



**HARYANA PUBLIC SERVICE COMMISSION**  
**BAYS NO 1-10, BLOCK-B, SECTOR - 4, PANCHKULA**

ADVERTISEMENT NO. 10 /2022

**POST: HYDROLOGIST AND GEOPHYSICIST IN PUBLIC HEALTH ENGINEERING  
DEPARTMENT, HARYANA**

Item(s)	Timeline
Date of publication	10.05.2022
Opening date for submission of online applications ( <b>Opening Date</b> )	16.05.2022
Closing date for submission of online applications ( <b>Closing Date</b> )	06.06.2022

(The Commission's Website: [www.hpsc.gov.in](http://www.hpsc.gov.in))

**IMPORTANT**

**Note:** The post of Hydrologist and Geophysicist in Public Health Engineering Department, Haryana were advertised vide Advertisement No. 9 of 2015, published on 08.02.2016. Against the said advertisement, insufficient of valid application received. Hence the Commission has decided to re-advertise these posts vide this advertisement.

The candidates who had applied earlier in response to Advertisement No. 09 of 2015, published on 08.02.2016 and are otherwise found eligible need not apply again as their previous application forms will be considered under this advertisement.

**1. CANDIDATES TO ENSURE THEIR ELIGIBILITY FOR THE POST:**

The Candidates applying for the post should ensure that they fulfill all eligibility conditions for the post. Their admission to the recruitment process will be purely provisional subject to satisfying the prescribed eligibility conditions. Mere issue of e-Admit Card to the candidate will not imply that his/her candidature has been finally cleared by the Commission. The Commission takes up verification of eligibility conditions with reference to original documents only after the candidate has qualified for the interview.

**Note:** The decision of the Commission with regards to the eligibility or otherwise of a candidate shall be final.

**2. HOW TO APPLY:**

Candidates are required to apply online on the website <http://hpsc.gov.in/en-us/>. Detailed instructions for filling up online applications are available on the above mentioned website. No other means / mode of submission of application will be accepted.

**3. LAST DATE FOR RECEIPT OF APPLICATIONS:**

The online Applications can be submitted up to the **Closing Date** till 11:55 PM. The eligible candidates shall be issued an e-Admit Card well before the commencement of the Recruitment/ Written Test, if any. The e-Admit Card will be made available on

the website <http://hpsc.gov.in/en-us/> for downloading by the candidates. No Admit Card will be sent by post.

**4. FACILITATION COUNTER FOR GUIDANCE OF CANDIDATES:**

In case of any guidance/information/clarification regarding their applications, candidature etc., the candidates can contact over Helpline No. 70489-36810 & 93106-11990 Helpdesk Email ID: [hpscruitment@registernow.in](mailto:hpscruitment@registernow.in) on any working day, between 09.00 hrs and 18.00hrs.

**5. NAME AND CATEGORY WISE BIFURCATION OF THE POSTS:**

A competitive examination for recruitment to the posts of **Hydrologist and Geophysicist (Class-II)** in Public Health Engineering Department, Haryana, will be held by the Haryana Public Service Commission at Panchkula or anywhere in the State of Haryana as per provision contain in the Haryana Public Health Engineering Department, Hydrologist and Geophysicist (Group - B) Service Rules, 2012 and amended vide notification dated G.S.R. 13/Const./Art./309/2015 dated 18.08.2015. The scheme of examination, number of papers & syllabus for this examination as prescribed by the Govt. is appended in the last at Sr. No. 19 to 21 and the Examination will be held in accordance with this syllabus. The number of posts is as under:-

i) The name and category wise number of posts are as under:-

Sr. No	Name of the Post	Category	No. of Post
1.	Hydrologist	General/Unreserved	01
2.	Geophysicist	General/Unreserved	01

ii) The number of posts given above is liable to variation.

iii) The Service Rules & Amendments (upto the issuance of this Advertisement) for the above posts are available on the website of Public Health Engineering Department, Haryana i.e. <https://phedharyana.gov.in/ActsRules?type=A>

**6. ESSENTIAL QUALIFICATIONS:**

The essential qualifications are as under:-

Sr. No	Name of the Post	Essential Qualifications
1.	Hydrologist	(i) Atleast 2 <sup>nd</sup> Class M. Sc. Or M. Tech. in Geology from recognized university / institution. (ii) Knowledge of Hindi / Sanskrit up to Matric or higher qualification with Hindi as one of the subject.
2.	Geophysicist	(i) Atleast 2 <sup>nd</sup> Class M. Sc. Or M. Tech. in Geophysics from recognized university / institution. (ii) Knowledge of Hindi / Sanskrit up to Matric or higher qualification with Hindi as one of the subject.

