Government of Andhra Pradesh

ENDOWMENTS DEPARTMENT

NOTIFICATION NO.01/2023

ENGAGING ASSISTANT EXECUTIVE ENGINEERS & TECHNICAL ASSISTANTS ON CONTRACT BASIS

Applications are invited from eligible candidates for the following posts in A.P. Endowments Department on contract basis for a period of 5 years:

Assistant Executive Engineers		Technical Assistants	
AEE (Civil)	35 Posts	Technical Assistants- Civil	30 Posts
AEE (Electrical)	5 Posts		
Eligibility	Graduate or equivalent in respective branch of Engineering Upper age limit - 42 years	Eligibility	LCE Diploma issued by the Board of Technical Education or an equivalent qualification Upper age limit - 42 years

For age relaxation conditions, Application form & other details, visit: **www.escihyd.org/**

Convener,
Recruitment Services, PED, ESCI
Contact Nos.: 040–66304170 to 76

Commissioner
A.P. Endowments Department.

GOVERNMENT OF ANDHRA PRADESH

Endowments Department

NOTIFICATION NO.01/2023

ENGAGING ASSISTANT EXECUTIVE ENGINEERS & TECHNICAL ASSISTANTS ON CONTRACT BASIS

Applications are invited from the eligible and interested candidates from the state of Andhra Pradesh only to the post of AEE (Civil), AEE (Electrical) and Technical Assistant (Civil) on Contractual basis through conducting written test. Last date for receipt of applications is **5th January, 2024** a candidate should possess the requisite qualification as on the date of notification.

The Endowments Department is not responsible for incomplete applications and once fee paid shall not be refundable. The Endowments Department is having right to cancel the notification / postpone the selections / Interviews / written tests if any, without any intimation to the candidates on administrative reasons.

Persons professing Hindu Religion should only Apply.

DETAILS OF THE VACANT POSTS

A. i. Name of the post : AEEs(Civil) & - 35 vacancies
ii. Name of the post : AEEs No. of Posts (Electrical)- 05 vacancies
Total= 40 vacancies.

Cadre	Category	No. of vacancies
Assistant Executive Engineer (Civil)	Other Castes	15
	BC Category	9
	SC	5
	ST	3
	EWS	3
	Total (Civil)	**35**
Assistant Executive Engineer (Electrical)	Other Castes	**3**
	BC(A)	**1**
	SC	**1**
	Total (Electrical)	**5**

Eligibility for AEE(Civil)	Must possess B.E./B.Tech degree (Civil)/ of a university in India established or incorporated by or under a central Act, provincial Act or a State Act or an institution recognized by the University Grants Commission or AMIE or an equivalent qualification.
Eligibility for AEE(Electrical)	Must possess B.E./B.Tech degree (Electrical) of a university in India established or incorporated by or under a central Act, provincial Act or a State Act or an institution recognized by the University Grants Commission or AMIE or an equivalent qualification.
Remuneration (consolidated pay)	Rs.35000/- per month +(Annual increment Rs.1000/-) Extra Allowances: Rs.2000/- for travel allowance & Rs.1000/-phone charges

B. **Name of the post :Technical Assistant (Civil)**
No. of vacancies : 30vacancies.

Cadre	Category	No. of vacancies
Technical Assistant (Civil)	Other Castes	13
	BC	8
	SC	5
	ST	2
	EWS	2
	Total	**30**

Eligibility for Technical Assistant (Civil)	Must possess LCE Diploma issued by the Board of Technical Education or an equivalent qualification there to(G.O.Ms.No.829 Revenue (Endts.III) Dept., Dated 16.11.2000)
Remuneration (consolidated pay)	Rs.25000/- per month +(Annual increment Rs.1000/-) Extra Allowances: Rs.2000/- for travel allowance & Rs.1000/-phone charges
Category of Candidate	**Age and its concessions for AEE(Civil), AEE(Electrical) and Technical Assistant (Civil)**
General	The upper age limit is 42 years as on the 1st July of notification year, as per the AP State and subordinate service rules.
SC/ST/BC's/EWS	5 Years
Ex-servicemen	Shall be allowed to deduct from his age a period of **3 years** in

