

Certificate of Disability  
(In cases of other than those mentioned in Forms II and III)  

(Name and Address of the Medical Authority/Board issuing the Certificate)

Recent passport size attested photograph (showing face only) of the person with disability

Certificate No.

Date:

This is to certify that we have carefully examined Shri/Smt./Kum. \_\_\_\_\_ son/wife/daughter of Shri \_\_\_\_\_ Date of birth (DD/MM/ YY) \_\_\_\_\_ age \_\_\_\_\_ years, male/ female \_\_\_\_\_ Registration No. \_\_\_\_\_ permanent resident of House No. \_\_\_\_\_ Ward/Village/ Street \_\_\_\_\_ Post Office \_\_\_\_\_ District \_\_\_\_\_ State \_\_\_\_\_, whose photograph is affixed above, and am satisfied that he/she is a case of Disability. His/her extent of percentage physical impairment/disability has been evaluated as per guidelines (.....number and date of issue of the guidelines to be specified) and is shown against the relevant disability in the table below:-

S. N.	Disability	Affected part of body	Diagnosis	Permanent physical impairment/mental disability (in%)
1.	Locomotor disability	@		
2.	Muscular Dystrophy			
3.	Leprosy cured			
4.	Cerebral Palsy			
5.	Acid attack Victim			
6.	Low Vision	#		
7.	Deaf	£		
8.	Hard of Hearing	£		
9.	Speech and Language disability			
10.	Intellectual Disability			
11.	Specific Learning Disability			
12.	Autism Spectrum Disorder			
13.	Mental illness			
14.	Chronic Neurological Conditions			
15.	Multiple sclerosis			
16.	Parkinson's disease			
17.	Haemophilia			
18.	Thalassemia			
19.	Sickle Cell disease			

Please strike out the disabilities which is not applicable)  
2. The above condition is progressive/non-progressive/ likely to improve/not likely to improve.  
3. Reassessment of disability is:-  
(i) not necessary,  
or  
(ii) is recommended/after.....years..... months, and therefore this certificate shall be valid till.... (DD) (MM) (YY)  
@ e.g. Left/right/both arms/legs  
# e.g. Single eye/both eyes  
£ e.g. Left/Right/both ears

Signature and seal of the Medical Authority.

Name and Seal of Member	Name and Seal of Member	Name and Seal of the Chairperson
<div>Signature/thumb impression of the person in whose favour certificate of disability is issued</div>	Countersigned by the Chief Medical Officer (with seal)	

उत्तर प्रदेश लोक सेवा (शारीरिक रूप से विकलांग, स्वतंत्रता संग्राम सेनानियों के आश्रितों और भूतपूर्व सैनिकों के लिये आरक्षण), अधिनियम, 1993 (यथासंशोधित) के अनुसार स्वतंत्रता संग्राम सेनानी के आश्रित के प्रमाण-पत्र का प्रपत्र।  
प्रमाण-पत्र  
प्रमाणित किया जाता है कि श्री / श्रीमती ..... निवासी ग्राम- ..... नगर- ..... जिला- ..... उत्तर प्रदेश लोक सेवा (शारीरिक रूप से विकलांग, स्वतंत्रता संग्राम सेनानियों के आश्रितों और भूतपूर्व सैनिकों के लिये आरक्षण) अधिनियम, 1993 के अनुसार स्वतंत्रता संग्राम सेनानी हैं और श्री / श्रीमती / कुमारी (आश्रित) ..... पुत्र / पुत्री / पौत्र (पुत्र का पुत्र या पुत्री का पुत्र) तथा पौत्री (पुत्र की पुत्री या पुत्री की पुत्री) (विवाहित अथवा अविवाहित) उपर्युक्त अधिनियम, 1993 (यथासंशोधित) के प्रावधानों के अनुसार उक्त श्री / श्रीमती (स्वतंत्रता संग्राम सेनानी) .....के आश्रित हैं।  
हस्ताक्षर .....  
पुरा नाम .....  
मुहर .....  
जिलाधिकारी .....  
(सील) .....

कुशल खिलाड़ियों के लिये प्रमाण-पत्र जो उ.प्र. के मूल निवासी हैं शासनार्देश संख्या-22/21/1983-कार्मिक-2 दिनांक 28 नवम्बर, 1985 प्रमाण-पत्र के फॉर्म - 1 से 4 प्रारूप - 1 (मान्यता प्राप्त क्रीड़ा/खेल में अपने देश की ओर से अन्तर्राष्ट्रीय प्रतियोगिता में भाग लेने वाले खिलाड़ी के लिये) सम्बन्धित खेल की राष्ट्रीय फेडरेशन/राष्ट्रीय एसोसिएशन का नाम ..... राज्य सरकार की सेवाओं/पदों पर नियुक्ति के लिए कुशल खिलाड़ियों के लिए प्रमाण-पत्र प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी ..... आत्मज/पत्नी/आत्मजा श्री ..... निवासी (पूरा पता) ..... ने दिनांक ..... से दिनांक ..... तक ..... (स्थान का नाम) में आयोजित ..... (क्रीड़ा/खेल-कूद का नाम) की प्रतियोगिता/टूर्नामेंट में ..... स्थान प्राप्त किया गया। उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नामेंट में ..... (प्रदेशीय संघ का नाम) में उपलब्ध रिकार्ड के आधार पर दिया गया है। यह प्रमाण-पत्र राष्ट्रीय फेडरेशन/राष्ट्रीय एसोसिएशन/(यहाँ संस्था का नाम दिया जाये) ..... में उपलब्ध रिकार्ड के आधार पर दिया गया है।

स्थान .....  
दिनांक .....

हस्ताक्षर .....  
नाम .....  
पद .....  
संस्था का नाम .....  
मुहर .....

