnetic Induction. Terrestrial magnetism, Magnetic field around a magnet, elements of terrestrial magnetism, Theory of Magnetism, Inverse square of magnetism, Magnetic field due to a bar magnet, Mapping of magnetic lines of force due to a bar magnet : neutral points, magnetic properties of materials. Coulomb's Inverse Square Law, Definition of Magnetic Field, Magnetic Lines of Force, Uniform and Non-Uniform Magnetic Fields. Couple acting on a bar magnet placed in a uniform magnetic field, Definition of magnetic moment of magnet. Magnetic Induction due to a bar magnet on axial and equatorial lines. Types of magnetic material, Para, Dia, and Ferro magnetism, Definition and properties.
7. **ELECTRICITY**
 Electrostatics - Electrification by friction, Charges, Coulomb's Law: Permittivity of Free Space and Medium, Electric Field – Electric lines of force, their properties – Electric intensity, Electrostatic Potential, Relation between electrostatic potential and electric intensity. Capacitance and capacitors, Dielectric constant, Condenser, its uses –Dielectric Strength – Effect of dielectric on capacitance of capacitors. Current electricity - Primary Cells-Series and Parallel connection-Electric circuits, Electrical Resistance, Ohm's Law and its verification, Ohmic and Non Ohmic elements, Resistance-Resistances in Series and Parallel, Heating Effects of Electric Current-Joule's Law, Faraday's Laws of Electrolysis, Magnetic Effects of Electric Current, Principle and Working of an Electric Motor, Electro – Magnetic Induction. Electric current – Flow of Electric charges in a metallic conductor – Drift velocity and mobility – Relation between electric current and drift velocity, Conductance, Electrical Energy – Power.
- 8.**ELECTROMAGNETISM** - Electromagnetic Waves, Spectrum Oersted's Experiment, Ampere's Law, Magnetic field near a long straight wire and magnetic field at the Center of a circular coil carrying current, Field on the axis of circular coil carrying current, Force on a moving charge in a magnetic field – Force on a current carrying conductor placed in a magnetic field. Force between two long straight parallel conductors carrying current, Definition of Ampere. Fleming's Left Hand Rule. Current loop as magnetic dipole, force and Torque on Current loop in an uniform magnetic field, magnetic dipole moment of a revolving electron. Electromagnetic induction, Magnetic Flux, Induced EMF, Faraday's and Lenz's Law. Fleming's Right Hand Rule, Self Inductance, Mutual Inductance, Principle of Transformer.
9. **MODERN PHYSICS** :
 Atomic physics - Discharge of Electricity through gases, X-rays. atomic structure, atomic number, atomic mass and mass defect, radioactivity, artificial transmutation. Discovery of electron – E/M of electron by Thomson's method. X-Rays- Production of X-Rays – Coolidge tube.
 Nuclear physics - Composition and size of nucleus, mass defect and binding energy and their relation. Radio Activity- Artificial Transmutation of elements, Nuclear Radiation Hazards, Protective shielding. Nuclear Fusion – Energy of sun and stars.
 Semi conductor devices - Band theory of solids, Intrinsic and Extrinsic Semiconductors, Junction Diodes and Transistors, Properties and Uses, Basic Principles of Working Intrinsic and Extrinsic semi conductors (n and p type).Junction diode – p-n junction, depletion layer and barrier potential, Forward and Reverse bias, Transistor Function of Emitter, base and Collector, p-n-p and n-p-n Transistors.
10. **COMMUNICATION SYSTEMS**: Computer-Parts of Computer-Uses of Computer, Telephone, Wireless System-Radio Broad Casting, Recording and Reproduction of Sound, Cine projector, Elements of communication systems

(block diagrams only), Television, Bandwidth of signals (speech TV and digital data) bandwidth of Transmission medium – Propagation of electromagnetic waves in the atmosphere sky and space wave propagation. Modulation – Need for modulation.