NCC (Who have worked as Instructor in N.C.C.)	addition to the length of service rendered by him in the armed forces / NCC. As per the APSS Service Rules: (i) a person who worked in the armed forces of the Indian Union shall be allowed to deduct from his age a period of three years in addition to the length of service rendered by him in the armed forces for purposes of the maximum age limit. (ii) a person who was recruited as whole – time Cadet Corpse Instructor on or after the 1st January,1963 on his discharge from the NCC either before or after the expiry of the initial or extended tenure of his office in NCC having served for a period of not less than 6 months prior to his release from the NCC shall, subject to the production of a certificate to effect that he has been released from the NCC be allowed to deduct from his age a period of three years in addition to the length of service rendered by him in the NCC for purpose of maximum age limit; Provided that the person referred to in sub- rules (i) and (ii) above shall, after making the deductions referred on in the sub- rules shall not exceed the maximum age limit prescribed for the post.
	(iii) A person already in Endowments Department service, who has been appointed contractual basis/ outsourcing basis shall be allowed to deduct from his age the length of contractual service under the State Government upto a maximum of five years for purpose of the maximum age limit and in the case of a person who has rendered minimum temporary service of six months in the Census Department (Organization) of his State and who has been retrenched during1991shall be allowed to deduct from his age a period of three years for purpose of computing the maximum age limit. (iv) Weightage of marks will be added to the person who are already working in Endowments Department services.
Eligibility criteria of candidates from outside (non-local)of Andhra Pradesh/ Telangana (Migrated to AP) eligible for these posts	As per APPSC, "Candidates who migrated from Telangana to Andhra Pradesh between 2nd June, 2014 and 1st June, 2021 as per G.O.Ms.No.130, General Administration (SPF&MC) Department, dated.29.10.2019 and as per terms laid down in circular memo no.4136/SPF & MC/2015-5, Dated.20.11.2017of Government of Andhra Pradesh shall obtain the Local Status Certificate from competent authority and produce at the time of verification" is considered as local candidate.
Selection Methodology **of Written Examination**	i. Medium of Examination – English ii. 100 Questions Paper- Multiple Choice Questions to be marked on OMR sheet. 10 Marks – English Language, 10 Marks – General Knowledge,

80 Marks- Technical (as prescribed in syllabus).

iii. Duration : 3 hrs(180 minutes).

iv. Centre : **Vijayawada, Andhra Pradesh.**
(Venue details will be informed)

v. Hall tickets will be dispatched one week in advance.

General Instructions:

a. Original valid I.D Proof of the candidate issued by the Government is required before entering the examination hall.
b. Candidate must report to examination centre one hour before the scheduled time of the examination
c. Calculator is permitted.
d. Mobile phone, Electronic watch, Bluetooth any kind transmitter / receiver and other electronic gadgets are STRICTLY PROHIBITED in the Examination Hall.
e. Candidate should get their Pencils& Eraser to fill in the OMR forms. The question paper booklet should be returned to the invigilator along with the OMR sheet after completing the examination.
f. Avoid bringing valuable items which are not allowed in the examination center as the authorities are not responsible for safe keeping of them.
g. Candidates will be permitted to appear for the examination ONLY after verification of credentials by Center officials & after frisking to ensure that no prohibited articles are carried.
h. Candidates will be permitted to occupy their allotted seats 30 minutes before the scheduled start of the examination.
i. No candidate will be allowed to enter the Examination Hall after closing the gate.
j. Candidates should only carry his/her hall ticket, Valid identification card and BLUE/BLACK BALLPOINT PEN, inside the examination hall. Rough sheets will be provided at examination hall by the invigilator.
k. Candidates are prohibited from communicating, consulting, conversing with other candidates or adopting agitation tactics in and around the examination Hall such as raising of slogans, causing disturbance in any manner whatsoever during the examination. Candidates are expected to behave in orderly and disciplined manner while taking the examination. In case of disorder / rowdy behavior / trying to use **unfair means** during examination, an F.I.R will be lodged with Police Station concerned apart from disqualifying his / her candidature.

	l. Admission to Examination is provisional, subject to the confirmation / satisfaction of conditions of Notification No. 1/2023, and also subject to satisfying the eligibility criteria and verification of required certificates at a later stage. Admission / Appearing to the examination does not confer ipso facto any right for recruitment / selection. m. Hall Ticket must be preserved by the candidate till the final conclusion of the process of Recruitment.
Application Fee	Application Fee: Rs. 500/- Demand Draft drawn in favour of **IE(I)-Engineering Staff College of India"** payable at Hyderabad should be enclosed along with the application form. Application fee is non-refundable.
Syllabi	i. **For AEEs (Civil & Electrical):** GATE Syllabus will be followed excluding Higher Mathematics topic. ii. **For Technical Assistants (Civil):** Syllabus is enclosed (click on the link)

The Selection Committee reserves the right to change the modalities, if feel fit.