नोट : यह प्रमाण-पत्र नेशनल फेडरेशन/नेशनल एसोसिएशन के सचिव द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर होने पर ही मान्य होगा।

प्रारूप - 2 (मान्यता प्राप्त क्रीड़ा/खेल में अपने प्रदेश की ओर से राष्ट्रीय प्रतियोगिता में भाग लेने वाले खिलाड़ी के लिये) सम्बन्धित खेल की प्रदेशीय एसोसिएशन का नाम ..... राज्य सरकार की सेवाओं/पदों पर नियुक्ति के लिए कुशल खिलाड़ियों के लिए प्रमाण-पत्र प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी ..... आत्मज/पत्नी/आत्मजा श्री ..... निवासी (पूरा पता) ..... ने दिनांक ..... से दिनांक ..... तक ..... में (क्रीड़ा/खेल-कूद का नाम) की प्रतियोगिता (टूर्नामेंट स्थान का नाम) ..... आयोजित राष्ट्रीय ..... में (क्रीड़ा/खेल-कूद का नाम) की प्रतियोगिता/टूर्नामेंट में प्रदेश की ओर से भाग लिया। उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नामेंट में ..... स्थान प्राप्त किया गया। यह प्रमाण-पत्र ..... (प्रदेशीय संघ का नाम) में उपलब्ध रिकार्ड के आधार पर दिया गया है।  
स्थान ..... हस्ताक्षर .....  
दिनांक ..... नाम .....  
पद .....  
संस्था का नाम .....  
मुहर .....

नोट : यह प्रमाण-पत्र प्रदेशीय खेल-कूद संघ के सचिव द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर होने पर ही मान्य होगा।

प्रारूप - 3 (मान्यता प्राप्त क्रीड़ा/खेल में अपने विश्वविद्यालय की ओर से अन्तर्विश्वविद्यालय प्रतियोगिता में भाग लेने वाले खिलाड़ी के लिये) विश्वविद्यालय का नाम ..... राज्य स्तर की सेवाओं/पदों पर नियुक्ति के लिए कुशल खिलाड़ियों के लिए प्रमाण-पत्र प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी ..... आत्मज/पत्नी/आत्मजा श्री ..... निवास (पूरा नाम) ..... विश्वविद्यालय की कक्षा ..... के विद्यार्थी ने दिनांक ..... से दिनांक ..... तक ..... (स्थान का नाम) में आयोजित अन्तर्विश्वविद्यालय ..... (क्रीड़ा/खेल-कूद का नाम) प्रतियोगिता/टूर्नामेंट में ..... विश्वविद्यालय की ओर से भाग लिया। उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नामेंट में ..... स्थान प्राप्त किया गया। यह प्रमाण-पत्र डीन ऑफ स्पोर्ट्स अथवा इंचार्ज खेल कूद ..... विश्वविद्यालय में उपलब्ध रिकार्ड के आधार पर दिया गया है।  
स्थान ..... हस्ताक्षर .....  
दिनांक ..... नाम .....  
पद .....  
संस्था का नाम .....  
मुहर .....

नोट : यह प्रमाण-पत्र विश्वविद्यालय के डीन ऑफ स्पोर्ट्स या इंचार्ज खेल-कूद द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर होने पर ही मान्य होगा।

प्रारूप - 4 (मान्यता प्राप्त क्रीड़ा/खेल में अपने स्कूल की ओर से राष्ट्रीय खेल-कूद में भाग लेने वाले खिलाड़ी के लिये)डाइरेक्ट्रेट ऑफ पब्लिक इन्स्ट्रक्शन्स/निदेशक, शिक्षा, उत्तर प्रदेश राज्य स्तर की सेवाओं/पदों पर नियुक्ति के लिए कुशल खिलाड़ियों के लिए प्रमाण-पत्र प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी ..... आत्मज/पत्नी/आत्मजा श्री ..... निवासी (पूरा पता) ..... में ..... स्कूल में कक्षा ..... के विद्यार्थी ने दिनांक ..... से दिनांक ..... तक .....(स्थान का नाम) में आयोजित स्कूलों के नेशनल गेम्स की (क्रीड़ा/खेल-कूद का नाम) प्रतियोगिता/टूर्नामेंट में ..... स्कूल की ओर से भाग लिया। उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नामेंट में ..... स्थान प्राप्त किया गया। यह प्रमाण-पत्र डाइरेक्ट्रेट ऑफ पब्लिक इन्स्ट्रक्शन्स/शिक्षा में उपलब्ध रिकार्ड के आधार पर दिया गया है।  
स्थान ..... हस्ताक्षर .....  
दिनांक ..... नाम .....  
पद .....  
संस्था का नाम .....  
मुहर .....

नोट : यह प्रमाण-पत्र निदेशक/या अतिरिक्त/संयुक्त या उपनिदेशक डाइरेक्ट्रेट ऑफ पब्लिक इन्स्ट्रक्शन्स/शिक्षा ..... द्वारा व्यक्तिगत रूप से हस्ताक्षर होने पर मान्य होगा।

Appendix-2  
उ०प्र० सम्मिलित राज्य अभियंत्रण सेवा परीक्षा  
प्रथम चरण—प्रारम्भिक परीक्षा  
परीक्षा—योजना

प्रश्नपत्र — एक (वरतुनिष्ठ प्रकारक)  
प्रश्नों की संख्या — 150 (सामान्य ज्ञान—25 प्रश्न, सामान्य हिन्दी—25 प्रश्न एवं ईंजीनियरिंग एपीटीयूड—100 प्रश्न)  
कुल अंक — 300 (प्रत्येक प्रश्न 2 अंक)  
समायावधि — 2 घंटा

प्रारम्भिक परीक्षा मात्र आईकारी होगी जिसमें मा० आयोग द्वारा निर्धारित मानक प्रति पद 15 गुना अभ्यर्थी द्वितीय चरण (मुख्य परीक्षा) में सम्मिलित होने हेतु सफल किये जायेंगे। इस सम्बन्ध में मा० आयोग द्वारा समय-समय पर लिये गये प्रक्रियागत निर्णय प्रभावी होंगे।