**Notes:-**

- (i) The Department vide its letter No. 1/23/2008-PH-5 dated 26.09.2017 had clarified that no associate course in Master Degree is to be considered for the posts of Hydrologists & Geophysicist except the advertised qualification.
- (ii) The eligibility of the candidate with regard to educational qualifications and experience etc. shall be determined with reference to the **Closing Date** fixed for submission of online application forms.
- (iii) All applicants must fulfil the essential requirements of the post and other conditions stipulated in the advertisement on the **Closing Date**. They are advised to satisfy themselves before applying that they possess at least the essential qualifications laid down for the posts. No enquiry asking for advice as to eligibility will be entertained.
- (iv) The certificates/ documents in support of the claim should be possessed by the candidates on or before the **Closing Date**. The certificates issued after the **Closing Date** will not be accepted by the Commission.
- (v) The improvement in marks done by a candidate after the **Closing Date** shall not be considered for any purpose in this recruitment.
- (vi) The prescribed essential qualifications are the minimum and mere possession of the same does not entitle candidates to be called for interview.

The candidate should, therefore, mention all his/her qualifications and experience in the relevant field over and above the minimum qualifications.

7. **SCALE OF PAY:** Rs. 9300-34800+5400/- Grade Pay

8. **AGE LIMITS:**

Candidate should not be less than 20 years or more than 40 years as on the last date i.e. **Closing Date** fixed for submission of online applications to the Commission.

(I) The relaxation in maximum age for various categories is available as under:-

Sr. No.	Categories where relaxation is admissible	No. of years of relaxation
(i)	Wife of military personnel who is disabled while in military service.	5 years
(ii)	Widowed or legally divorced woman provided she has not remarried.	5 years
(iii)	Judicially separated woman residing separately for more than two years from the date as prescribed for the purpose of age for candidates of other categories.	5 years
(iv)	Unmarried woman.	5 years
(v)	Disabled persons who are covered under the Rights of Persons with Disabilities Act, 2016.	5 years (+5 years; if candidate belongs to EWS category of Haryana) subject to a maximum of 52 years.
(vi)	Persons who have already worked or presently working on adhoc/contract/work-charged/ daily wages basis in any Department / Board / Corporation of Haryana Government including Government-	Relaxation in age equal to the number of completed years only on equivalent post on adhoc/ contract/ work-charged/ daily wages basis excluding the period

	aided Institutions under Haryana Government.	of break, if any, including any other age relaxation admissible, if any, subject to maximum age of 52 years and also subject to the condition that if once a person has been appointed on regular basis in any Department / Board / Corporation etc. of Haryana Government with the benefits of relaxation in age he will not be entitled to avail the same again for any subsequent appointment.
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**Note:- 1.** The experience certificate(s) of equivalent post issued by the Appointing Authority of respective Department / Department / Board / Corporation / Government-aided Institutions only shall be valid. Before grant of benefit of relaxation in age, the experience certificate(s) shall be got verified by the Haryana Public Service Commission from the concerned Appointing Authorities (ties) **(Attach proof of Experience Certificate).**

**9. RESERVATION:**

- (i) The candidates of reserved categories of Haryana can apply for these posts as a General category candidates, if he / she fulfils all the eligibility conditions as meant for General category candidates, except fee. Such candidates must attach scanned copy of their caste certificate for claiming fee concession.
- (ii) The reserved category candidates belonging to other States will be considered as a General/Unreserved category candidates.

**10. EVIDENCE OF AGE:** The Matriculation certificate or equivalent academic certificate thereto is the only acceptable document for evidence of age.

**11. APPLICATION FEE:**

The category wise application fee payable through Net Banking, Debit Card and Credit Card upto 11:55 PM of the **Closing Date** is as under:-

Sr. No.	Categories of candidates	Fee (Rs.)
1.	(i) For Male candidates of General category including Dependent Son of Ex-Serviceman of Haryana. (ii) For Male candidates of General and all reserved categories of other States.	1000/-
2.	(i) For all Female candidates of General category including Female Dependent of ESM of Haryana only. (ii) For Female candidates of General and all reserved categories of other States.	250/-
3.	(i) For Male & Female candidates of SC / BC-A / BC-B / ESM categories of Haryana only. (ii) Economically Weaker Sections (EWS)	250/-
4.	For all Persons with Disabilities category candidates (with at least 40% disability) of Haryana only.	NIL

**Notes:-**

1. Fee will not be refunded to those candidates who did not appear in the Examination.
2. Applications without the prescribed fee (unless remission of fee is claimed) shall be summarily rejected.
3. Fee once paid shall not be refunded under any circumstances nor can the fee be held in reserve for any other examination or selection.