S Satyanarayana,
Commissioner.

Application No: ESCI/PED/AEE/CSR-_____

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

APPLICATION FORM

FOR THE POST OF ASST. EXECUTIVE ENGINEER (CIVIL / ELECTRICAL) IN A.P ENDOWMENTS DEPARTMENT ON CONTRACT BASIS

1.	Name in Full (BLOCK LETTERS)																		Affix a recent Passport size Self attested photo
	As per S S C																		
2.	Name of Father (BLOCK LETTERS)																		

3.	Gender :		4.Marital Status	

5.	Postal Address :																		
											Pin:								

6.	e-Mail id & Mobile:									M:									
7.	Permanent Address																		

8.	Date of Birth	D	D	M	M	Y	Y	Y	Y	9. Age as on dt: 1/07/2023		10. Nationality							
11.	Aadhaar No.															12. Native Place			

13.	Religion :	(Only Hindus are eligible as per conditions)

14.	Caste /Sub-caste:	SC		ST		BC		EWS	Other Caste
						Category			

15. Whether physically handicapped : Yes / No

16. Are you a Ex-service Men / NCC : Yes / No

17. Are you working / worked in AP Endowment Department: Yes / No

If yes, Furnish Details: (Attach Proof)

18. Are you a Retrenched employee of Census Department: Yes / No

If yes, provide necessary proof:

19. Educational Qualifications:

Particulars	College / university / Institution	Year of Passing	Percentage of Marks	Class / Division
SSC				
Intermediate				
Graduation (BE / B.Tech / AMIE)				
Post Graduation (Specialization)				
Others				

20. Experience:

Name of Organization	Designation	Period	
		From	To

Declaration

I hereby declare that I have carefully read and understood all the instructions of the Advertisement and that all entries in this form as well as the attachments are true to the best of my knowledge. If at any point of time it is found that incorrect information has been furnished by me or there has been suppression of fact by me, my candidature shall be summarily rejected or if in the employment, I shall be terminated immediately.

Note: Incomplete and / or erroneous applications will be rejected. If any query is not applicable to you, please write NA against it.

Date: _____ / _____ / __ _____

Place: _____ **(Signature of Applicant)**

Hall Ticket for Witten Examination

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

FOR THE POST OF ASST. EXECUTIVE ENGINEER (CIVIL / ELECTRICAL)
IN A.P ENDOWMENTS DEPARTMENT ON CONTRACT BASIS

Hall Ticket No.

Time & Date :_____

Test Centre: _____

(To be filled in by the candidate in his / her own handwriting and to be submitted along with the Application Form)

Candidate's Name (BLOCK LETTERS)		**Latest Passport size photograh to be affixed and duly self-attested.**
Father's Name		
Address:		
Email id & Mobile No.		

Signature of the Convener **Signature of the Candidate**

Instructions :

1. Original I.D, Proof of the candidate issued by the Government is required before entering the examination hall.
2. Candidate must report one hour before the scheduled time of the examination .
3. Calculator is permitted .
4. Mobile phone, Electronic watches, and any other electronics devices are **Strictly prohibited** in the Examination Hall.
5. Candidate should get BLUE/BLACK BALLPOINT PEN to fill in the OMR circles. Bubbling with Ink pen/Gel pen/Pencil is not permitted

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Hall Ticket for Written Examination

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

FOR THE POST OF ASST. EXECUTIVE ENGINEER (CIVIL / ELECTRICAL)
IN A.P ENDOWMENT DEPARTMENT ON CONTRACT BASIS

Hall Ticket No.

Time &Date :_____

Test Centre : _____

(To be filled in by the candidate in his / her own handwriting and to be submitted along with the Application Form)

Candidate's Name (BLOCK LETTERS)		**Latest Passport size photograh to be affixed and duly self-attested.**
Father's Name		
Address:		
Email id & Mobile No.		

