



JAMMU AND KASHMIR PUBLIC SERVICE COMMISSION

Solina Srinagar, Kashmir - 190001

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Subject: Filling up of Gazetted posts in Department of Mining, Government of Jammu & Kashmir.

Reference: Department of Mining Letter No. GM-MNG/33/2022-04 dated 07.04.2022 & GM-MNG/33/2022-04 dated 18.04.2022

Notification No: 20 - PSC (DR-P) OF 2022

Dated: 05 -08-2022

Applications through online mode are invited from the applicants who are domiciled in the Union Territory of Jammu & Kashmir and are possessing the prescribed Academic/ Professional qualification and age for the posts details of which are given in the following paras, in terms of Jammu & Kashmir Geology and Mining (Gazetted) Service Recruitment Rules 1992, notified vide SRO 142 of 1992 dated 19.06.1992, "Jammu & Kashmir Probationer (Conduct of Service, Pay & Allowance) and Fixation of Tenure Rules, 2020" notified vide S.O. 192 of 2020 dated 17.06.2020 and the Jammu and Kashmir Public Service Commission (Business and Procedure) Rules, 2021.

MOST IMPORTANT

- **Candidates are advised to update their One Time Registration before filling the application Form**
- The Application Form together with instructions for filling up the Application Forms, will be available at the website of the Commission from **10.08.2022**
- Candidates are advised to go through the instructions and ensure that they meet all the eligibility conditions prescribed for the post before filing the online Application Form.
- Last date for filing of online Application complete in all respects along with the requisite fee (online mode only) is **09.09.2022**
- The last date for receipt of online applications provided in the notification shall be the cut-off date for determining the eligibility as regards acquisition of domicile certificates, educational or professional qualifications.
- The minimum and maximum age will however be reckoned with reference to **1st January, 2022**.
- Candidates can edit some of the fields in their online application form from **10.09.2022 to 12.09.2022 (upto 11:59 P.M)** Instructions in this regard will be separately made available on the website.
- Candidates are required to upload all the mandatory prescribed/requisite documents alongwith the online application form.
- In case the mandatory prescribed/requisite documents are not uploaded with the online applications form, the application form/candidature of the applicant is liable to be rejected without any further notice.
- Candidates are not required to submit hard copy of the online application form or any other documents to the Commission at the time of filling up of online application form.
- The candidates will however, be required to present/produce a down loaded copy of the online form alongwith original certificates at the time of documentary verification.
- Candidates are advised in their own interest to submit online applications much before the closing date and not to wait till the last date to avoid the possibility of disconnection/inability to pay fee or failure to login to the online application portal on account of heavy load on the website during the closing days.

2. Details of post with category wise breakup is given below

Name of the Post with pay scale	OM	RBA	SC	ST	Total
Geologist (Grade-III) L-8A (50700-160600)	03	01	01	01	06
Driller L-10A (56600-179800)	01	-	-	-	01
Assistant Mining Engineer L-10A (56600-179800)	01	-	-	-	01
Total					08

3. Prescribed Qualification

Designation	Qualification
Geologist (Grade-III)	Masters Degree in Geology/Applied Geology or equivalent from a recognized Institute
Driller	i. Degree in Mechanical/Drilling Engineering or ii. Diploma in Mechanical/Drilling Engineering with AMIE. or iii. Matriculate within job training in Drilling Technology from IBM/NCDC/RGWB.
Assistant Mining Engineer	Degree in Mining Engineering or its equivalent from a recognized Institute or Diploma in Mining and three years minimum experience in Metalliferous/Non-Metalliferous/Coal Mining Knowledge of Exploratory Mining and underground Geological Mapping in an Organization of repute.

4. Age as on 1st January 2022

The prescribed age (minimum/maximum) for candidates belonging to Open Merit (OM) & Reserved Categories is as below:-

S.NO	Category	Age limit	Not born after	Not born before
1	OM	40	01.01.2004	01.01.1982
2	RBA, SC, ST	43	01.01.2004	01.01.1979
3	In service candidate	40	01.01.2004	01.01.1982

One time age relaxation is granted to the over-aged candidates who had earlier applied for the posts of Geologist (Grade-III) advertised vide Notification No. 21-PSC(DR-P) of 2013 dated 12.11.2013, and were within the age limit, at that time, but has in the meantime crossed the upper age limit, if he/she applies for the post(s) in pursuance to instant Notification and also need not to pay any fee afresh.

5. Reservation

- i) A candidate seeking his/her consideration under a Reserved Category must ensure that he/she possesses a valid requisite Category certificate on the cut-off date.

- ii) The candidature of the candidates will be provisional till the genuineness of the reserved category certificate is verified by the Appointing Authority.
- iii) Candidates may note that in case a claim for reservation is made on the basis of false/fake/fraudulent certificate, he/she shall be debarred from the examination(s) conducted by the J&K Public Service Commission, in addition to any other penal action as may be deemed appropriate.