**12. ELIGIBILITY CONDITIONS (NATIONALITY):**

For this recruitment, a candidate must be either:-

- (a) a citizen of India, or
- (b) a subject of Nepal, or
- (c) a subject of Bhutan, or
- (d) a Tibetan refugee who came over to India before 1<sup>st</sup> January, 1962 with the intention of permanently settling in India, or
- (e) a person of Indian origin who has migrated from Pakistan, Burma, Sri Lanka, East African countries of Kenya, Uganda, the United Republic of Tanzania, Zambia, Malawi, Zaire, Ethiopia and Vietnam with the intention of permanently settling in India.

Provided that a candidate belonging to categories (b), (c), (d) and (e) shall be a person in whose favour a certificate of eligibility has been issued by the Government of India.

A candidate in whose case a certificate of eligibility is necessary, may be admitted to the examination but the offer of appointment may be given only after the necessary eligibility certificate has been issued to him/her by the Government of India.

**13. SPECIAL INSTRUCTIONS REGARDING SUBMISSION OF APPLICATIONS:**

- (i) The candidates should read the instructions and procedures carefully before starting filling the Online Application Form and check all the particulars filled up in application form after getting the printout to ensure the correctness of information and upload all documents before finally submitting the application.
- (ii) The candidates should fill all details while filling the Online Application Form. Due care should be taken by the candidates while filling up the online application form. Incomplete or defective application form shall be summarily rejected. No representation or correspondence regarding such rejection shall be entertained under any circumstances.
- (iii) Candidates are advised to fill their application forms carefully such as Name, Father's/Mother's name, Date of Birth, Category, Qualification, marks obtained, passing year, photo, Signature, details & fee etc. After final submission of application form, no change will be allowed and no request for change of any particular/s in the online application form shall be entertained by the Commission after submission of application form.
- (iv) Candidate will be responsible for any mistake in the application form and fees paid by him/her. In case candidate feels that he/she has filled up the form erroneously, he/she should fill up a fresh online application form alongwith fresh requisite fee before the **Closing Date**.
- (v) The applicants are advised to submit only single application for a post. However, if due to any unavoidable situation, if he/she submits another/multiple applications, then he/she must ensure that application with the Highest Application Number is complete in all respects like applicant's details, examination centre, photograph, signature, fee

etc. The applicants who submit multiple applications should note that only the application with Highest/Latest Application Number shall be entertained by the Commission, and also that the fee paid against one Application Number shall not be adjusted against any other Application Number.

- (vi) After successful submission of application, candidates should take print out of application form. The hard copy of application form along with all uploaded documents must be brought at the time when called upon to do so by the Commission. No document/s which has/have not been uploaded shall be entertained.
- (vii) The application of the candidates, who do not fulfill the qualifications/eligibility conditions on the **Closing Date**, shall not be accepted by the online application system.

**(viii) Documents to be uploaded with Application Form:**

1. Scanned Photo duly signed by the Candidate.
2. Scanned Signatures of the Candidate.
3. Scanned copies of degrees and mark sheets of Educational Qualifications.
4. Scanned copy of SC/BC-A/BC-B/EWS certificate.
5. Scanned copy of PwBD Certificate.
6. Scanned copy of ESM Certificate issued by concerned Zila Sainik Board (For ESM).
7. Scanned copy of Haryana Domicile Certificate.
8. Scanned copy of NOC from Department (For Haryana Govt. employees who have signed Bond)
9. Scanned copy of proof of having worked on adhoc/contract/work-charged/ daily wages basis in any Department / Board / Corporation of Haryana Government (For candidates claiming benefit of age relaxation).

**14. REGARDING NO OBJECTION CERTIFICATE BY THE EMPLOYER:**

- (i) The employees of Haryana Government who have not executed any bond with the State Government, may forward their application without NOC from the Department. However, self-declaration of such Government employees is required to be submitted to the effect that employee is not facing any disciplinary proceedings. In case of employees who have executed bond with the State Government (e.g. Doctors), the NOC of Head of the Department (HOD) shall, however, be required. If the candidate resigns after sending the application, then such candidate will be interviewed only if he/ she produces a letter from the HOD to the effect that he / she has resigned from the post and his / her resignation has been accepted. The NOC or the letter, as the case may be, shall be submitted on or before the date of his/her interview failing which he/she will not be interviewed.
- (ii) The candidate who joins service under any Government, Quasi- Government Organisation, Public Sector Undertaking after the submission of application and has executed a bond, will have to produce No Objection Certificate from the employer, on or before the date of his / her interview failing which he or she will not be interviewed.
- (iii) Persons in private employment are not required to submit their application forms through their employer or to produce the employer's NOC/ permission at the time of interview.