पाठ्यक्रम  
सामान्य ज्ञान: सामान्य ज्ञान के प्रश्न-पत्र समसामयिक घटनाओं और ऐसी बातों की उनके वैज्ञानिक पहलुओं पर ध्यान देते हुए जानकारी सम्मिलित होगी जो प्रतिदिन के अनुभव में आती हैं तथा जिनकी किसी शिक्षित व्यक्ति से अपेक्षा की जा सकती है। प्रश्न-पत्र में भारत का इतिहास, राजनीति और भूगोल के ऐसे प्रश्न भी सम्मिलित होंगे जिनका उत्तर उम्मीदवार विशेष अध्ययन किये बिना ही दे सकेंगे।  
सामान्य हिन्दी— हिन्दी का पाठ्यक्रम इस प्रकार बनाया जायेगा ताकि उम्मीदवार की हिन्दी भाषा की समझ और शब्दों के कुशल प्रयोग की जाँच हो सके। इसका स्तर हाई स्कूल का होगा।

Engineering Aptitude:-  
1. General principles of design and drawing  
2. Engineering materials  
3. Basics of thermodynamics  
4. Water resources and conservation processes  
5. Basics of project management  
6. Industrial safety and safety standards  
7. Information and communication technologies (ICT)  
8. Basics of artificial intelligence and robotics  
9. Types of machinery maintenance  
10. Green Energy  
11. Basics of measurement & instrumentation  
12. Energy conversion principles  
13. Disaster management  
14. Ethics and values in engineering profession  
15. Quality control  
16. Intellectual property rights  
17. Human health and sanitation  
18. Handling & storage of products  
19. Climate change  
20. Production & construction

21. Recent development in applied sciences

22. Role of Science & Technology in daily life

Appendix-3

द्वितीय चरण—मुख्य परीक्षा की योजना एवं पाठ्यक्रम

सम्मिलित राज्य अभियन्त्रण सेवा परीक्षा हेतु वस्तुनिष्ठ प्रकार के निम्नवत् दो प्रश्न—पत्र होंगे:—

प्रथम प्रश्न पत्र

विषय	प्रश्नों की संख्या	अंक	कुल अंक	समय
1— सामान्य हिन्दी	25 (प्रत्येक प्रश्न 3 अंक)	75	375	2.30 (ढाई) घण्टा
2— मुख्य विषय (सिविल इंजी०— I, मैके० इंजी०— I, विद्युत इंजी०— I, कृषि इंजी०— I)	100 (प्रत्येक प्रश्न 3 अंक)	300		

द्वितीय प्रश्न पत्र

विषय	प्रश्नों की संख्या	अंक	कुल अंक	समय
1— सामान्य अध्ययन	25 (प्रत्येक प्रश्न 3 अंक)	75	375	2.30 (ढाई) घण्टा
2— मुख्य विषय (सिविल इंजी०— I, मैके० इंजी०— I, विद्युत इंजी०— I, कृषि इंजी०— I)	100 (प्रत्येक प्रश्न 3 अंक)	300		

तृतीय चरण—व्यक्तित्व परीक्षा (साक्षात्कार) — 100 अंक

कुल योग — 375 + 375 + 100 = 850 अंक

पाठ्यक्रम

सामान्य हिन्दी— हिन्दी का पाठ्यक्रम इस प्रकार बनाया जायेगा ताकि उम्मीदवार की हिन्दी भाषा की समझ और शब्दों के कुशल प्रयोग की जाँच हो सके। इसका स्तर हाई स्कूल का होगा।

सामान्य अध्ययन: सामान्य अध्ययन के प्रश्न—पत्र समसामयिक घटनाओं और ऐसी बातों की उनके वैज्ञानिक पहलुओं पर ध्यान देते हुए जानकारी सम्मिलित होगी जो प्रतिदिन के अनुभव में आती है तथा जिनकी किसी शिक्षित व्यक्ति से अपेक्षा की जा सकती है। प्रश्न—पत्र में भारत का इतिहास, राजनीति और भूगोल के ऐसे प्रश्न भी सम्मिलित होंगे जिनका उत्तर उम्मीदवार विशेष अध्ययन किये बिना ही दे सकेंगे।

CIVIL ENGINEERING

PAPER-1

PART-A

ENGINEERING MECHANICS, STRENGTH OF MATERIALS AND STRUCTURAL ANALYSIS.

Units and Dimensions, SI units, vectors, concept of force, Concept of particle and rigid body concurrent, Non-Concurrent and parallel forces in a plane, moment of force and varignon's theorem free body diagram, conditions of equilibrium Principle of virtual work, equivalent force system.

First and second Moment of area, Mass moment of inertia, Static Friction, inclined plane and bearings, kinematics and kinetics, kinematics in Cartesian and Polar Coordinates, motion under uniform and non-uniform acceleration, motion under gravity, Kinetics of particle: Momentum and Energy principles, D Alembert's principle, Collision of elastic bodies, rotation of rigid, bodies, simple harmonic motion.

STRENGTH OF MATERIALS:

Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, bending stress, Shear Stress, beams of uniform strength, Leaf Spring, close coiled helical springs, Strain Energy in direct Stress, bending & Shear. Deflection of beams: Macaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method, Torsion of Shafts, Transmission of power, Elastic stability of columns, Euler's Rankin's and Secant formulae. Principal stresses and strains in two dimensions, Mohr's Circle, Theories of Elastic Failure, Thin and Thick cylinder, Stresses due to internal and external pressure-Lame's equations.

STRUCTURAL ANALYSIS: Castigliano's theorems I and II, Unit load method of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution, Kani's method of analysis and column Analogy method applied to indeterminate beams and rigid frames. Rolling loads, and influence lines: Influence lines for reactions of beam, shear force and bending moment at a section of beam. Criteria for maximum shear force and bending moment in beams traversed by a system of moving loads, influence lines for simply supported plane pin jointed trusses, Arches: Three hinged, two hinged and fixed arches, rib shortening and temperature effects, influence lines in arches, Matrix methods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames. Plastic Analysis of beams and frames: Theory of plastic bending, plastic analysis, statical method, Mechanism method. Unsymmetrical bending: Moment of inertia, product of inertia, position of neutral axis and principal axis, calculation of bending stresses.

PART-B

DESIGN OF STRUCTURES: STEEL, CONCRETE AND MASONRY STRUCTURES.