Signature of the Convener **Signature of the Candidate.**

Instructions :

1. Original I.D, Proof of the candidate issued by the Government is required before entering the examination hall.
2. Candidate must report one hour before the scheduled time of the examination .
3. Calculator is permitted .
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LIST OF ENCLOSURES WITH APPLICATION FORM

A. D.D. No. _____ date: _____ towards fees of Rs.500/- in favour of **IE(I)-Engineering Staff College of India"** payable at Hyderabad.

B. Photocopies of following documents shall invariably be submitted

1. Age: Proof of age as recorded in SSC certificate or equivalent
2. Provisional / Original Degree Certificate
3. Technical and other qualifications if any
4. Latest Caste Certificate
5. Adequate proof of certificates for claiming reservation.
6. Latest Income proof certificate for EWS reservation
7. Aadhaar Card

C. One self-addressed envelope (10" x 4 ½ ")to be attached with application form.

FILLED IN APPLICATION FORMS ALONG WITH ENCLOSURES

SHALL BE SENT TO THE FOLLOWING ADDRESS

Post Box No.

The Convener,
Recruitment Services,
Power & Energy Division
Engineering Staff College of India,
Old Bombay Road, GachiBowli,
Hyderabad– 500 032.

Application No: ESCI/PED/TA /CSR-_____

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

APPLICATION FORM

FOR THE POST OF TECHNICAL ASSISTANT (CIVIL)
IN A.P ENDOWMENTS DEPARTMENT ON CONTRACT BASIS

1.	Name in Full (BLOCK LETTERS)																		Affix a recent Passport size Self attested photo
	As per S.S.C																		
2.	Name of Father (BLOCK LETTERS)																		

3.	Gender :		4.Marital Status	

5.	Postal Address :																		
												Pin:							

6.	e-Mail id & Mobile:										M:								
7.	Permanent Address																		

8.	Date of Birth	D	D	M	M	Y	Y	Y	Y	9. Age as on dt: 1/07/2023		10. Nationality							
11.	Aadhaar No.															12. Native Place			

13.	Religion :	(Only Hindus are eligible as per conditions)																	

14.	Caste/Sub-caste:	SC		ST		BC		EWS		Other Caste									
						Category													

15. Whether physically handicapped : Yes / No

16. Are you a Ex-service Men / NCC : Yes / No

17. Are you working / worked in AP Endowment Department: Yes / No

If yes, Furnish Details: (Attach Proof of duration of service)

18. Are you a Retrenched employee of Census Department: Yes / No

If yes, provide necessary proof:

19. Educational Qualifications:

Particulars	College / university / Institution	Year of Passing	Percentage of Marks	Class / Division
S.S.C				
L.C.E Diploma / equivalent qualification				
Any Other Qualifications				

20. Experience:

Name of Organization	Designation	Period	
		From	To

Declaration

I hereby declare that I have carefully read and understood all the instructions of the Advertisement and that all entries in this form as well as the attachments are true to the best of my knowledge. If at any point of time it is found that incorrect information has been furnished by me or there has been suppression of fact by me, my candidature shall be summarily rejected or if in the employment, I shall be terminated immediately.

Note: Incomplete and / or erroneous applications will be rejected. If any query is not applicable to you, please write NA against it.

Date: _____ / _____ / __

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Place: _____ **(Signature of Applicant)**

Hall Ticket for Written Examination

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

FOR THE POST OF TECHNICAL ASSISTANTS (CIVIL)
IN A.P ENDOWMENTS DEPARTMENT ON CONTRACT BASIS

Hall Ticket No.

Time & Date :_____

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Candidate's Name (BLOCK LETTERS)		**Latest Passport size photograph to be affixed and duly self-attested.**
Father's Name		
Address:		
Email id& Mobile No.		

Signature of the Convener **Signature of the Candidate**

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Hall Ticket for Written Examination

Engineering Staff College of India (ESCI)

Autonomous Organ of the Institution of Engineers (India)
Old Bombay Road, Gachi Bowli, Hyderabad – 500 032

FOR THE POST OF TECHNICAL ASSISTANTS (CIVIL)
IN A.P ENDOWMENT DEPARTMENT ON CONTRACT BASIS

Hall Ticket No.