**15. SCRIBE / EXTRA TIME FOR PWBD CATEGORY CANDIDATES:**

- i) An extra/compensatory time @ 20 minutes per hour will be allowed in each paper to the Persons with Benchmark Disabilities (Blind and Low vision or

- Locomotor Disability), only on production of a Medical Certificate issued by Medical Board constituted by the Chief Medical Officer of concerned district, and after issuing permission by the Commission in this regard.
- ii) The PwBD (Blindness and Low vision) candidates who want the help of a scribe to write his/her paper will have to apply to the Commission for the permission of a scribe separately well in time i.e. at least 10 days prior to the commencement of the Examination.
  - iii) The candidate has to make his / her own arrangement of a scribe.
  - iv) The scribe should be a studying-student upto 10+2 and his/her photo & other particulars should be duly verified by the Principal of the Institution in which the student is studying. No online request for a scribe will be accepted by the Commission.
  - v) The PwBD (Blindness and Low vision) candidates who want only extra time (without the help of a scribe) will have to apply to the Commission for the permission for extra time well in time.
  - vi) The PwBD (Locomotors Disability) candidates who want extra/ compensatory time will have to apply to the Commission for permission. Such candidates will be allowed extra time @ 20 minutes per hour for Examination, on production of medical certificate issued by a Medical Board, clearly stating therein that the candidate's writing ability is severally affected due to his / her disability.
  - vii) It should be noted that no such permission in the above cases will be granted by the Centre Supervisor.

#### 16. PENALTY FOR CERTAIN ACTS:

A candidate who is or has been declared by the Commission to be guilty of:

- (i) Obtaining support for his candidature by the following means, namely:—
  - (a) offering illegal gratification to; or
  - (b) applying pressure on; or
  - (c) blackmailing, or threatening to blackmail any person connected with the conduct of the examination; or
- (ii) impersonation; or
- (iii) procuring impersonation by any person; or
- (iv) submitting fabricated documents or documents which have been tampered with; or
- (v) Uploading irrelevant photos in the application form in place of actual photo/signature.
- (vi) Making statements which are incorrect or false or suppressing material information; or
- (vii) Resorting to the following means in connection with his candidature for the examination, namely:—
  - (a) obtaining copy of question paper through improper means;
  - (b) finding out the particulars of the persons connected with secret work relating to the examination;
  - (c) influencing the examiners; or
- (viii) being in possession of or using unfair means during the examination; or
- (ix) writing obscene matter or drawing obscene sketches or irrelevant matter in the scripts; or
- (x) misbehaving in the examination hall including tearing of the scripts, provoking fellow examinees to boycott examination, creating a disorderly scene and the like; or
- (xi) harassing or doing bodily harm to the staff employed by the Commission for the conduct of their examination; or
- (xii) being in possession of or using any mobile phone, (even in switched off mode), pager or any electronic equipment or programmable device or storage media

- like pen drive, smart watches etc. or camera or bluetooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination; or
- (xiii) violating any of the instructions issued to candidates along with their admission certificates permitting them to take the examination; or
- (xiv) attempting to commit or, as the case may be, abetting the commission of all or any of the acts specified in the foregoing clauses; may in addition to rendering himself liable to criminal prosecution, be liable :—
- (a) to be disqualified by the Commission from the Examination for which he is a candidate; and/or
- (b) to be debarred either permanently or for a specified period:—
- (i) by the Commission, from any examination or selection held by them;
- (ii) by the central government from any employment under them; and
- (c) if he is already in service under Government to disciplinary action under the appropriate rules:

Provided that no penalty under this rule shall be imposed except after:—

- (i) giving the candidate an opportunity of making such representation in writing as he may wish to make in that behalf; and
- (ii) taking the representation, if any, submitted by the candidate within the period allowed to him into consideration.