11. States of Matter - Gases and Liquids: Measurable Properties of Gases, Gas Laws, Graham's law of diffusion – Dalton's law of partial pressures, Avogadro's law, Ideal behavior, empirical derivation of gas equation, ideal gas equation, Kinetic molecular theory of gases, Kinetic gas equation (No derivation) – deduction of gas laws.
12. Atomic Structure: Matter – Its Structure, Cathode Rays, Canal Rays, Discovery of Neutron, Atomic Models – Arrangement of Sub Atomic Particles, Rutherford's model of atom and its drawbacks, Bohr's model of atom and its limitations, Sommerfeld's elliptical model, Sub Energy Levels – Quantum Numbers, Atomic Orbitals, Relative energies of the atomic orbitals, Electronic configuration of Atoms, Some Physical Quantities of Atoms, Nature of Electromagnetic Radiation, Planck's Quantum theory. Explanation of Photo electric effect. Features of Atomic Spectra. Characteristics of Hydrogen Spectrum. Bohr's explanation of Spectral Lines, Wave-particle nature of electron, De Broglie's hypothesis, Heisenberg's uncertainty principle, Important feature of the quantum mechanical model of an atom, Electronic configurations of atoms – Explanation of stability of half filled and completely filled orbitals.
13. Classification of Elements And Periodicity in Properties: Symbols and formulae, Radicals and their formulae, Chemical equation, Meaning, Calculations based on equations and relationship of reactants and products by weights, Classification of Elements, The Periodic Law, Modern Periodic Table, The significance of atomic number and electronic configuration, Classification of elements into s, p, d, f blocks and their characteristics, Period trends in physical and chemical properties of elements, Periodic trends of elements with respect to atomic radii, ionic radii, inert gas radii, ionization energy, electron gain energy, electro negativity, Valency, Variation of atomic radii in inner transition elements.

Alkali and Alkaline Earth Metals

Alkaline Earth Metals, Electronic configuration, occurrence, Trends in properties of alkaline earth metals, Reactions of alkaline earth metals, General methods of preparation of Alkaline Earth Metals, Anomalous properties of the first element in each group, Diagonal relationship. Trends in properties like ionization, enthalpy, atomic and ionic radii, reactivity with oxygen, hydrogen, halogens and water, uses, Preparation and properties of some important compounds by different methods: Sodium hydroxide, Salts of oxo acids, Sodium carbonate and Sodium hydrogen carbonate, Sodium chloride, Biological importance of sodium and potassium, CaO , CaCO_3 and CaSO_4 preparation and uses, Industrial uses of lime and lime stone, Biological importance of Mg and Ca

P-Block Elements; Group 15 Elements (VA)

Occurrence – physical states of Nitrogen and Phosphorous, allotropy, catenation, capacity, electronic configuration, oxidation states, General Characteristics of Hydrides, Structure of hydrides, General Characteristics of Oxides, General Characteristics of Halides, Oxoacids of Nitrogen, Oxoacids of Phosphorous, Preparation and uses of Nitric acid and Ammonia, Superphosphate of lime. Group 16 Elements: Group (VI A) Elements) : Extraction of Sulphur, Allotropic forms of Sulphur, Physical and Chemical properties of Sulphur, Uses of Sulphur, Preparation of Sulphur dioxide, Manufacture of Sulphuric acid, Properties of Sulphuric acid, Sulphuric acid as oxidizing and dehydrating agent, Laboratory preparation of Hydrogen Sulphide,

Properties of Hydrogen Sulphide, Occurrence, electronic configuration, oxidation states, Physical states of oxygen and sulphur and their structure, allotropy, General characteristics of hydrides, oxides and halides, Structural aspects of oxy-acids of halogens, Ozone, uses of ozone. Sodium thiosulphate, Sulphuric acid – industrial process of manufacture. Group 17 Elements : (Group VII A Elements) : Occurrence, electronic configuration and oxidation states, Physical states of halogens, I.P. Values, electro-negativity and electron affinity, bond energies, chemicals reactivity, oxidizing power of chlorine, Structural aspects of oxy acids of chlorine, Preparation, properties and uses of chlorine and bleaching powder. Hydrogen and its Compounds - Volumetric composition of water, Industrial and other uses of water, Laboratory preparation, Properties and Uses of Hydrogen including as a fuel, Laboratory preparation, Properties and Uses of Oxygen, Position of hydrogen in the periodic table, Occurrence, isotopes of hydrogen, Reactions of Hydrogen with different types of elements leading to ionic, molecular hydrides, Physical and Chemical properties of water and heavy water.