Time & Date :_____

Test Centre : _____

(To be filled in by the candidate in his / her own handwriting and to be submitted along with the Application Form)

Candidate's Name (BLOCK LETTERS)		**Latest Passport size photograph to be affixed and duly self-attested.**
Father's Name		
Address:		
Email id & Mobile No.		

Signature of the Convener **Signature of the Candidate**

Instructions :

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B. Photocopies of following documents shall invariably be submitted

1. Age: Proof of age as recorded in SSC certificate or equivalent
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FILLED IN APPLICATION FORMS ALONG WITH ENCLOSURES

SHALL BE SENT TO THE FOLLOWING ADDRESS

Post Box No.

The Convener,
Recruitment Services,
Power & Energy Division
Engineering Staff College of India,
Old Bombay Road, GachiBowli,
Hyderabad– 500 032.

Application Form
For
Economically Weaker Section Income Certificate
For the Financial year _____

*Affix Your Passport Size Photo Here

Applicant Details:

Applicant Name*: Father Name*:

Gender*: Date of Birth:

Aadhaar Number (optional):

Caste Category*: Sub Caste Category*:

Present Address:

Door No*: Locality/Landmark:

State*:

District*: Mandal*: Village*: Pincode*:

Postal Address is same as Permanent Address:

Door No*: Locality/Landmark:

State*:

District*: Mandal*: Village*: Pincode*:

Mobile Number*: Mail Id:

Ration Card Number:

Income Details*:

Gross Annual Income includes Salary, Agriculture, Business, Profession etc., for the financial year prior to the year of application (Applicant/His/Her Family*):_____ (In Rupees)

Assets Information (Applicant/ His/Her/Family*):

i) 5 Acres of agricultural Land and above : **Yes/No**
ii) Residential flat of 1000 sq. ft. and above: **Yes/No**
iii) Residential plot of 100 sq. yards and above in notified municipalities: **Yes/No**
iv) Residential plot of 200 sq. yards and above in areas other than the notified municipalities: **Yes/No**

Note : The term "**Family** " for this purpose will include the person who seeks benefit of Reservation , His/Her parents and siblings below the age of 18 years as also His/Her spouse and children below the age of 18 years.

<u>Documents to be uploaded</u>:

i) Application Form*
ii) Ration Card/Epic Card/Aadhaar Card*
iii) Copy of IT Returns/Pay Slips (Any of other Documents)
iv) Affidavit

Note:

- ☑ *I hereby declare that the above mentioned information is furnished on best of my knowledge. If information & declaration is found false, I am liable for prosecution.
- ☑ I don't belong to SC, ST and OBC Caste.

* Represents all the fields are mandatory.

Date: Signature of the Applicant

GATE Syllabus (Civil Engineering)

Section 2: Structural Engineering

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural Steel –Composition, material properties and behaviour; Concrete - Constituents, mix design, short term and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete beams.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis -beams and frames.

Section 3: Geotechnical Engineering

Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; One dimensional consolidation, time rate of consolidation; Shear Strength, Mohr’s circle, effective and total

shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths.

Foundation Engineering: Sub-surface investigations - Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine andCoulomb; Stability of slopes – Finite and infinite slopes, Bishop's method; Stress distributionin soils – Boussinesq's theory; Pressure bulbs, Shallow foundations – Terzaghi's andMeyerhoff's bearing capacity theories, effect of water table; Combined footing and raftfoundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations-dynamic and static formulae, Axial load capacity of piles in sands and clays, pile load test, pileunder lateral loading, pile group efficiency, negative skin friction.

Section 4: Water Resources Engineering

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energyequations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipenetworks; Concept of boundary layer and its growth; Concept of lift and drag.

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes;Dimensional analysis and hydraulic similitude; Channel Hydraulics - Energy-depthrelationships, specific energy, critical flow, hydraulic jump, uniform flow, gradually varied flowand water surface profiles.

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed,infiltration, unit hydrographs, hydrograph analysis, reservoir capacity, flood estimation androuting, surface run-off models, ground water hydrology - steady state well hydraulics andaquifers; Application of Darcy's Law.

Irrigation: Types of irrigation systems and methods; Crop water requirements - Duty, delta,evapo-transpiration; Gravity Dams and Spillways; Lined and unlined canals, Design of weirson permeable foundation; cross drainage structures.

Section 5: Environmental Engineering

Water and Waste Water Quality and Treatment: Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment.

Sewerage system design, quantity of domestic wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications.