#### 17. CORRESPONDENCE WITH THE COMMISSION:

The Commission will not enter into any correspondence with the candidates about their candidature except in the following cases:-

- i) If a candidate is not able to download his/her e-Admit Card or does not receive any other communication regarding his/her candidature for the examination well before the commencement of the examination, he/she should at once contact the Commission. Information in this regard can also be obtained over Helpline No. 70489-36810 & 93106-11990, Helpdesk Email ID: hpscruitment@registernow.in In case no communication is received in the Commission's Office from the candidate regarding non-receipt of his/her e-Admit Card well before the examination, he/she himself/herself will be solely responsible for non-receipt of his/her e- Admit Card. No candidate will ordinarily be allowed to take the examination unless he/she holds an e-Admit Card for the examination. On downloading of e-Admit Card, the candidates should check it carefully and discrepancies/errors, if any, should be brought to the notice of the Commission immediately.
- ii) Candidates should note that the name in the Admit Card in some cases may be abbreviated due to technical reasons.
- iii) Candidates must ensure that their Mobile No. & Emails IDs given in their online application are valid and active.
- iv) All communications to the Commission should invariably contain the following particulars:-
1. Name and year of the examination;
  2. Application Number
  3. Roll Number (if received)
  4. Name of candidate (in full and in block letters)
  5. Complete postal address as given in the application.
- Communication not containing the above particulars may not be attended to.
- v) Candidates should note down their Application Number for future reference. They may be required to indicate the same in connection with their candidature in future.



- vi) Candidates will be informed of the final result in due course through HPSC website/ Newspaper and the interim enquires about the result are, therefore, unnecessary and will not be attended to. The Commission do not enter into correspondence with the candidates about reasons for their non-selection for interview/appointment.
- vii) All correspondence with the Commission should be addressed to the Secretary, Haryana Public Service Commission, Bays No. 1-10, Block- B, Sector-4, Panchkula, Haryana.

**18. GENERAL INSTRUCTIONS:**

- i) The use of any mobile phone (even in switched-off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or blue tooth devices or any other equipment or related accessories either in working or switched-off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.
- ii) Candidates are advised in their own interest not to bring any of the banned items including mobile phones/pagers to the venue of the written test/ examination as arrangement for safe-keeping cannot be assured. Commission will not be responsible for any loss in this regard.
- iii) Candidates are also advised not to bring any valuable/costly items to the venue of the written test/examination as safe-keeping of the same cannot be assured. Commission will not be responsible for any loss in this regard.
- iv) Candidates should ensure that the signatures appended by them at all the places viz. at uploaded application form, attendance list, and in other documents as well as in all the correspondence with the Commission should be identical. If any variation is found in the signatures appended by a candidate, his / her candidature will be liable for cancellation by the Commission.
- v) No candidate shall be admitted to the Recruitment Test/Written Test/Examination unless he/she holds a certificate of Admission/Admit Card issued by the Commission.
- vi) No Individual information at any stage shall be given to candidates and hence all candidates should regularly visit the Website of the Commission & Public Notices in different Newspapers.
- vii) Success in the Recruitment Test/Written Test/Examination confers no right to appointment unless Government is satisfied after such enquiry as may be considered necessary, that the candidate is suitable in all respects for appointment.
- viii) Only those documents which are uploaded by the candidates shall be considered. If there is any variation in the document uploaded and produced at the time of scrutiny, candidature shall be liable to be cancelled. If any application is found without uploading requisite supporting documents and other relevant information, the candidate himself/herself shall be responsible for that and his/her candidature would be liable to be cancelled due to lack of proper or correct documents/information.
- ix) Candidates, who have obtained degrees or diplomas or certificates for various courses from any Board/institution declared fake by the University Grants Commission or not recognized by Haryana Government, shall not be eligible for being considered for recruitment to the posts advertised and no representation in this regard shall be entertained.
- x) Candidates must ensure that information provided by them is true. If at any subsequent stage or at the time of interviews any information given by them or any claim made by them in their online applications is found to be false, their candidature will be liable to be rejected and they may also be debarred either permanently or for a specified period by the Commission from any examination or selection held by them.

- xi) The decision of the Commission in all matters relating to acceptance or rejection of an application, eligibility/suitability of the candidates, mode and criteria for selection etc. will be final and binding on the candidates. No inquiry or correspondence will be entertained in this regard.

19. **Scheme of Examination:** The selection of candidate shall be made by the Commission, after holding a competitive examination, the syllabus for which is given in **Appendix E** of the relevant service rules and the same is also given below.

Provided that if the number of candidates is **more than twenty times** the number of vacancies advertised, the Commission may hold a screening test to shortlist the candidate for the competitive examination.