STRUCTURAL STEEL DESIGN:

Structural steel: Factors of safety and load factors, rivetted, bolted and welded joints and its connections, Design by working, stress/limit state method of tension and compression member, beams of built up section, rivetted and welded plate girders, gantry girders, stanchions with battens and lacings, slab and gussetted column bases, Design of highway and railway bridges: Through and deck type plate girder, Warren girder, Pratt truss.

DESIGN OF CONCRETE AND MASONRY STRUCTURES:

Reinforced Concrete: Working Stress and Limit State Method of design-Recommendations of B.I.S. codes, design of one way and two way slabs, stairs-case slabs, simple and continuous beams of rectangular, T and L sections, compression members under direct load with or without eccentricity, isolated and combined footings, Cantilever and counter-top type retaining walls, Water tanks: Design requirements as per B.I.S. code for rectangular and circular tanks resting on ground, Prestressed concrete: Methods and systems of prestressing, anchorages, analysis and design of sections for flexure based on working stress, losses of prestress, Earthquake resistant design of building as per BIS code. Design of brick masonry as per I. S. Codes, Design of masonry retaining walls.

PART - C

Building Materials, Construction Technology, Planning and Management

Building Materials: Physical properties of construction materials with respect to their use: stones bricks, tiles, lime, glass, cement, mortars, Concrete, concept of mix design, pozzolans, plasticizers, super plasticizers, Special concrete: roller compacted concrete, mass concrete, self compacting concrete, ferro cement, fibre reinforced concrete, high strength concrete, high performance concrete, Timber: properties, defects and common preservation treatments, Use and selection of materials for various uses e.g. Low cost housing, mass housing, high rise buildings.

Constructions Technology, Planning and Management:

Masonry constructions using brick, stone, construction detailing and strength characteristics paints, varnishes, plastics, water proofing and damp proofing materials. Detailing of walls, floors, roofs, staircases, doors and windows. Plastering, pointing,

flooring, roofing and construction features. Retrofitting of buildings, Principle of planning of building for residents and specific uses, National Building code provisions and uses. Basic principles of detailed and approximate estimating, specifications, rate analysis, principles of valuation of real property. Machinery for earthwork, concreting and their specific uses, factors effecting selection of construction equipments, operating cost of equipments. Construction activity, schedules, organizations, quality assurance principles. Basic principle of network CPM and PERT uses in construction monitoring, cost optimization and resource allocation. Basic principles of economic analysis and methods. Project profitability: Basis principles of financial planning, simple toll fixation criterions.

PART - D

GEO TECHNICAL ENGINEERING AND FOUNDATION ENGINEERING

Types of soils, phase relationships, consistency limits particles size distribution, classifications of soils, structure and clay mineralogy. Capillary water, effective stress and pore water pressure, Darcy's Law, factors affecting permeability, determination of permeability, permeability of stratified soil deposits. Seepage pressure, quick sand condition, compressibility and consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test.

Compaction of soil, field control of compaction total stress and effective stress parameters, pore pressure parameters, shear strength of soils, Mohr Coulomb failure theory, shear tests.

Earth pressure at rest, active and passive pressures, Rankin's theory Coulomb's wedge theory, Graphical method of earth pressure on retaining wall, sheetpile walls, braced excavation, bearing capacity, Terzaghi and other important theories, net and gross bearing pressure.

Immediate and consolidation settlement, stability of slope, total stress and effective stress methods, conventional methods of slices, stability number. Subsurface exploration, methods of boring, sampling, penetration tests, pressure meter tests, essential features of foundation, types of foundation, design criteria, choice of type of foundation, stress distribution in soils, Boussinessq's theory, Westergaard method, Newmarks chart, pressure bulb, contact, pressure, applicability of different bearing capacity theories, evaluation of bearing capacity from filed tests, allowable bearing capacity, settlement analysis, allowable settlement, proportioning of footing, isolated and combined footings, rafts, pile foundation, types of piles, plies capacity, static and dynamic analysis, design of pile groups, pile load test, settlement of piles lateral loads, foundation. for bridges, Ground improvement techniques: sand drains, stone columns, grouting, soil stabilization geotextiles and geomembrane, Machine foundation: Natural frequency, design of machine foundations based on the recommendation of B.I.S. codes.

CIVIL ENGINEERING PAPER-II

Part - A

FLUID MECHANICS, OPEN CHANNEL FLOW, HYDRAULIC MACHINES AND HYDROPOWER ENGINEERING.

Fluid Mechanics: Fluid properties and their roles in fluid motion, fluid statics including forces acting on plane and curved surfaces, Kinematics and Dynamics of Fluid flow: Velocity and acceleration, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions, flownet, methods of drawing flownet, source and sink, flow separation, free and forced vorties.

Flow control volume equation, continuity, momentum and energy equations, Navier-Stokes equation, Euler's equation of motion and application to fluid flow problems, pipe flow, plane, curved, stationary and moving vanes sluice gates, weirs, orifice meters and Venturi meters.

Dimensional Analysis and Similitude: Buckingham's Pi-theorem, dimensionless parameters, similitude theory, model laws, undistorted and distorted models.

Laminar Flow: Laminar flow between parallel, stationary and moving plates, flow through pipes.

Boundary Layer: Laminar and turbulent boundary layer on a flat plate, laminar sub-layer, smooth and rough boundaries, submerged flow, drag and lift and its applications. Turbulent flow through pipes: Characteristics of turbulent flow, velocity distribution, pipe friction factor, hydraulic grade line and total energy line, siphons, expansion and contractions in pipes pipe networks, water hammer in pipes and surge tanks.

Open Channel Flow: Flow types, uniform and nonuniform flows, momentum and energy correction factors, Specific energy and specific force, critical depth, resistance equations and roughness coefficient, rapidly varied flow, flow in transitions, Brink flow, Hydraulic jump and its applications, waves and surges, gradually varied flow, classification of surface profiles, control section, Integration of varied flow equation and their solution.