14. Chemical Bonding and Molecular Structure

Types of Bonds, Inter Molecular Attractions, Energy changes during a chemical reaction, Exothermic and Endothermic Relations, ionic bond, energy changes in ionic bond formation, Properties of ionic Compounds, Covalent Bond, Multiple Covalent Bonds, Shapes of some molecules. VSEPR theory, The valence bond approach for the formation of covalent bonds, Directional nature of covalent bond, Properties of covalent bond, Different types of hybridization involving s, p and d orbitals and draw shapes of simple covalent molecules, Definition of coordinate covalent bond with examples, Description of molecular orbital theory of homo nuclear diatomic molecules, Bonding, antibonding molecular orbitals, σ , π bond orbitals, their symmetry.

15. Chemical Kinetics, Energetics, Chemical Calculations And Stoichiometry

Chemical combination, Chemical decomposition, Chemical displacement, Chemical Double decomposition, Slow and Fast reactions, Rate of a Reaction, Factors affecting the reaction rate, Reversible and Irreversible Reactions, Law of conservation of mass, Law of definite proportions, Law of multiple proportions, Rate law, units of rate constant, Collision theory of reaction rates (elementary ideas), concepts of activation energy. Stoichiometry - Meaning of Chemical Equations, Thermochemical Equations, Problems Based on Equations, Laws of chemical combination, principles and examples, Molar mass, concept of equivalent weight with examples, Percentage composition of compounds and calculations of empirical and molecular formula of compounds, Oxidation number concept, Balancing of redox reactions by ion electron method and oxidation number method, Types of redox reactions, Applications of redox reactions in titrimetric quantitative analysis and redox reactions in electrode process, Numerical calculations based on equations. Equilibrium - Differences between Physical and Chemical change, Equilibrium in physical and chemical process, Dynamic nature of equilibrium, law of mass action, Equilibrium Constant, Factors affecting equilibrium.

16. Solutions, Acids And Bases

Solutions, Types, Solubility and Factors affecting concentration of solutions, Ionization of Substances in Water, Classification of solutions – Methods of expressing concentration of solutions – Molarity, Normality, Molality, Mole Fraction, Preparation of Acids and Bases, General properties of Acids and Bases, Arrhenius Theory, The Strengths of Acids and Bases, Neutralisation and Heat of Neutralisation, Ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionic product of water, Concept of pH., pH of some

common fluids, Common Salt, Electrolysis of brine, Chlorine, Properties of Chlorine, Uses of Chlorine, Hydrogen Chloride

17. Chemistry of Carbon Compounds

Allotropic forms of Carbon, Oxides of Carbon, Uniqueness of Carbon and Source of Carbon Compounds, Anomalous behavior of first element namely Carbon, Carbon-catenation, allotropic forms, physical and chemical properties and uses, Fuel gases – producer gas and water gas manufacture and uses.

Hydrocarbons -Classification : Alkanes – Nomenclature, isomerism, conformations, Methods of preparation of ethane, Physical properties, chemical reactions including free radical mechanism of Halogenation, combustion and Pyrolysis of Ethane, Cycloalkanes, preparation and properties of cyclohexane. Alkenes – Nomenclature, structure of double bond (Ethene), Geometrical isomerism, physical properties, Methods of preparation of ethylene, Physical properties, chemical reactions : Addition of hydrogen, halogen, Water, Hydrogen halides (Markownikoff's addition and Peroxide Effect), Ozonolysis, Oxidation, Mechanism of Electrophilic addition. Alkynes – Nomenclature, Structure of triple bond, Methods of preparation of acetylene, Physical properties, Chemical reactions: Acidic character of acetylene, addition reaction of hydrogens, halogens, hydrogen halides and water. Aromatic hydrocarbons - Introduction, IUPAC nomenclature; Benzene; Resonance, Aromaticity, Chemical properties : Mechanism of electrophilic substitution – Nitration, Sulphonation, Halogenation, Friedel Craft's alkylation and acylation; directive influence of functional group in mono-substituted benzenes; carcinogenicity and Toxicity.