6. Domicile

The candidate should be a Domicile of the Union Territory of Jammu & Kashmir. The candidate must possess a valid Domicile Certificate issued by the Competent Authority in the prescribed format as on the last date prescribed for submission of online application form.

7. Centre of Examination

- I. The examination will be held at Srinagar & Jammu centres. All the candidates shall indicate the option for examination centre as indicated above.
- II. The allotment of centres shall be at sole discretion of the Commission and once a centre is allotted to a candidate, request for a change of centre will not be entertained.
- III. Information about the Examination indicating the time table and Centre of Examination for the candidates will be uploaded on the websites of the Commission about two weeks before the date of examination. If any candidate does not find his/her Roll Number on the website of the Commission, one week before the date of examination, he/she must immediately contact the Commission's Office at Srinagar/Jammu, with proof of having submitted his/her application. Failure to do so will deprive his/her of any claim for consideration.
- IV. Candidate must submit his/her online application form, Email ID and Mobile Number along with his/her Name, Date of Birth and Name of the Examination, while addressing any communication to the Commission. Communication from the candidates not furnishing these particulars shall not be entertained.
- V. Admit Cards will be available for downloading about two weeks before the date of examination on the official website of the Commission i.e. jkpsc.nic.in. Candidate must bring printout of the Admit Card/Roll Number Slip to the Examination Hall.
- VI. For securing entry into the centre of examination, in addition to the Admit Card/roll Number Slip, it is mandatory to carry at least two passport size recent color photographs (not taken earlier than 01.01.2022) and any of the original valid Photo-Id proof such as:
 - i. Aadhar Card/ E-Aadhar,
 - ii. Voter's ID Card,
 - iii. Driving License,
 - iv. PAN Card,
 - v. Passport,
 - vi. School /College/University I- Card
 - vii. Employer ID Card.

8. Scheme of Selection / Examination

- The pattern of Examination shall comprise the following:

(A) Written Examination

- i) The written examination will be an objective type Multiple Choice Question (MCQ) paper of two hours duration and having minimum 100 questions.
- ii) There will be negative marking for incorrect answers (as detailed below) for all questions:
 - a) There are four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, one fourth (25) of the marks assigned to that question will be deducted as penalty.
 - b) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answer happen to be correct and there will be same penalty as above for that question.
 - c) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question.

The Selection shall be made in accordance with the provisions of Rule 43(ii) of Jammu and Kashmir Public Service Commission (Business & Procedure) Rule, 2021, reproduced as under :-

A	Written Examination	68 points	
B	Performance in the Interview/ Viva Voce test. The candidate shall be asked to deliver a 5 minute demonstration/lecture on a given topic from the relevant subject to demonstrate his/ her domain knowledge/ skills and will be assessed and evaluated by the subject experts and the Members of the Commission in the Selection Committee/ Interview Board.	25 points	
C	Weightage for Academic Merit/ Higher Qualification in the relevant subject	Upto a Maximum of 04 points	
	a. Where Bachelor's degree is prescribed as the minimum qualification	Upto a Maximum of 04 points	
	(i) One year Post Graduate Diploma in the relevant subject (on pro-rata basis)	02 points	Maximum 4 points
	(ii) Masters/ Post Graduate degree in the relevant subject (on pro-rata basis)	04 points	
	b. Where Master's degree is prescribed as the minimum qualification	Upto a Maximum of 04 points	
	(i) MPhil in the relevant subject	02 points	Maximum 04 points
	(ii) PhD in the relevant subject	04 points	
D	Distinction in Sports (Certified by Secretary, J&K Sports Council to be an outstanding Sports Person in terms of J&K (Appointment of Outstanding Sports Persons) Rules, 2022	01 point	
E	Distinction in NCC activities (Holder of Grade "C" Certificate)	01 point	
F	Special Attributes		
	(i) Gold Medal for overall first position in the prescribed qualification	1 point	
G	Total (A to F)	100 points	

The syllabus for the written examination is given in Annexure "A", "B" and "C".

(B) **Interview/ Viva Voce**

On the basis of the marks obtained by the candidates in the written examination, an interview/viva voce test will be conducted. The number of candidates called for interview/ viva voce test shall be restricted, as far as practicable, to a minimum of three times the number of vacancies in order of merit. The interview/ viva-voce will have 25 points.

- i) The written exam will carry Sixty eight (68) points. The marks obtained in the written examination shall be taken into account on pro-rata basis for determining the final merit list

9. Provision of Compensatory Time and Assistance of Scribe

On request of a visually impaired (Blind) or any other candidate who is handicapped to the extent that he/she is not able to write, the candidate shall be provided assistance of an amanuensis (Scribe) on production of a Disability Certificate issued by the Medical Board constituted by the Government consisting of CMO of the District and at least two Medical Specialists nominated by the concerned Director, Health Services (with at least one specialist from the field concerned department). After verifying the genuineness of the certificate/satisfying itself, the Commission may provide services of Scribe to the candidate on the day of examination. The scribe should have one qualification down than the requirement for the post applied for by the candidate(s) and further should be from an academic stream different from that stipulated for the post. The scribe shall be paid remuneration charges equivalent to the Invigilator.