HYDRAULIC MACHINES AND HYDROPOWER:

Centrifugal pumps-Types, characteristics, Net Positive Suction-head (NPSH), specific speed, Pumps in series and parallel. Reciprocating pumps, Air vessels, Hydraulic ram, efficiency parameters, Rotary and positive displacement pumps, diaphragm and jet pumps.

Hydraulic turbines: types, classification, Choice of turbines, performance parameters, controls, characteristics, specific speed. Principles of hydropower development: Types, layouts and component works, surge tanks, types and choice, Flow duration curves and dependable flow, Storage and pondage, Pumped storage plants, Special types of hydel plants.

Part - B

Hydrology and Water Resources Engineering

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration, overland flow, hydrographs, flood frequency analysis, flood routing through a reservoir, channel flow routing- Muskingum method.

Ground Water flow: Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, radial flow into a well under confined and unconfined conditions, Open wells and tube wells. Ground and surface water recourses single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation. Water requirements of crops consumptive use, duty and delta, irrigation methods, Irrigation efficiencies.

Canals: Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distributory canals, Design of canal by Kennedy's and Lacey's theory, Water logging and its prevention.

Diversion head works: Components, Principles and design of weirs on permeable and impermeable foundations, Khosla's theory, Bligh's creep theory Storage works. Cross drainage works.

Types of dams, design principles of gravity and earth dams, stability analysis. Spillways: Spillway types energy dissipation.

River training: Objectives of river training, methods of river training and bank protection.

Part-C

Transportation Engineering

Highway Engineering: Principles of Highway alignments, classification and geometric design, elements and standards for roads.

Pavement: flexible and rigid pavements Design principles and methodology Construction methods and materials for stabilized soil. WBM, Bituminous works and Cement Concrete roads. Surface and sub-surface drainage arrangements for roads, culvert structures. Pavement distresses and strengthening by overlays.

Traffic surveys and their application in traffic planning, Typical design features for channelized, intersection, rotary etc., signal designs, standard traffic signs and markings.

Railway Engineering: Permanent way, ballast, sleeper, chair and fastenings, points,



crossings, different types of turn outs, cross-over, setting out of points, Maintenance of track, super elevation, creep of rails ruling gradients, track resistance tractive effort, curve resistance, Station yards and station buildings, platform sidings, turn outs, Signals and interlocking, level crossings.

**Air port Engineering:** Layouts, Planning and design.

#### Part - D

##### Environmental Engineering

**Water supply:** Estimation of water demand, impurities in water and their significance, physical, chemical and bacteriological parameters and their analysis, waterborne diseases, standards for potable water.

**Water collection & treatment:** Intake structures, principles and design of sedimentation tank, coagulation cum flocculation units slow sand filter, rapid sand filter and pressure filter, theory & practices of chlorination, water softening, removal of taste and salinity, Sewerage Systems, Domestic and industrial wastes, storm, sewage, separate and combined systems, flow through sewers, design of sewers.

**Waste water characterization:** Solids, Dissolved oxygen (DO), BOD COD, TOC, and Nitrogen, Standards for disposal of effluent in normal water course and on to land.

**Waste water treatment:** Principles and design of wastewater Treatment units-, Screening, grit chamber, sedimentation tank activated sludge process, trickling filters, oxidation ditches, oxidation ponds, septic tank; Treatment and disposal of sludge; recycling of waste water.

**Solid waste management:** Classification, Collection and disposal of solid waste in rural and urban areas, Principles of solid waste management.

**Environmental pollution:** Air and water pollution and their control acts. Radioactive waste and their disposal Environmental impact assessment of Thermal power Plants, mines and river valley projects, Sustainable development.

#### Part-E

##### Survey and Engineering Geology

**(a) Surveying:** Common methods and instruments for distance and angle measurements in Civil Engineering works, their use in plane table traverse survey, levelling, triangulation, contouring and topographical maps. Survey layouts for culverts canal, bridge, roads, railway alignment and buildings.

Basic principles of photogrammetry and remote sensing.

Introduction to Geographical information system.

##### Engineering Geology

Basic concepts of Engineering geology and its applications in projects such as dams, bridges and tunnels.

#### MECHANICAL ENGINEERING

##### PAPER-I

##### 1. Engineering Mechanics:

Analysis of force systems, friction, centroid and centre of gravity, trusses and beams principle of virtual work, kinematics and kinetics of particle, kinematics and kinetics of rigid bodies.

##### 2. Mechanism and Machines:

Velocity and acceleration of links, cams and followers gears and gear trains clutches, belt drives, brakes and dynamometers, Flywheel and governors, balancing of rotating and reciprocating masses, balancing of multi cylinder engines, Free and forced vibration damped vibration, whirling of shafts.

##### 3. Mechanics of Solids:

Stresses and strains, compound stresses strains, Torsion of circular shafts, stresses and deflections in beams unsymmetrical bending, curved beams, Thin and thick cylinders and spheres, Buckling of columns, Energy methods, helical and leaf springs.

##### 4. Design of Machine Elements:

Design for Static and dynamic loading, Theories of failure, fatigue principles of design of riveted, welded and bolted joints, shafts, springs, bearings, brakes, clutches and flywheels.

##### 5. Engineering Materials:

Crystal systems and crystallography, crystal imperfections, Alloys and phase diagrams, Heat treatment, ferrous and non ferrous metals and alloys, Mechanical properties and testing.

**6. Manufacturing:** Metal casting, metal forming, metal joining, Mechanics of metal cutting, machining and machine tool operations, unconventional machining methods limits, fits and tolerances, inspection: Surface roughness, comparators, computer integrated manufacturing, Flexible manufacturing systems, jigs and fixtures

##### 7. Industrial Engineering:

Production, planning and control, inventory control and operation, research, CPM and PERT.

##### 8. Mechatronics and Robotics:

Microprocessors and microcontrollers, Architecture, Programming, Computer interfacing Programmable logic controller, sensors and actuators, Piezoelectric accelerometers, Hall effect sensors, optical encoder, resolver, Inductosyn, Pneumatic and Hydraulic Actuators, stepper motor, control system, mathematical modeling, control signals, controllability and observability, Robotics: Robot classification, robot specification. Notation: Direct and inverse kinematics homogeneous co-ordinates and arm equation of four axis SCARA Robot.