18. Carbohydrates, Proteins, Vitamins & Lipids

Carbohydrates, Manufacture of Cane-sugar, Manufacture of Alcohol, Classification (aldoses and ketoses), Monosaccharides (glucose and fructose), Oligosaccharides (sucrose, lactose, maltose), Polysaccharides (starch Cellulose, Glycogen – Preparation, properties and structure, Importance. Proteins - Elementary idea of amino acids, peptide bond, Poly peptides, Proteins, Primary Structure, secondary structure, Tertiary structure and quaternary structure (qualitative ideas only), De-naturation of proteins, enzymes. Vitamins - Classification, Functions in biosystems. Lipids - Classification, structural features, Functions in biosystems.

19. Chemistry & Industry

Uses of Oils and Fats, Hydrogenation of Oils, Manufacture of Soap, Portland Cement, Glass Industry, Plastics, Adhesives and Man-made Fibres, Cosmetics, Dyes, Drugs and Pharmaceuticals, Petroleum Industry, Common Fertilizers, Classification of polymers, Addition, condensation, copolymerization, Natural rubber, vulcanization of rubber, synthetic rubber

Molecular weights of polymers – number average and weight average, molecular weights – definitions only, Bio-Polymers, bio-degradable polymers

Some commercially important polymers like polythene, nylon, polyesters and Bakelite

20. General Principles Of Metallurgy

Occurrence and Relative Abundance of metals in earth's crust, The Metallurgy of Iron & Extraction, Protection of Metals and Prevention of Corrosion, Principles and methods of extraction – concentration, reduction by chemical and electrolytic methods and refining

21. Environmental Chemistry

Pollution : Air, Water and Soil Pollution, Oxides of Carbon, Carbon Monoxide, Oxides of nitrogen and Sulphur, Chlorofluoro carbons, Chemical reactions in atmosphere, smogs, major atmospheric pollutants, acid rain, Ozone and its reactions, effects of depletion of ozone layer, Green house effect and global

warming, Pollution due to industrial wastes, Green chemistry as an alternative tool for reducing pollution with two examples.

Methodology

1. The Nature of Science: Nature and scope of science, Science, ideology and Society, Structure of Science (a) Substantive structure – Empirical knowledge, Theoretical Knowledge – (Facts, Concepts, hypothesis, theory, Principle Law), (b) Syntactic Structure of Science – Scientific inquiry, Processes of Science, Attitudes of inquiry
2. The History and Development of Science: A brief introduction to oriental and western science, Contribution of the following Scientists in the Development of Science: Aryabhata, Bhaskara Charya, Aristotle, Copernicus, Newton, Einstein, C.V. Raman, Various organizations working for the development of science in India
3. Aims and Values of teaching Physical Sciences: Aims of teaching Physical Sciences, Values of teaching Physical Science, Correlation of Physics and Chemistry with other subjects
4. Objectives of teaching Physical Sciences: Meaning and importance of objectives, Bloom's Taxonomy of Educational objectives, Specific / Behavioral objectives / (Instructional objectives), Critique on Bloom's Taxonomy
5. Approaches and Methods of teaching Physical Sciences: Inductive and Deductive Approaches, Micro Teaching, Team Teaching, Lecture Method, Lecture cum Demonstration Method, Historical Method, Heuristic Method, Project Method, Laboratory method, Problem Solving Method, Scientific Method, Multimedia Approach in Teaching Learning process, Programmed Learning, CAI and CAL
6. Planning for effective instruction in Science: Year Plan, Unit Plan, Lesson Plan, Learning experience, characteristics, classification, source and relevance.
7. Teaching Learning Material (TLM): Characteristics and Importance of TLM, Classification and Types of TLM, Hardware and Software in TLM, TLM-Principles to be followed, Edgar Dale's cone of learning experience.
8. Science laboratories: Importance of Practical work in science, Planning of Science laboratories, Procurement, care and maintenance of laboratory equipment, Registers, Management of safety and science kits, Development of improvised Apparatus.
9. Physical Science Curriculum: Principles of Curriculum Construction, Defects in the existing school science curriculum, Qualities of a good Science Text Book.
10. Non-formal Science Education: Science Clubs, Science Fairs – purposes, levels, organization, advantages, Science Library, Role of NGOs and State in popularizing Science
11. Evaluation: Concept and Process of Evaluation, Tools of Evaluation, Preparation of Scholastic Achievement Test (SAT), Analysis and interpretation of Scores