Provided the concerned Supervisor shall ensure that the scribe provided to the candidate shall not extend any type of help to the candidate in solving the questions. Blind candidates will be allowed an extra time of 20 minutes per hour.

10. Requisite Fee

After successful submission of the online application form, candidate will be required to deposit requisite fee through online mode. The amount of fee to be paid is given below:

OM Category	Rs.1000.00
Reserved Categories	Rs.500.00
PHC	Nil

Note:

- i. The application Form submitted without deposition of the fee, which gets substantiated through reflection of the same on the application form, such application form shall be treated as incomplete and candidature shall be deemed to have been rejected without any notice. No representation against such rejection shall be entertained.
- i. Submission of multiple applications by way of prefixing Mr./Ms or through generation of multiple User ID's or any other mode, followed by either non-payment of fee particulars or fee particulars (TID) of one application (RID) being mentioned against another application with a different RID would lead to rejection of the online application. The applicants who are submitting multiple applications should note that only the applications with higher Registration ID (RID) number

shall be entertained by the Commission and fee paid against one RID shall not be adjusted against any other RID number. Besides a strict disciplinary action shall be taken including the cancellation of candidature and debarment for future examinations of J&K PSC will be taken against such applicants.

11. Documents to be uploaded

While filling the online application form the applicants are requested to upload the documents as per details given below:-

Documents (Mandatory):-

1. Date of birth certificate (secondary School/Matric Certificate)
2. Domicile Certificate of the UT of J&K.
3. Masters' Degree / Bachelor Degree /Diploma alongwith consolidated Marks Card (s) upto 05 lvs.

Documents (Mandatory if claiming benefit under that category):-

1. Category Certificate. 01 leaf
2. In-service certificate signed by HOD

Any other document for which the candidate is claiming weight age as per J&K (Business and Procedure) Rules, 2021:-

1. M.Phil degree certificate alongwith result Notification
2. Ph. D Degree certificate alongwith result Notification
3. Experience Certificates, as per format-upto 05 lvs.
4. "C" Certificate in NCC activities. 01 leaf
5. Certificate of Distinction in Sports in terms of J&K Appointment of (Outstanding Sports Persons) Rules, 2022
6. Gold Medal Certificate for overall first position in the prescribed qualification. 01 leaf
7. Post Doctorate Certificate minimum 1 year.

It may be noted that no further opportunity to upload any document shall be provided hereafter and action under rules including rejection of application/candidature will be taken. While uploading the documents, the following guidelines, wherever applicable, shall also be kept in view before claiming weightage on such parameters:-

- i. The weightage available for the Gold Medal(s) shall be for securing the overall first position in the minimum prescribed qualification. In case the convocation for award of Gold Medal has not been convened, a certificate from the competent authority shall be uploaded to the effect that he/she is entitled to Gold Medal for security overall 1st position in the prescribed qualification and shall be awarded the same in the convocation of the University/Institute.
- ii. Foreign Degree shall only be entertain if equivalence Certificate issued by Association of Indian Universities (AIU) is made available.

12. Important instructions regarding filling up of online applications are given herein below:

- a) Candidates are required to apply online through the website of the Commission i.e. <http://www.jkpsc.nic.in>. No other means/ mode of application shall be accepted.

- b) Candidates are first required to go to the JKPSC website www.jkpsc.nic.in and click on the link “**One Time Registration**” or click on Login menu if you have already created your profile with the JK PSC.
- c) After logging into your account, candidates are required to fill all the requisite fields of One Time Registration (OTR) i.e. personal information, contact information & educational qualification, service details etc.
- d) The candidate shall also be required to upload the image of date stamped recent passport size color photograph and signature. The photograph should not be taken earlier than 01.01.2022..
- e) Size of the photograph (passport size) and signature must be between 10kB to 20kB in *.jpeg or *.jpg only.
- f) After successful submission of all the details in your OTR account, check the eligibility conditions as mentioned in the advertisement notification before applying for the post.
- g) On Clicking on the “show examination” a window will appear on your computer screen. Select the month of the advertisement notification for which you want to apply, a link(s) for the post(s) will appear on the computer screen.
- h) An “APPLY” button is shown against the respective post and the candidates will click on the APPLY button against the post he/she is eligible.
- i) On clicking “APPLY” button, an instruction window will appear. Candidates should read instructions carefully before clicking on “APPLY” button at the bottom of the webpage.
- j) On clicking “APPLY” button, the system will display all facts/particulars that a candidate may have mentioned while filling up the necessary fields of his/her OTR account. Candidate shall fill up the remaining required fields in the application form and accept the declaration thereof.
- k) Once the candidate is satisfied *about the correctness* of the filled in details, then, he or she may click on “SUBMIT” button to finally push the data into server with successful submission report.
- l) On successful submission of the basic details, the candidates will be required to pay the online fee and uploading of the documents, for final submission of the online application form.
- m) Candidates can pay the requisite fee through online mode in the “SUBMITTED APPLICATIONS” menu in your account.
- n) After successful payment of the fee, the fee status will get reflected on the Online Application form. Candidates can check the fee status by clicking on the **Print Application Button** in the submitted Applications menu in your JKPSC account. In case the payment status shows either “not submitted or under processing or status has not been reflected on your submitted application form”, candidates(s) are advised to contact the JKPSC office at Solina Srinagar/ReshamGhar Colony Jammu immediately for clarification. Further where the online fee is paid through other service providers the candidate must ensure that not only the amount of fee is debited from his/service provider’s Account but also credited into the official account of JKPSC.
- o) After successful submission of fee, the candidates will be required to upload requisite documents as specified in the advertisement/application form.