#### MECHANICAL ENGINEERING

##### PAPER-II

##### 1. Thermodynamics:

Thermodynamic systems and processes, properties of pure substances, concepts and applications of zeroth, first and second law of thermodynamics, entropy, availability and irreversibility, detailed analysis of thermodynamic cycles, ideal and real gases, fuels and combustion.

##### 2. Fluid Mechanics:

Basic concepts and properties of fluids, manometry, fluid statics, buoyancy equations of motion, Bernoulli's equation and applications, viscous flow of incompressible fluids, laminar and turbulent flows, flow through pipes and head losses in pipes, dimensional analysis, Forces on immersed bodies and boundary layer over a flat plate, isentropic and adiabatic flows, normal shock waves.

##### 3. Heat Transfer:

Modes of heat transfer, steady and unsteady heat conduction, thermocouple time constant, critical thickness of insulation, heat transfer from fins, momentum and energy equations for boundary layer flow on a flat plate. Free and forced convection, radiation heat transfer, Stefan-Boltzmann law, shape factor, black and grey body radiation heat exchange, boiling and condensation, heat exchanger analysis, LMTD and NTU - effectiveness methods.

##### 4. Energy conversion:

SI and CI engines, performance characteristics and testing of IC engines, combustion phenomena in SI and CI engines, carburetion and fuel injection systems, emissions and emission control. Reciprocating and rotary pumps, pelton wheel, Francis and Kaplan turbines, velocity diagrams impulse and reaction principles steam and gas turbines; Rankine and Brayton cycles with regeneration and reheat, high pressure boilers, draft, condensers. Unconventional power systems, including nuclear, MHD, biomass, wind and tidal systems, utilization of solar energy; Reciprocating and rotary compressors; theory and applications, Theory of propulsions, pulsejet and ramjet engines.

##### 5. Environmental control:

Vapour compression, vapour absorption, steam jet and air refrigeration systems properties of refrigerant and their nomenclature, psychometrics properties and processes psychometric relations, use of psychometric chart, load estimation, supply air conditions sensible heat factors, air conditioning system layout, comfort chart, comfort and industrial air conditioning.

#### ELECTRICAL ENGINEERING

##### PAPER - I

**Networks and Systems:** Steady-state and Transient-state Analysis of systems Thevenin's-, Norton's-, Superposition- and Maximum Power Transfer-theorems, Driving point Transfer functions, Two-port networks, Laplace and Fourier transforms and their applications in Network analysis, Z-transforms for discrete systems, R-L, R-C & L-C network synthesis.

**E.M. Theory:** Analysis of electrostatic and magnetostatic fields, Laplace, Poisson and Maxwell equations, solution of boundary value problems, electromagnetic wave propagation, ground and space waves, Propagation between Earth Station and Satellites.

**Control systems:** Mathematical modelling of dynamic linear continuous systems, Block diagrams and Signal flow graphs, time-response specifications, steady-state error, Routh- Hurwitz criterion, Nyquist techniques, Root Loci, Bode Plots, Polar Plot, and stability analysis, Lag-, Lead-, Lag-Lead-compensation, state-space modelling, state transition matrix, controllability and observability.

**Elements of Electronics:** Basics of semiconductor diodes, BJT, FET and their characteristics, different types of transistors and FET amplifiers equivalent circuits and frequency response, feedback oscillators, colpitts oscillator and Hartley Oscillator, Operational amplifiers-characteristics and applications.

**Power System Analysis and Design:** Line parameters and calculations, Performance of Transmission lines. Mechanical design of overhead lines and Insulators, Corona and radio interference Parameters of single- and three-core Cables, Bus admittance matrix, Load flow equations and methods of solutions, Fast-decoupled load flow, Balance- and Unbalanced-faults analysis, Power system stability, Power system transients and travelling Waves, EHV Transmission, HVDC transmission, Concepts of FACTS, Voltage Control and Economic operation, Concepts of distributed generation, solar and wind power, smart grid concepts.

**Elements of Electrical Machines:-** General concepts of E.m.f., m.m.f., and torque in rotating machines, DC Machines: motor and generator characteristics, equivalent circuits, commutation and amature reaction, starting and speed controls of motors; Synchronous Machines: performance, regulation, Parallel operation of generators, motor starting, characteristics and applications, Transformers: phasor-diagram and equivalent circuit, efficiency, and voltage regulation, auto-transformers, 3-phase transformers.

**Measurement:-** Basic methods of measurement, Precision and standards, error analysis, Bridges and Potentiometers; moving coil, Moving iron, dynamometer and induction type instruments, measurement of voltage, current, power, energy, and power factor Instrument transformers, digital voltmeters and multimeters, phase-, time- and frequency measurement. Q-meters Oscilloscopes, Basics of sensors, and data acquisition system, Instrumentation systems for pressure and temperature measurements.

#### ELECTRICAL ENGINEERING

##### PAPER - II

**Power Electronics and Drives:** Semiconductor, power., diodes, transistors, thyristors triacs, GTOs, MOSFETS and IGBTs static characteristics and principles of operation, triggering circuits single phase and threephase controlled rectifiers-fully controlled and half controlled, smoothing and filters regulated power supplies, DC-DC choppers and Inverters, speed control circuits for DC and A.C. drives, Basics of electric drives: types, quadrant operation, reversing and braking of electric motors, estimation of power ratings, traction motors.

**Digital Electronics:** Boolean algebra, logic gates, combinational and sequential logic circuits, multiplexers, multivibrators, sample and hold circuits, A/D and D/A converters, basics of filter circuits and applications, active filters, semiconductor memories.

**Microwaves and Communication systems:** Electromagnetic wave in guided media, wave guide components, resonators, microwave tubes, microwave generators and amplifiers.

**Analogue Communication basics:** modulation and demodulation, noise and bandwidth, transmitters and receivers, signal to noise ratio, digital communication basics, sampling quantizing, coding frequency- and time-domain multiplexing, sound and vision broadcast antennas, transmission lines at audio and ultra-high frequencies.