**Provided further that a candidate shall not be considered qualified for appointment, unless he obtains not less than forty percent marks in each subject and also not less than fifty percent marks in the aggregate, and no candidate who fails to obtain the qualifying marks shall be called for interview by the Commission.**

**However, candidates three times of the advertised posts plus bracketed candidates, if any, in order of merit of the Examination will be called for interview for Personality Test.**

**Interview for Personality Test:-**

The candidate will be interviewed by a Board of competent and unbiased observers who will have before them a record of his career. The object of the interview is to assess his suitability for the posts for which he has competed. Special attention will be paid in the Personality Test to assessing the candidate's capacity for leadership, initiative and intellectual curiosity, tact and other social qualities, mental and physical energy, powers of practical application, integrity of character and aptitude for adapting themselves to the field life.

20. **Papers and Syllabus :** The examination will be held on the basis of the syllabus given below:-

**(A) FOR THE POST OF HYDROLOGIST**

Sr. No.	Subject	Duration	Marks
1.	General English	3 hrs.	100
2.	Geology Paper I	3 hrs.	200
3.	Geology Paper II	3 hrs.	200
4.	Hydrogeology	3 hrs.	200
<b>Total</b>			<b>700</b>

**Marks of Interview for Personality Test will be 100**

**(B) FOR THE POST OF GEOPHYSICIST**

Sr. No.	Subject	Duration	Marks
1.	General English	3 hrs.	100
2.	Geology Paper I	3 hrs.	200
3.	Geology Paper II	3 hrs.	200
4.	Geology Paper III	3 hrs.	200
<b>Total</b>			<b>700</b>

**Marks of Interview for Personality Test will be 100**

## 21. Standard and Syllabus of Paper:

### Schedule

#### Standard and Syllabus

The standard of the paper in General English will be such as may be expected of a science graduate. The papers on geological subjects will be approximately of the M. Sc. Degree standard of an Indian University and questions will generally be set to test the candidate's grasp of the fundamentals in each subject.

There will be no practical examination in any of the subjects.

#### (1) General English

Candidate will be required to write a short Essay in English. Other questions will be designed to test their understanding of English and workmanlike use of words.

#### (2) GEOLOGY - PAPER I

##### Section A: Geomorphology and Remote Sensing

Basic principles. Weathering and soils, Mass wasting. Influence of climate on processes. Concept of erosion cycles. Geomorphology of fluvial tracts, arid zones, coastal regions, 'Karst' landscapes and glaciated ranges. Geomorphic mapping, slope analysis and drainage basin analysis. Applications of geomorphology in mineral prospecting, civil engineering, hydrology and environmental studies. Topographical maps. Geomorphology of India.

Concepts and principles of aerial photography and photogrammetry, satellite remote sensing - data products and their interpretation. Digital image processing. Remote sensing in landform and land use mapping, structural mapping, hydrogeological studies and mineral exploration. Global and Indian Space Missions. Geographic Information System (GIS) - principles and applications.

##### Section B: Structural Geology

Principles of geological mapping and map reading, projection diagrams. Stress-strain relationships of elastic, plastic and viscous materials. Measurement of strain in deformed rocks. Behaviour of minerals and rocks under deformation conditions. Structural analysis of folds, cleavages, lineations, joints and faults. Superposed deformation. Mechanism of folding and faulting. Time-relationship between crystallization and deformation. Unconformities and basement-cover relations. Structural behaviour of igneous rocks, diapirs and salt domes. Introduction to petrofabrics.

##### Section C: Geotectonics

Earth and the solar system, Meteorites and other extra-terrestrial materials, Planetary evolution of the earth and its internal structure. Heterogeneity of the earth's crust. Major tectonic features of the Oceanic and Continental crust. Continental drift - geological and geophysical evidence, mechanics, objections, present status. Gravity and magnetic anomalies at Mid-ocean ridges, deep sea trenches, continental shield areas and mountain chains. Palaeomagnetism. Seafloor spreading and Plate Tectonics. Island arcs, Oceanic islands and volcanic arcs. Isostasy, orogeny and epeirogeny. Seismic belts of the earth. Seismicity and plate movements. Geodynamics of the Indian plate.

### **Section D : Stratigraphy**

Nomenclature and modern stratigraphic code. Radioisotopes and measuring geological time. Geological time-scale. Stratigraphic procedures of correlation of unfossiliferous rocks. Precambrian stratigraphy of India. Stratigraphy of the Paleozoic, Mesozoic and Cenozoic formations of India. Gondwana system and Gondwanaland. Rise of the Himalaya and evolution of Siwalik basin. Deccan Volcanics. Quaternary Stratigraphy. Rock record, palaeoclimates and palaeogeography.