- p) The candidate would be able get the printout of his/her submitted application only after the payment of the requisite fee and uploading of requisite documents.
- q) Please note that the above procedure is the only valid procedure for applying. No other mode of application or incomplete steps would be accepted and such applications would be rejected.

13. Editing of the online application form

Candidates who have successfully submitted the online application form along with requisite fee will be allowed to edit some of the fields in their submitted online application form within three days after the cut-off date i.e. on **10.09.2022 to 12.09.2022**. Detailed instruction in this regard will be made available on the website.

14. Action against candidates found guilty of misconduct

Candidates are advised that they should not furnish any particulars that are false or suppress any material information.

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

- i. obtaining by wrongful support of his/her candidature by any means, or
- ii. impersonating, or
- iii. procuring impersonation by any person, or
- iv. submitting fabricated documents or documents which have been tampered with or
- v. making statements which are incorrect, or false or suppressing material information, or
- vi. resorting to any other irregular or improper means in connection with his/her candidature for the selection, or
- vii. using unfair means during the interview, or
- viii. misbehaving in any other manner in the interview, or
- ix. harassing or doing bodily harm to the staff employed by the Commission for the conduct of their test, or
- x. 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/herself liable to criminal prosecution.

Shall be liable;

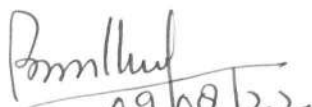
(a) to be disqualified by the Commission from selection for which he/she is a candidate , and/or

(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 Union Territory Government from any employment under them, and

(c) if he/she is already in service under Government, disciplinary action can be taken against his/her under the appropriate rules.


09/08/22
(Bashir Ahmad Dar) JKAS
Secretary

J&K Public Service Commission

No:PSC/DR/Drillers/Asstt.Engineer/Geologist-III/MiningDeptt/22 **Dated: 05.08.2022**

Copy to the: -

1. Secretary to the Government, Department of Mining, Civil Secretariat, Jammu/Srinagar.
2. Director, Information Department J&K. He is requested to publish the Notification in at least two local dailies of the Union Territory of J&K, for at least three consecutive days.
3. P.S. to Chairman, J&K Public Service Commission for information of the Hon'ble Chairman.

4. P.S. to Member _____, J&K PSC for information of Hon'ble Member.
5. P.A. to Controller of Examination, J&K Public Service Commission.
6. In charge website, J&K Public Service Commission for uploading of the Notification on the website.
7. Notice Board, J&K Public Service Commission, Srinagar/Jammu.
8. Stock file/Main file.

Syllabus
GEOLOGIST

Annexure "A" to Notification No. 20-PSC(DR-P) of 2022 dated 05.08.2022

Physical Geology:

Principle of uniformitarianism; Origin of the Solar System and the Earth; Geosphere and the composition of the Earth; Shape and size of the Earth; Earth-Moon system; Dating techniques and methods and age of the Earth; Earthquakes; Earth's magnetism and gravity, Isostasy; Basic elements of Plate Tectonics; Orogenic cycles. differentiation and internal structure of the Earth; origin of atmosphere; earthquakes and volcanoes; continental drift, sea-floor spreading; geological action of rivers, wind, glaciers, waves; erosional and depositional landforms; weathering processes and products of weathering.

Structural Geology:

Orientation of planes and lines in space, concept of dip, strike, rake and plunge. Contour lines; Rule of 'V's and outcrop patterns; Interpretation of geological maps and cross-section construction; Classification and origin of folds, faults, joints, unconformities, foliations and lineations; age relationship, origin and significance of geological structures. Stereographic and equal-area projections of planes and lines; Numerical problems related to outcrop and bore-hole data. Stress, strain and rheological properties of rocks; Mohr's circle and criteria for failure of rocks; ductile and brittle deformation in rocks; study of toposheets. Significance and limitations of π - and β -diagrams. Geometrical analysis of simple and complex structures on macroscopic scale.