**Induction and special Machines:** Three-phase Induction motors Rotating magnetic field, Torque-slip characteristics, Equivalent Circuit and determination of its parameters, starters, speed control, Induction generators. Single phase Induction motors: Theory and phasor diagrams, characteristics, starting and applications, repulsion motor, series motor: E.m.f. equation and phasor diagram and performance, servomotors, stepper motors, reluctance motors, brushless DC motors (BLDC).

**Power system protection and Switch gear:** Methods of Arc Extinction, Restriking voltages and recovery voltage, testing of circuit breakers, Protective relays, protective schemes for power system equipment, surges in transmission line and protection.

**Numerical Methods:** Solution of non liner algebraic equations, single and multisteps methods for solution of differential equations.

**Electrical Engineering Materials:** Crystal structure and defects, conducting, insulating and magnetizing Materials, super-conductors.

**Elements of Microprocessors:** Data representation and representation of integer and floating point-numbers. Organization and programming of a microprocessor, ROM and RAM memories CPU of a microcomputer, interfacing memory and I/O devices Programmable peripheral and communication interface. Application of microprocessors.

#### AGRICULTURAL ENGINEERING

##### PAPER-I

**(a) Thermodynamics and Heat Engines:** Concept of energy, temperature and heat equations; laws of thermodynamics, pure substances and their properties; entropy Rankine, air standard Otto, Diesel and Joule cycles; indicator diagrams.

**(b) Farm Power:** Sources and status of power in India; farm power and agricultural productivity relationship; construction and operational features of IC engines, various, system of IC engine namely carburetion, ignition, cooling, lubrication; valves and valve timing, special features of diesel engines, tractors and their classification, power transmission, repair and maintenance; tractor testing, and tractor economics; power tillers -their economics and suitability, Energy in Agriculture.

**(c) Farm Machinery:** Design, construction, operation, repair and maintenance of tillage tools, implements and equipment viz. mould board and disk plough; harrows, cultivators, rotary tiller, seeding and planting machines, hoe, weeders, sprayers and dusters; harvester, threshers and combines; soil and crop factors influencing machine performance and energy requirements; selection of farm machines, economics of agricultural mechanization, Earth moving machineries.

**(d) Heat and Mass Transfer:** Thermal properties of materials; steady state and transient heat conduction, natural and forced convection; boiling, condensation, thermal radiation exchange, Heat exchangers, heat and mass transfer analogy; Fick's laws of diffusion, psychrometrics; analysis of heat and mass transfer processes, instrument and measurement systems.

**(e) Process and Food Engineering:** Unit operations in post harvest processing (cleaning, grading, drying, size reduction, evaporation, pasteurization, distillation etc.); processing of cereals, pulses, oilseeds, fruits & vegetables, animal feed, spices, dairy products, meat etc.; design of processing equipment and systems, milking machines.

**(f) Storage and handling:** Changes in stored products during storage; storage of food grains and their products, perishables (vegetable, fruits, dairy product, meat and eggs) storage system- air tight ventilated, refrigerated, modified atmospheric and controlled atmospheric storages; packaging; conveyors; design and management of storage and handling systems. Reducing losses in storages and handling.

AGRICULTURAL ENGINEERING

PAPER-II

(a) **Hydraulics and Fluid Mechanics:** Fluid properties, units and dimensions: surface tension and capillarity, equation of continuity, Bernoulli equation, Laminar and turbulent flow, steady and unsteady flow, Flow of fluids in pipes and open channels, design of open channels for non erosive and non silting velocities, most economical cross section, measurement of irrigation water and other water measuring devices viz. weirs, notches, orifices and flumes.

(b) **Surveying and Leveling:** Linear measurements; survey methods and devices used; principle of leveling, simple, differential and profile leveling; Contouring and characteristics of contour lines; Land leveling and grading, earth work estimation.

(c) **Soil and Water Conservation Engineering:** Forms of precipitation; hydrologic cycle; Point rainfall analysis, frequency analysis, agricultural watershed and its management; water management in agri-horti-aquaculture system, mechanics of water and wind erosion; Rational method of prediction of peak runoff and its limitations; concept of unit hydrograph and instantaneous hydrograph; factors affecting erosion and runoff; water erosion control measures - contour cultivation, strip cropping, terracing, afforestation pastures; Design of gully control structures - temporary and permanent; stream bank erosion; flood routing; flood amelioration by upstream soil water management; wind erosion control measures and sand dunes stabilization.

(d) **Irrigation Pumps:** Design, construction, performance characteristics, selection installation, servicing and maintenance of different pumps (reciprocating, centrifugal gear, turbine, submersible, propeller, jet); Hydraulic ram; Renewable and non-renewable power sources for pumping solar pumps.

(e) **Irrigation and Drainage Engineering:** Water wealth and irrigation in India; Soil water plant relationship; Forms and occurrence of soil water; methods and devices for soil moisture measurement; water requirement of crops; irrigation scheduling; irrigation methods their hydraulics and design flood, border, furrow, sprinkler and drip irrigation, concept of irrigation efficiencies; water conveyance and control; Design of canals. Lacey and Kennedy's theories.

Drainage needs and its benefits; Darcy's Law, hydraulic conductivity; drainage coefficient; drainage methods, surface drainage (drainage of flat and sloping lands); design of open ditches their alignment and construction; designs and layout of subsurface drains; depth and spacing of drains and drainage outlets; installation of drains and drainage wells; drainage of salt affected areas.

(f) **Ground Water Hydrology and Tube well Engineering:** Occurrence and movement of ground water, steady and transient flow into wells, well interference, well drilling, design of well assembly and gravel pack, installation of well screen, completion and development of wells.

(g) **Rural Engineering:** Building materials and their properties; Farm stead planning, and design of dairy barns; poultry, goat-sheep, and piggery housing; selection of site, planning and design of rural houses, farm roads, village drainage; waste disposal and sanitary structures; cost estimates, green house construction.