Air Pollution: Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle energy recovery, treatment and disposal).

Section 6: Transportation Engineering

Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments.

Geometric design of railway Track – Speed and Cant.

Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.

Highway Pavements: Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes

Traffic Engineering: Traffic studies on flow and speed, peak hour factor, accident study, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic signs; Signal design by Webster's method; Types of intersections; Highway capacity.

Section 7: Geomatics Engineering

Principles of surveying; Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement - Levelling and trigonometric levelling; Traversing and triangulation survey; Total station; Horizontal and vertical curves.

Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS.

GATE Syllabus (Electrical Engineering)

Section 2:

Electric circuits Network elements:

ideal voltage and current sources, dependent sources, R, L, C, M elements; Network solution methods: KCL, KVL, Node and Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and Maximum Power Transfer theorem; Transient response of dc and ac networks, sinusoidal steady-state analysis, resonance, two port networks, balanced three phase circuits, star-delta transformation, complex power and power factor in ac circuits.

Section 3:

Electromagnetic Fields:

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

Section 4:

Signals and Systems:

Representation of continuous and discrete time signals, shifting and scaling properties, linear time invariant and causal systems, Fourier series representation of continuous and discrete time periodic signals, sampling theorem, Applications of Fourier Transform for continuous and discrete time signals, Laplace Transform and Z transform. R.M.S. value, average value calculation for any general periodic waveform

Section 5:

Electrical Machines:

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring and generating mode of operation and

their characteristics, speed control of dc motors; Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines.

Section 6:

Power Systems:

Basic concepts of electrical power generation, ac and dc transmission concepts, Models and performance of transmission lines and cables, Economic Load Dispatch (with and without considering transmission losses), Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per- unit quantities, Bus admittance matrix, Gauss- Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential, directional and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

Section 7:

Control Systems:

Mathematical modelling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Stability analysis using RouthHurwitz and Nyquist criteria, Bode plots, Root loci, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, Solution of state equations of LTI systems

Section 8:

Electrical and Electronic Measurements:

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multi-meters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis. Section 9: Analog and Digital Electronics Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: biasing, equivalent circuit and

frequency response; oscillators and feedback amplifiers; operational amplifiers: characteristics and applications; single stage active filters, Active Filters: Sallen Key, Butterwoth, VCOs and timers, combinatorial and sequential logic circuits, multiplexers, demultiplexers, Schmitt triggers, sample and hold circuits, A/D and D/A converters.

Section 10:

Power Electronics:

Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost Converters; Single and threephase configuration of uncontrolled rectifiers; Voltage and Current commutated Thyristor based converters; Bidirectional ac to dc voltage source converters; Magnitude and Phase of line current harmonics for uncontrolled and thyristor based converters; Power factor and Distortion Factor of ac to dc converters; Single-phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.

GOVERNMENT OF ANDHRA PRADESH

Endowments Department

Syllabus for Written Exam for
TECHNICAL ASSISTANTS ON CONTRACT BASIS

Qualification: DIPLOMA

1) SOLID MECHANICS:

i) Forces: Different types of forces, gravitational, frictional, axial, tensile or compressive. Law of Parallelogram and triangle of forces, polygon of forces, problems.

ii) Centre of gravity and moment of inertia. Simple plane figures, Simple machines, law of machine, Mechanical advantage, velocity ratio and efficiency, wheel and axle, pulleys and simple screw jack-problems.

iii) Simple Stresses and strailns: Different types of stresses and strains, stress-strain diagram for ductile materials. Factor of safety, ultimate strength and working strength, elastic constants, Poisson ratio. Deformations, volume changes. Relations between elastic constants. Hooke's Law. Compound rods, temperature stresses, strain energy, impact loading.

iv) Riveted and welded joints, different modes of failures, efficiency of joints, thin cylindrical shells, longitudinal and circumferential stresses and volume changes.

v) Shear force and bending moment diagrams for simply supported, over hanging and cantilever beams. Relation between intensity of loading, shear force and bending moment.

vi) Theory of simple bending: Assumptions, basic flexure formula, bending stresses, modulus of section, moment of resistance. Circular bending. Distribution of shear stress in common structural sections.

vii) Deflection in cantilever and simply supported beams under simple loading-propped cantilever beams subjected to simple loading, determination of reaction. SF and BM diagrams.

viii) Simple plane and pin-jointed trusses: Stresses by method of joints and method of sections.

ix) Torsion: Assumptions, basic formula of torsion, power transmission by shafts of uniform circular sections close-coiled springs, strain-energy in simple beams and shafts, sudden and impact loading. Principal stresses and principal planes. Moher's circle of stress.

x) Thin cylinders under internal pressure stresses and volume changes.

xi) Columns and struts: Direct and bending stresses, core of section. Short and long columns under axial loading-various end-conditions. Euler and Rankine formulae, Slenderness ratio, simple built-up columns.