Mineralogy and Crystallography:

Elements of symmetry, notations and indices; Bravais lattices; chemical; Combination of symmetry elements; 32 classes of crystals, spherical and stereographic projections. classification of minerals; isomorphism, polymorphism, solid solution and exsolution; silicate structures; physical and optical properties of common rock forming minerals- olivine, garnet, pyroxene, amphibole, mica, feldspar and quartz. Orthoscopic and conoscopic study of minerals. Optic figure, optic sign, dispersion, pleochroism and absorption. Determinative methods in mineralogy: Refractive index. Pressure Temperature stability and mode of occurrence of silicates, native elements, sulphides, oxides, hydroxides and carbonates. Mineral assemblages.

Igneous and Metamorphic Petrology:

Magma: nature, cooling behavior, properties and chemistry; volatiles in silicate melts, magmatic crystallization. Magma types and their evolution; IUGS classification of igneous rocks; forms, structures and textures of igneous rocks; association, and genesis of common igneous rocks. applications of binary and ternary phase diagrams in petrogenesis; magmatic differentiation and assimilation; petrogenesis of common types of igneous rocks. Application of major and trace elements (including REE) and Sr, - Pb, - and Nd - isotopes studies in deciphering magma generation, mantle - crust interactions and tectonic environments. Metamorphism its Limits, types and controls; metamorphic structures- slate, schist and gneiss; metamorphic textures- pre, syn and post tectonic porphyroblasts; concept of metamorphic zone, isograd and facies; geothermal gradients, facies series and plate tectonics. Concept of matasomatism and anataxis. Concept of projections - ACF, AKF and AFM diagrams; Phase Rule and its applications.

Sedimentology:

Origin of sedimentary rocks. Types of sandstones and their petrogenesis; Grawacke and Grawacke problem, plate tectonics and sandstones composition. Argillaceous rocks, their classification and genesis.

Volcaniclastic sediments and their characteristics with reference to Kashmir Himalayas. Limestone and dolomites: classification and petrography, Study of evaporites such as gypsum, and anhydrite. Diagenesis of sandstones, mudrocks and carbonate rocks. Fluid flow concepts and sediment transport. Bedforms and sedimentary structures, Palaeocurrent analysis. Sediment texture, textural parameters and their significance. Tectonic classification of sedimentary basins; Sedimentary facies; Processes and characteristics of depositional environments like Fluvial, Estuarine, Deltaic, Tidal flat, Lagoonal, Barrier beach and Deep-Sea environments. Concise approach to regional unconformities, parasequences and systems tracts; Allogenic and autogenic controls on sedimentation. Introduction to Quaternary Sedimentology.

Palaeontology:

Fossils and processes of fossilization; concept of species and binomial nomenclature; morphology and classification and major evolutionary trends as well as different ages of animal groups of Brachiopoda, Mollusca, Trilobita, Graptolitoidea, Anthozoa, Echinodermata, etc. Gondwana plant fossils along with the primary idea of vertebrate fossils. evolution and morphological characters in Equidae and Hominidae; Definition and scope of micropaleontology; Relationship of micropaleontology with ocean sciences; Modern field and laboratory techniques in the study of microfossils (collection, sampling and processing techniques, scanning electron microscopy and mass spectrometry); micropaleontology in reconstruction of history of past, environmental changes and biostratigraphic correlation. Application of Micropaleontology in hydrocarbon exploration.

Stratigraphy:

Principles of stratigraphy; Litho-, Chrono- and biostratigraphic classification; Stratigraphic correlation techniques; Archaean cratons of Peninsular India (Dharwar, Singhbhum and Aravalli); Proterozoic mobile belts; Stratigraphy of Cuddapah and Vindhyan basins; Stratigraphy of Paleozoic – Mesozoic of Spiti and Kashmir, Gondwana Supergroup, Jurassic of Kutch, Cretaceous of Trichinopoly, Tertiary and Quaternary sequences of Assam, Bengal and Siwaliks. Concept of sequence stratigraphy; brief ideas of magneto-seismic- chemo- and event stratigraphy and stratigraphic correlation. Precambrian/Cambrian and Permian/Triassic boundary problem.

Geomorphology:

Basic concepts and significance of Geomorphology; Cycle of erosion. Concept of karst landscapes; elementary idea about morphogenesis and morphography; Morphometric analysis; Morphochronology, Neotectonics: Geomorphological indicators, active faults, drainage changes, recurrent seismicity. Geomorphology of India - Peninsular, extra-peninsular and Indo-Gangetic Plains. Application of Geomorphology in Mineral Prospecting, Civil Engineering, Military purposes, Hydrogeology and Environmental studies. Concept of Quaternary geomorphology. Introduction to geotectonics; Paleomagnetism, polar wandering and reversal of earth's magnetic field; Geomagnetic time scale; Principal Geotectonic features: Features of the Ocean, Continent and Continental margins Plates and plate boundaries; Principles of Plate Tectonics; Force Balance and Mantle Plume models of plate movements; Orogeny and Epeirogeny; Anatomy of orogenic Belts; Geodynamic Evolution of Himalaya.