### **Section E : Paleontology**

Fossil record and geological time-scale. Morphology and time-ranges of fossil groups. Evolutionary changes in mollusks and mammals in geological time. Principles of evolution. Use of species and genera of foraminifera and echinodermata in biostratigraphic correlation. Siwalik vertebrate fauna and Gondwana flora, evidence of life in Precambrian times, different microfossil groups and their distribution in India.

## **(3) GEOLOGY - PAPER II**

### **Section A : Mineralogy**

Physical, chemical and crystallographic characteristics of common rock forming silicate mineral groups. Structural classification of silicates. Common minerals of igneous and metamorphic rocks. Minerals of the carbonate, phosphate, sulphide and halide groups.

Optical properties of common rock forming silicate minerals, uniaxial and biaxial minerals. Extinction angles, pleochroism, birefringence of minerals and their relation with mineral composition. Twinned crystals. Dispersion. The U-Stage.

### **Section B: Igneous and Metamorphic Petrology**

Forms, textures and structures of igneous rocks. Silicate melt equilibria, binary and ternary phase diagram. Petrology and geotectonic evolution of granites, basalts, andesites and alkaline rocks. Petrology of gabbros, kimberlites anorthosites and carbonatites. Origin of primary basic magmas.

Textures and structures of metamorphic rocks. Regional and contact metamorphism of pelitic and impure calcareous rocks. Mineral assemblages and P/T conditions. Experimental and thermodynamic appraisal of metamorphic reactions. Characteristics of different grades and facies of metamorphism. Metasomatism and granitization, migmatites. Plate tectonics and metamorphic zones Paired Metamorphic belts.

### **Section C: Sedimentology**

Provenance and diagenesis of sediments. Sedimentary textures. Framework matrix and cement of terrigenous sediments. Definition, measurement and interpretation of grain size. Elements of hydraulics. Primary structures, palaeocurrent analysis. Biogenic and chemical sedimentary structures. Sedimentary environment and facies. Facies modeling for marine non-marine and mixed sediments. Tectonics and sedimentation. Classification and definition of sedimentary basins, Sedimentary basins of India. Cyclic sediments. Seismic and sequence Stratigraphy. Purpose and scope of basin analysis. Structure contours and isopach maps.

### **Section D: Geochemistry**

Earth in relation to the solar system and universe, cosmic abundance of elements. Composition of the planets and meteorites. Structure and composition of earth and distribution of elements. Trace elements. Elementary crystal chemistry and thermodynamics. Introduction to isotope geochemistry. Geochemistry of hydrosphere, biosphere and atmosphere. Geochemical cycle and principles of geochemical prospecting.

### **Section E : Environmental Geology**

Concepts and principles. Natural hazards – preventive / precautionary measures – floods, landslides, earthquakes, river and coastal erosion. Impact assessment of anthropogenic activities such as urbanization open cast mining and quarrying, river-valley projects, disposal of industrial and radio-active waste, excess withdrawal of ground water, use of fertilizers, dumping of ores, mine waste and fly-ash. Organic and inorganic contamination of ground water and their remedial measures. Soil degradation and remedial measures. Environment protection – legislative measures in India.

## **(4) HYDROGEOLOGY**

### **Section A: Origin, occurrence and distribution of water**

Origin of water: meteoric, juvenile, magmatic and sea waters. Hydrologic cycle: precipitation, runoff, infiltration and evapotranspiration, Hydrographs. Subsurface movement and vertical distribution of groundwater, Springs, Classification of aquifers, Concepts of drainage basin and groundwater basin. Hydrological properties of rocks – specific yield, specific retention, porosity, hydraulic conductivity, transmissivity, storage coefficient, water table fluctuations – causative factors, concept of barometric and tidal efficiencies, water table contour maps, Classification of rocks with respect to their water bearing characteristics, Hydro-stratigraphic units, Groundwater provinces of India, Hydrogeology of and Zones of India, wet lands.

### **Section B: Well hydraulics and well design**

Theory of groundwater flow, Darcy's Law and its applications, determination of permeability in laboratory and in field, Types of wells, drilling methods, construction, design, development and maintenance of wells, specific capacity and its determination. Unconfined, confined, steady, unsteady and radial flow conditions, Pumps tests – methods, data analysis and interpretation for hydro geologic boundaries, Evaluation of aquifer parameters using Thiem, Theis, Jacob and Walton methods, Groundwater modeling – numerical and electrical models.