2) FLUID MECHANICS:

i) Introduction: Scope of hydraulics in Engineering. Definition and properties of fluid.

ii) Fluid pressure and its measurement: Atmospheric pressure, Gauge pressure and absolute pressure. Piezometer, Manometer-U-tube, Inverted U-tube, and differential manometers.

iii) Pressure on plane surface immersed in liquid-Horizontal, vertical and inclined plane surface.

iv) Flow of fluids: Type of flow-uniform flow, non-uniform flow, streamline flow, Turbulant flow, steady flow and unsteady flow, Energies in fluid motion-Datum head, pressure head and velocity head. Total energy of fluid in motion - Bernoulli's theorem. Practical application of Bernoulli's theorem - flow measurement- pitot tube venturimeter - Orificemeter.

treatment units, principles and design of septic tanks, disposal of septic tank effluent; Common Effluent Treatment Plants, Zero liquid discharge;
Disposal of products of sewage treatment; Sludge handling, treatment and disposal; self purification of streams; Building drainage, Plumbing Systems; Rural and semi-urban sanitation;
Urban storm water management, Impact of storm water, Management of storm water runoff, design of storm water drainage systems;

ii) Air and Noise Pollution

Air pollution, classification of air pollutants, sources and effects of air pollution, Factors influencing air pollution, air quality standards; Meteorology and air pollution; Wind roses, lapses rates, mixing depth, plume behaviour, effective stack height; Monitoring of air pollution; air pollution dispersion, estimation of ground level concentration of air pollutants; Engineered systems for air pollution control: control of particulate matter and gaseous pollutants;
Noise pollution, characteristics, sources of noise pollution, measurements of noise, impacts of noise pollution; Noise pollution monitoring, standards; control measures;

5.(i) Solid Waste Management

Sources of solid waste, classification, characteristics, generation, on-site segregation and storage, collection, transfer and transportation of solid waste; principles and engineering systems for solid waste management, treatment and processing of solid waste; landfills and their classification, principles, design and management of landfills; Leachate management, disposal of solid waste;
Hazardous waste characteristics, handling, storage, collection and transportation, treatment and disposal; e-waste: sources, collection, treatment and reuse;

ii) Environmental Impact Assessment (EIA) and Sustainable Development

Objectives and concepts of EIA, types of EIAs, components of EIA, framework of EIA, policies and legal provisions of EIA in India; Planning of EIA studies, methodology for identification of impacts on environment; Environmental settings, indices, prediction and assessment of impacts, mitigation aspects; Environmental Impact Statement; Environmental Management Plan, preparation, implementation, and review; public participation in EIA, review and evaluation of EIA; Environmental audit; Environmental protection acts of India.
Ecosystems, classification of ecosystems, structural and functional interactions of environmental ecosystems; Ecosystem stability, biogeochemical cycles, nutrient cycles, ecological niche and ecotone, pesticides and bioaccumulation, water pollution, soil pollution, wetlands, methods for conservation of biodiversity;
Sustainable Development, objectives and principles of sustainable development, indicators of Sustainability; Strategies and barriers to sustainability, clean development mechanism, carbon credit, carbon sequestration, carbon trading, Life Cycle Assessment (LCA), Elements of LCA;
Global environmental issues, climate change and its impact on environment; mitigation of impacts; adaptability and climate resilience; ecological foot print, major environmental problems related to the conventional energy resources

6. WATER RESOURCES ENGINEERING

i) Fluid Mechanics and hydraulic Machines

Physical properties of fluids, fluid statics; fluid flow concepts, Kinematics of flow, continuity, momentum and energy principles and corresponding equations; Flow measurement; dimensional analysis and hydraulic similitude; flow through pipes and open channel hydraulics; Hydraulic jump, Surges and Water hammer;