Economic Geology:

Properties of mineral deposits- form, mineral assemblage, texture, rock-ore association and relationships; magmatic, sedimentary, metamorphic, hydrothermal, supergene and weathering related processes of ore formation; processes of formation of coal and petroleum; distribution and geological characteristics of major mineral and hydrocarbon deposits of India. Important metallic, non-metallic and atomic mineral deposits of India. Ore texture, sequence of temperature of formation, ore solutions, complexing and ore

deposition. Mineral resources- time, space, and dynamic controls, resource management concept, mineral economics, present status of resources, resource development and future sources. Mineral economics and National mineral policy; classification of mineral deposits, discovery types, stages of exploration: reconnaissance permits, large area prospecting, prospecting license, mining lease, mineral deposits and host rocks Geological exploration: surface signatures like stratigraphy, weathering (gossan), structures (fold, fault, lineament, shear, breccia). Geochemical exploration: soil, rock, stream sediments, hydrogeochemical, biogeochemical, geobotanical, atmogeochemical, and electrogeochemical. Drilling technology: percussion, diamond, reverse circulation, air core, wireline, BH deviation survey. Study of following Indian ore deposits with reference to their mineralogy, mode of occurrence, origin, geological association and geographical distribution: iron, manganese, gold, aluminum, chromium, copper, lead, zinc, tin, tungsten, titanium, nickel, molybdenum; fuels: coal, petroleum and radioactive minerals, gemstones

Geophysical Exploration:

Exploration Geophysics Basic principles of Geophysics. Detailed knowledge of different types of geophysics methods involving gravity, magnetism & seismology. Gravity methods: introduction, Gravity potential and field due to different simple bodies and structures. Field procedure. Bouguer gravity anomalies, interpretations & field-cases Magnetic methods: introduction, magnetic properties of rocks, geomagnetic field, field procedure, measurement of magnetic anomalies, interpretation. Electrical method: Introduction, Self potential, earth resistivity, different arrays, profiling & sounding techniques, interpretation & field cases. Induced polarization. Telluric & electromagnetic methods. Seismic method: introduction, refraction methods, layered earth refraction studies, hidden layer problem, correction, instruments, field procedures, interpretation. Various well-logging techniques.

Hydrogeology:

Ground water, origin, types, importance, occurrence, reservoirs and movement; renewable and nonrenewable groundwater resources; hydrologic properties of rocks: porosity; permeability; specific yield; specific retention, hydraulic conductivity, transmissivity, storage coefficient. Groundwater quality, estimation of parameters; hydrographs; water table contour maps; hydrostratigraphic units,. Well hydraulics: confined, unconfined, steady, unsteady and radial flow; water level fluctuations; causative factors and their measurements; methods of pumping test and analysis of test data; evaluation of aquifer parameters. Methods of artificial groundwater recharge; method of rainwater harvesting, problem of over exploitation of groundwater; groundwater legislation; water management in rural and urban areas, salt water intrusion in coastal aquifers; remedial measures. Surface and sub-surface geophysical and geological methods of groundwater exploration; hydrogeomorphic mapping using various Remote Sensing techniques; radioisotopes in hydrogeological studies, concept of watershed management, ground water management technical and social aspects.

Engineering and Environmental Geology:

Role of engineering geology in civil construction and mining industry. Various stages of engineering geological investigations for civil engineering projects. Engineering properties of rocks: rock discontinuities, physical characters of building stones, concrete and other aggregates. Geological consideration for evaluation of dams and reservoir sites. Dam foundation, rock problems, geotechnical evaluations of tunnel alignments and transportation routes. Methods of tunneling; Classification of ground for tunneling purposes; various types of support. Geological considerations involved in the construction of roads, railways, bridges and buildings. Improvement of sites for engineering projects. Mass Movements with special emphasis on landslide and causes of hill slope instability. Seismic designs of buildings influence of geological condition on foundation and design of buildings. Surveying: Surveying: Fundamental Concepts and principles; Primary division and classification of surveys; Common methods of surveying: Reconnaissance survey, Offsetting, Radiation, and triangulation; Open and closed traversing;

Leveling. Accuracy and errors in surveying; Basic elements of map preparation and map reading Working principles and use of different Surveying Instruments: Chain, Plane Table, Prismatic Compass, Dumpy level, Theodolite and Total Station. Concept of Global Positioning System (GPS). Concepts of Environmental Geology. Domains of Environmental Geology. Time scales of global changes in the ecosystem and climate. Impact of circulations in atmosphere and oceans on climate and rain fall. Levels of Present and past atmospheric carbon-dioxides. Global warming caused by CO₂ increase in the present atmosphere. Carbon Sequestration. Role of physical, chemical and biological parameters influencing environment. Riverine and marine environments and their important characteristics. Air, water and noise pollution and their major causes. Pollution in the mining areas. Parameters influencing weathering, development of soils and soil profiles. Distribution, magnitude and intensity of earthquakes. Seismic hazard zones. Neotectonics in seismic hazard assessment. Landslide, Floods and volcanic hazards their causes and control. Coastal erosion its causes and control. Problems of urbanization, human population and their impact on environment. Alternative sources of energy. Waste disposal and related problems. Environmental legislation.