### **Section C: Groundwater chemistry**

Groundwater quality – physical and chemical properties of water, quality criteria for different uses, graphical presentation of water quality data, groundwater quality in different provinces of India – problems of arsenic and fluoride, Saline water intrusion in coastal and other aquifers and its prevention, Radioisotopes in hydrogeological studies, Groundwater contamination.

### **Section D: Groundwater exploration**

Geological – lithological and structural mapping, fracture trace analysis, Hydrogeological – lithological classification with respect of hydrologic properties, Hydraulic continuity in relation to geologic structures, Location of springs Remote sensing – hydrogeomorphic mapping of the terrain using different images of different satellite missions, lineament mapping, shallow groundwater potential zone mapping using satellite images, Surface geophysical methods – seismic, gravity, geo-electrical and magnetic, Subsurface geophysical methods – well logging for delineation of aquifers and estimation of water quality.

### **Section E: Groundwater problems and management**

Groundwater problems related to foundation work, mining, canals and tunnels, Problems of over exploitation and groundwater mining. Groundwater development in urban areas and rain water harvesting, Artificial recharge methods, Groundwater problems in arid regions and remediation. Groundwater balance and methods of estimation. Groundwater legislation. Sustainability criteria and managing renewable and nonrenewable groundwater resources.

## **(5) GEOLOGY – PAPER III**

### **Section A: Indian mineral deposits and mineral economics**

Occurrence and distribution in India of metalliferous deposits – base metals, iron, manganese, aluminium, chromium, nickel, gold, silver, molybdenum. Indian deposits of non-metal – mica, asbestos, barites, gypsum, graphite, apatite and beryl. Gemstones, refractory minerals, abrasives and minerals used in glass, fertilizer, paint, ceramic and cement industries. Building stones. Phosphorite deposits. Placer deposits, rare earth minerals.

Strategic, critical and essential minerals. India's status in mineral production. Changing patterns of mineral consumption. National Mineral Policy. Mineral Concession Rules. Marine mineral resources and Law of Sea.

### **Section B: Ore genesis**

Ore deposits and ore minerals. Magmatic processes of mineralization. Porphyry, skarn and hydrothermal mineralization. Fluid inclusion studies. Mineralisation associated with – (i) ultramafic, mafic and acidic rocks, (ii) greenstone belts, (iii) komatiites, anorthosites and kimberlites and (iv) submarine volcanism. Magma-related mineralization through geological time. Stratiform and stratabound ores. Ores and metamorphism – cause and effect relations.

### **Section C: Mineral exploration**

Methods of surface and subsurface exploration, prospecting for economic minerals – drilling, sampling and assaying. Geophysical techniques – gravity, electrical, magnetic, airborne and seismic. Geomorphological and remote sensing techniques. Geobotanical and geochemical methods. Borehole logging and surveys for deviation.

### **Section D: Geology of fuels**

Definition, origin of coal. Stratigraphy of coal measures. Fundamentals of coal petrology, peat, lignite, bituminous and anthracite coal. Microscopic constituents of coal.

Industrial application of coal petrology. Indian coal deposits. Diagenesis of organic materials.

Origin, migration and entrapment of natural hydrocarbons. Characters of source and reservoir rocks. Structural, stratigraphic and mixed traps. Techniques of exploration. Geographical and geological distributions of onshore and offshore petroliferous basins of India.

Mineralogy and geochemistry of radioactive minerals. Instrumental techniques of detection and measurement of radioactivity. Radioactive methods for prospecting and assaying of mineral deposits. Distribution of radioactive minerals in India. Radioactive methods in petroleum exploration - well logging techniques. Nuclear waste disposal - geological constraints.

### **Section E: Engineering Geology**

Mechanical properties of rocks and soils. Geological investigations for river valley projects - Dams and reservoirs; tunnels - types, methods and problems. Bridges - types and foundation problems. Shoreline engineering. Landslides - classification, causes, prevention and rehabilitation. Concrete aggregates - sources, alkali-aggregate reaction. Aseismic designing - seismicity in India and earthquake-resistant structures. Problems of groundwater in engineering projects. Geotechnical case studies of major projects in India.

#### **22. WITHDRAWAL OF APPLICATIONS:**

No request for withdrawal of candidature received from a candidate after he/she has submitted his/her application will be entertained under any circumstances.

**Date: 10.05.2022**

**Secretary**  
**Haryana Public Service Commission**  
**Panchkula**