Basic principles of hydraulic machines, turbines and pumps, types, selection, performance parameters, controls, scaling, pumps in parallel; Hydraulic ram;

ii) Hydrology

Hydrological cycle, precipitation and its estimation, evaporation and transpiration, runoff estimation; hydrographs;

Floods estimation and routing, flood management; streams and their gauging; capacity of Reservoirs. Watershed management and rainwater harvesting; ground water hydrology: steady state well hydraulics and application of Darcy's law, recuperation test for well yield, ground water management;

iii) Irrigation

Water resources of the earth, irrigation systems, advantages and disadvantages of irrigation, duty, delta, crop water requirements; Water logging and drainage, Design of canals, head works, canal distribution works, falls, crossdrainage works, canal lining; Sediment transport in canals;

7. SURVEYING

Principles of surveying, classification of surveys; Measurement of distances and directions, direct and indirect methods; optical and electronic devices; chain and compass survey; levelling and trigonometric levelling, Contours; Theodolite and tachometric survey; Total station, triangulations and traversing; measurements and adjustment of observations, errors and their adjustments, computation of coordinates; minor instruments; area and volumes; curve setting, horizontal and vertical curves;

Digital elevation modelling concept; basic concepts of remote sensing, GIS and global positioning system;

8. SOIL MECHANICS and FOUNDATION ENGINEERING

Physical and index properties of soil, classification and interrelationship; Permeability and seepage, Darcy's law; flow nets, uplift pressure, piping; Compressibility and consolidation; Compaction behaviour, methods of compaction and their choice; Shear strength of soils, stresses and failure, Mohr's circle; Earth pressure theories, stability analysis of slopes, retaining structures, stress distribution in soil; site investigations and sub-surface exploration;

Types of foundations, selection criteria, bearing capacity, effect of water table, settlement, laboratory and field tests; principles and design considerations of shallow and deep foundations; Types of piles, their design and layout, pile load tests, Caissons, Foundations on expansive soils, swelling and its prevention;

9. TRANSPORTATION ENGINEERING

Planning and development of highway, classification of roads, highway alignment and geometric design, cross-sectional elements, sight distance, horizontal and vertical alignment, grade separation; Highway materials, their properties and quality tests, construction of earthen, W.B.M., Bitumen and cement concrete roads; bitumen mix design; Maintenance of all types of roads, disposal of muck, highway drainage, Street lighting; design of flexible and rigid pavements using IRC recommendations;

Traffic engineering, traffic characteristics, traffic surveys, traffic control devices, intersections, signaling; Mass transit systems, accessibility, traffic control, emergency management.

Airports, layout and orientation, site selection; runway and taxiway design; drainage management; Zoning laws; Helipads, Airport obstructions, Visual aids and air traffic control;

10. SOLID MECHANICS and ANALYSIS OF STRUCTURES

i) Solid Mechanics

Simple stress and strain relationships, Bending moment flexural and shear stresses in statically determinate beams; Elastic theories of failure; Torsion of circular and rectangular sections and simple members; buckling of column, combined and direct bending stresses.

ii) Structural Analysis

Analysis of statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Analysis of thin and thick cylinders; Slope deflection, moment distribution, and Stiffness and flexibility methods of structural analysis; Influence lines;

11. DESIGN OF STRUCTURES

i) Reinforced Concrete Structures

Concepts of working stress, limit state and ultimate load design methods; IS code specifications for design of beams, slabs, columns, footings, and walls; design of beams, slabs, columns; Analysis of beam sections at transfer and service loads; ~~Design of wall footings, foundations, retaining walls, and water tanks~~ Principles of prestressed concrete, methods of prestressing; design of simple members; Design of brick masonry

ii) Steel Structures

Concepts of Working stress and Limit state design methods; Design of tension and compression members, beams, columns and column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses;

12. BUILDING MATERIALS and CONSTRUCTION PRACTICE

Building Materials: composition and properties of timber, bricks, cement, concrete, structural steel, plywood; mix design, short-term and long-term properties of concrete and mortar; Bitumen; Brick masonry, influence of mortar strength on masonry strength. Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, elasticity, nondestructive testing, mix design methods in concrete; Green building concepts construction Management: Types of construction projects; Concreting Equipment, Earthwork Equipment, Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation; Project planning and network analysis: PERT and CPM, Resource allocation.