Remote Sensing and GIS in Geology:

Remote sensing: principles and significance; Electromagnetic Radiation – Characteristics and Remote Sensing Regions and bands; Spectra of common natural objects – soil, rock, water and vegetation; General Orbital characteristics of satellites; Concepts of radiometric, spectral, spatial and temporal resolutions of satellite sensors; Sensor characteristics of remote sensing satellites: Landsat, IRS, ASTER, Quickbird Aerial photography: Planning and Execution, types of aerial photography; Aerial photos: classification, scale, resolution, stereoscopic parallax, image displacement; Properties of vertical and inclined aerial photographs; Elements of image and photo interpretations, Interpretations keys Earth Model: Geoid, Authalic sphere and ellipsoid and their uses in GIS; Concept of datum: geocentric and local geodetic, horizontal and vertical; Co-ordinate systems: Geographic and planar; Concept of Map projections: Principal scale and scale factor, Concept of cylindrical, conical and planar map projections; Brief idea about commonly used map projections: Mercator, Transverse Mercator, Universal Transverse Mercator (UTM), Lambert Conformal, Conic and Polyconic; Digital Image Processing: Geometric and radiometric Corrections of satellite images; Image enhancement and classification. Concept of GIS: Definition and components of GIS; Object based and field based GIS data model; Raster, vector, Spatial and non-spatial data structures; Data Based Management Systems and Model; Spatial Analysis: Spatial elements and analysis, local, focal, zonal and global operations; GIS query and output, Digital Elevation Model (DEM) and its derivatives; Utility of GIS in Geological project.

Syllabus
Driller

Annexure "B" to Notification No. 20-PSC(DR-P) of 2022 dated 05.08.2022

Engineering Mechanics: Simple applications of equilibrium equations. Motion in two dimensions, Projectile motion, Simple applications of equations of motion, simple harmonic motion, work energy, power. Friction, center of gravity, moment of inertia.

Mechanics of solids: Stress, strain, Hook's Law, elastic moduli, Bending moments and shearing force diagrams for beams. , springs, thin walled cylinders, torsion in shafts, struts and Columns, Mechanical properties and material testing.

Theory of Machines: Simple examples of links and mechanics, Kinematic pairs, chain and mechanisms

Velocity and acceleration in mechanisms, Classification of gears, standard gear tooth profiles, Gear Trains, Belts, Ropes, and chain Drives, Governors and Flywheels, Clutches, Classification of bearings. Statics and dynamic balancing. Cam and Followers,

Manufacturing Science: Mechanics of metal cutting, tool life, cutting tool materials. Basic machining processes, types of machine tools, Basic Principals of Machining with Lathe, Milling, Drilling, Shaping, Grinding machines. Methods of metal forming : Rolling, forging, extrusion, wire drawing, tube drawing and powder metallurgy. Metal joining - welding, soldering, brazing. Testing of metals and alloys, hardness, tensile strength, ductility measurements. Different types of casting and welding methods.

Production Management: Method and time study, motion economy and work space design, operation and flow process charts. Product design and cost selection of manufacturing process. Break even analysis, Site selection,

plant layout, Materials handling, selection of equipment for job, shop and mass production, Scheduling, dispatching routing.

Thermodynamics: Thermodynamic systems and processes, behavior of Ideal and Real Gases, zeroth and first law of Thermodynamics, Calculation of Heat and work in various processes. Second law of thermodynamics. Air and Gas compressors, Vapor and Gas power cycles. Concepts of Regeneration and Reheat. I.C Engines, Otto, Diesel and Dual cycles. Impulse and Reaction Principles: Steam and Gas Turbines, Heat Transfer: Heat transfer by conduction, Convection and Radiation. One dimensional steady state conduction through walls and cylinders. Heat transfer coefficient, combined heat transfer coefficient, Heat exchangers, Fins. Air Conditioning: Environmental Control Refrigeration cycles, refrigeration equipment- its operation and maintenance, important refrigerants, Psychometrics comfort, cooling and dehumidification.

Fluid Mechanics: Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; Equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids. Turbulent flow, flow through pipes, head losses in pipes, bends and fittings: Measurement of Flow rate Basic Principles: Venturimeter, Pitot tube, Orifice meter. Hydraulic Turbines: Classifications & Principles. Pumps: Classification & principals

Syllabus
Assistant Mining Engineer
Annexure "C" to Notification No. 20-PSC(DR-P) of 2022 dated
05.08.2022

As directed, the Syllabus framed for the Assistant Mining Engineer post of the department of Geology and Mining is hereby submitted:-

01-Elements of Mining Engineering:-

i) Introduction to Mining Engineering and opening of deposits. ii) Shaft sinking operation and Mechanized methods of shaft sinking & ordinary/water logged ground iii) Development of workings IV) Mine supports v) Tunneling Methods VI) Driving of inclined Shafts vii) Method of boring, Boring through disturbed strata