Appendix-4

Relevant Service Rules of Related Posts

- उत्तर प्रदेश अभियंता सेवा (सिंचाई विभाग) (समूह-‘ख’) नियमावली, 2007
- उत्तर प्रदेश जल निगम अभियंता (सार्वजनिक स्वास्थ्य शाखा) सेवा विनियमावली, 1978 (यथासंशोधित)
- The Uttar Pradesh Rural Engineering (Group-'B') Service Rules, 1993 (as amended)
- The Uttar Pradesh Development Authorities Centralised Services Rules, 1985 (as amended)
- The Uttar Pradesh Urban Planning and Development (Amendment and Validation) Act, 1985
- The Uttar Pradesh Urban Planning and Development (Amendment and Validation) Ordinance, 1984
- The Uttar Pradesh Public Works Department Group-'B' Civil Engineering Service Rules, 2004 (as amended)
- The Uttar Pradesh Agriculture Group-'B' Service Rules, 1995
- The Uttar Pradesh Engineering (Directorate of Electrical Safety) Service Rules, 2002
- The Uttar Pradesh Service of Civil Engineers, Medical Health and Family Welfare Department Service Rules, 1998 (as amended)
- उत्तर प्रदेश सर्विस ऑफ इंजीनियर्स (बिल्डिंग एण्ड रोड्स ब्रांच) क्लास-टू (संशोधन) नियमावली, 1987
- The Uttar Pradesh Assistant Engineer's Combined Competitive Examination Rules, 2014
- The Uttar Pradesh Assistant Engineer's Combined Competitive Examination (First Amendment) Rules, 2018

Appendix-5

(i) General Recruitment

Sl No.	Name of Department	Name of Post	Branch	No. of Vacancies	U	S	S	T	O	B	W	D	P	H	E	x	F	S	M
1.	Irrigation and Water Resources Deptt.	Asstt. Engg (Mechanical)	Mechanical	77	55	06	04	05	07	01	04	(LV-01, HH-01, OA-02)							
2.	U.P. Jal Nigam (Rural)	Asstt. Engg (Civil)	Civil	107	44	22	02	29	10	02	04	(OA-02, HH-02)							
3.	U.P. Jal Nigam (Rural)	Asstt. Engg (Electrical/Mechanical)	Mechanical	14	06	03	00	04	01	00	00								
4.	Rural Engineering Deptt.	Asstt. Engineer (Civil)	Civil	65	29	17	02	11	06	01	02	(HH-01), OA-01)							
5.	Housing and Urban Planning Deptt. (U.P. Development Authorities Centralised	Asst. Engineer (Electrical/ Mechanical)	Electrical/ Mechanical	08	04	04	00	00	00	00	00								

Service)

6.	Housing and Urban Planning Deptt. (U.P. Development Authorities Centralised Service)	Asst. Engineer (Civil)	Civil	40	26	10	00	02	02	00	02	01							
7.	Public Works Deptt. (P.W.D.)	Asstt. Engineer (Civil)	Civil	226	72	76	01	55	22	04	09	(HH-05, OA-01, OL-01, Dw-01, AAV-01)							
8.	Agriculture Department	U.P. Agriculture Service Group-'B' Grade-2 (Engineering Branch)	Agri-culture	12	05	04	00	02	01	00	00	00							
9.	Energy Department	Asstt. Director	Electrical	07	04	02	00	01	00	00	00	00							
10.	Irrigation and Water Resources Directorate	Asstt. Engineer (Civil)	Civil	20	09	04	00	05	02	00	01	(LV-01)							
11.	Medical, Health & Family Welfare Deptt.	Asst. Engineer (Civil)	Civil	06	04	00	00	02	00	00	00	00							
Total Vacancies				582	258	148	09	116	51	08	22	25	113						

(ii) Special Recruitment

12.	Irrigation and Water Resources Directorate	Asstt. Engineer (Civil)	Civil	22 (OBC/ ST)	00	00	03	19	00	00	01	(H H-01)	01	04					
* शासनादेश संख्या-3 / 2021 / 324 / 2021 / 65-3-2021-78 / 99टी.सी., दिनांक 30 जुलाई, 2021 के अनुसार दिव्यांगजन की विन्हांकित उपश्रेणियां का पदवार विवरण निम्नवत् हैं:-																			
क्र.सं.	पद का नाम					दिव्यांगजन की विन्हांकित उपश्रेणियां													

1.	Asstt. Engg. (Mechanical), Irrigation and Water Resources Department	O.A., O.L., L.V., H.H.
2.	Asstt. Engg. (Civil), U.P. Jal Nigam (Rural)	O.A., H.H.
3.	Asstt. Engg. (Electrical/Mechanical), U.P. Jal Nigam (Rural)	O.A., O.L., L.V., H.H.
4.	Asstt. Engineer (Civil), Rural Engineering Deptt.	O.A., O.L., L.V., H.H., Dw., A.A.V.
5.	Asstt. Engineer (Electrical/Mechanical), Housing and Urban Planning Deptt. (U.P. Development Authorities Centralised Service)	O.A., O.L., L.C., Dw., A.A.V., M.Dy., D., H.H., B., L.V.
6.	Asstt. Engineer (Civil), Housing and Urban Planning Deptt. (U.P. Development Authorities Centralised Service)	O.A., O.L., L.C., Dw., A.A.V., M.Dy., D., H.H., B., L.V.
7.	Asstt. Engineer (Civil), Public Works Deptt. (P.W.D.)	O.A., O.L., H.H., Dw., A.A.V.
8.	U.P. Agriculture Service Group-B. Grade-2 (Engineering Branch), Agriculture Department	O.A., O.L., L.C., Dw., A.A.V.
9.	Asstt. Director, Energy Department	O.A., O.L., L.V., H.H., Dw., A.A.V.
10.	Asstt. Engineer (Civil), Irrigation and Resources Directorate	O.A., O.L., L.V., H.H.
11.	Asstt. Engineer (Civil), Medical Health and Family Welfare Deptt.	O.A., O.L., L.C., C.P., Dw., A.A.V.

Reservation for P.H. of U.P. shall be permissible for the notified/identified posts.

Secretary