V(b). MATHEMATICS (Content and Methodology) (Marks: 15)

CONTENT

1. **Number system:** Whole numbers, place value, comparison, fundamental mathematical operations ; Addition, Subtraction, Multiplication and Division, Indian Currency, Prime and Composite numbers, Prime factors, Lowest Common Multiple (LCM) and Greatest Common Multiple (GCM).
2. **Fractions:** Concept of fractions, proper fractions, improper fractions, mixed fractions, decimal fractions, comparison, addition, subtraction, multiplication, division of fractions and decimal fractions. Use of fractions in daily life. Rational Numbers; definition, four fundamental operations; properties of numbers (N, W, Z and Q), Square, Square root, Cube, Cube root, and factorization.
3. **Arithmetic:** Unitary method, Ratio & Proportion, percentages, average, profit – loss.
4. **Geometry:** Rotation, Types of Angles, Construction and measurement of Angles, line, axis, shapes, reflection and symmetry.
5. **Measurements:** Length, Weight, Capacity, Time, Perimeter and Area, their standard units and relation between them.
6. **Data Applications:** Introduction to Data, data presentation, Bar graph.

Methodology

1. Meaning, Nature and Definitions of Mathematics
2. Correlation with other school subjects and daily life.
3. Aims, values and instructional objectives of teaching Mathematics
4. .Child Centered and Activity Based Approaches in Teaching Mathematics
5. Methods of Teaching & Remedial measures in Mathematics
6. . Instructional Material, TLM and Resource Utilization in Mathematics
7. . Curriculum, Text Book & Instructional Planning
8. Evaluation, tools of evaluation and Continuous Comprehensive Evaluation

V (c) BIOLOGICAL SCIENCE (Content and Methodology) (Marks: 15)

CONTENT

1. **Biology:** Its importance in everyday life, contribution of scientists, different branches.
2. **Living World – Characteristics:** Classification of Plants and Animals and their characteristics.
 - a) **Cell:** Concept, Cell theory, differences between Plant cell and Animal cell, Cell division.
 - b) **Tissues –** Animal tissues.
3. **Plant World – Types of plants:** Parts of a plant – their functions
Reproduction – Asexual, Sexual, Vegetative propagation, Nutrition, Photosynthesis, Excretion, Respiration
Economic importance of Plants, Agriculture, Crop diseases & pest control measure.
4. **Animal World:** Organ systems and their functions including man
Digestive system, Respiratory system, Circulatory system, Excretory system, Nervous system, Reproductive system, Sense organs in man, Nutrition
Deficiency diseases in man, First Aid
Economic importance of Animals, Animal husbandry, Pisciculture, Sericulture.
5. **Microbes:** Bacteria, Viruses, Fungi, Protozoan
useful and harmful, microbial diseases in plants & animals
6. **Our Environment:** Biotic & Abiotic factors, Natural resources
7. **Recent trends in Biology:** -Hybridization, Genetic engineering, Gene banks, Gene therapy, Tissue culture

Methodology

1. Definition, Nature, Structure and History of Science
2. Aims, Values and Instructional Objectives of teaching Science
3. Method of Teaching Science
4. Instructional Material in Teaching Science – TLM in Science.
5. Instructional Planning
6. Science Laboratory
7. Science Teacher - Changing Roles
8. Science Curriculum and its transaction
9. Science Textbook.
10. Evaluation – CCE - Designing, Administration, Analysis, Scholastic Achievement Test (SAT)