02-Mining Geology:-

Application of Geology in Mining Engineering ii) Economic geology and mineral deposits iii) Occurrences and distribution of Minerals in India IV) Coal, petroleum and natural gas v) Exploration Geology and Mining Geology vi) Mineral Deposits and their classification

03)-Mine Mechanization:-

i) Principles, Generation, Distribution and utilization of compressed air and introduction to Mine Transport Systems iii) Ropes and Ropes haulage Systems IV) Conveyors and Locomotives v) Winding system in Mines VI) Breaking system of Winders and study of layouts for Mine Transportation

04--Mine Surveying:-

i) Introduction to Surveying and Measurements of Distance and Directions ii) Leveling iii) Triangulation and Contouring iv) Computation of Areas and Volumes v) Introduction to Theodolite and Traversingvi)Types of plans, their preparation, care, storage/preserve

05-Drilling and Blasting Engineering:-

i) Principles of Drilling and Drill Bits ii) Explosives iii) Firing of explosives and Blasting Methods iv) Handling of Explosives v) Mechanics of Blasting and Effects of Vibration

06-Mine Environment and Ventilation Engineering:-

i) Mine Air and Study of Fire Damps ii) Mine climate iii) Air Flow through Mine Openings iv) Natural and Mechanical Ventilation v) Ventilation Survey and Elements of Ventilation Planning vi) Fire fighting, both on surface and below ground vii) ventilation plans

07-Underground Coal Mining:-

i) Introduction to Coal Mining ii) Board and Pillar Mining iii) Longwall Mining iv) Thick Seam Mining v) Special Methods of Mining

08)-Mineral Economics:-

i) Introduction and Economic importance of Mineral Industry ii) National Mineral Policy iii) Demand and Supply Analysis iv) Mineral Price and Pricing v) Sampling and Estimation of Reserves vi) Mine valuation and Financial Management

09)-Rock Mechanics:-

i) Introduction to Rock Mechanics ii) Analysis of Stress and Strain iii) Physico-Mechanical Properties of Rocks iv) In-situ Strength and failure Criteria of rocks

10)-Mine Disasters and Rescue:-

i) Mine Fires ii) Spontaneous Heating iii) Disasters iv) Mine Illumination v) Mine Rescue and Recovery

11)-Surface Mining:-

i) Introduction ii) Methods of opencast mining iii) Open Pit Layout and Design iv) Drilling and Blasting v) Source of Danger of water in opencast mining vi) Surface Mining Methods and Machinery vii) Mechanized Quarrying with deep hole blasting and HEM viii) Transport Equipment

12)-Underground Metal Mining:-

i) Introduction to Metal Mining and Mine Development ii) Stope and Stopping iii) Stopping Methods iv) Special Methods

13)-Mine Safety Engineering:-

i) Introduction ii) Risk Management iii) Statistical methods of Risk analysis iv) Mine Accidents Analysis v) Safety Audits and Training

14)-Ground Control:-

i) Design and Stability of structures in Rock ii) Design of Mine Pillars iii) Design of Mine Pillars iv) Subsidence v) Caving of Rock Mass vi) Classification of Rock Masses

15)-Occupational Health and General Safety:-

i) Introduction ii) Occupational Health iii) Safety Rules and Regulations and Bye-Laws iv) Accidents v) Accidental Planning

16)-Surface Mine Planning and Design:-

i) Introduction ii) Ore reserves estimation and Stripping ratio iii) Geometrical consideration and Pit Planning iv) Production planning, Analysis & design of highwall slopes and waste dumps

17)-Mine Legislation and General Safety:-

i) Introduction and the Mines Act 1952 ii) Mines Rules 1955 iii) Metalliferous Mines Regulation 1961 and Coal Mines Regulations 2017 iv) Mines and Minerals (Development and Regulation) Act 1952 and related Rule v) Silicosis and pneumoconiosis in Miners,

ANNEXURE "C"

vi) Mine Dust- sampling and Analysis vii) other miners diseases, their symptoms, prevention and treatment viii) Sanitation and health

18)-Computer Application in Mining:-

Computer Aided Design ii) Computer Graphics Software and Database
iii) Database Management System

19)- Dimensional Stone Mining:-

i) Introduction ii) Mining Dimensional Stones iii) Handling of Blocks and slabs iv) Quarrying machines for dimensional stones

20)-Environmental Impact of Mining:-

i) Introduction ii) Air Pollution iii) Water Pollution iv) Noise Pollution v) Land environment/ Land degradation due to Mining vi) Laws related to Mining environment, EIA of mining projects

21)-Mining Machinery:-

i) Strength of Materials and Applied Mechanics ii) Machine tools and workshop processes iii) Compressors and compressed air engines iv) Application of electricity in Mines v) Working Principles of Steam generators and steam engines vi) Generation, Transmission and utilization of power