(2)

REVISED SYLLABUS 2022

DEPARTMENTAL PROMOTION EXAMINATION FROM SENIOR SEISMOLOGIST / GEOPHYSICIST TO SUPERINTENDING SEISMOLOGIST / GEOPHYSICIST

PAPER-I **CURRENT AFFAIRS & RULES & REGULATIONS** — **100 marks** (Pass marks 47)

(Note: Passing in each part is mandatory to clear paper-1)

Part-I **Current Affairs** — **33 marks** (Pass marks 40%)

Current Affairs paper will be set from leading issues published in the newspaper for the last 3 months. The following books may be consulted.

- Monthly Current Affairs Digest by Tariq Mahmood Dogar
- Monthly Current Affairs Digest by Dr. Safdar Mahmood
- Any other Current Affairs Digest

Part-II **Rules and Regulations (Books allowed)** — **67 marks** (Pass marks 50%)

- The Pakistan WAPDA Employees (E&D) Rules, 1978
- The Pakistan WAPDA Employees (Retirement) Rules, 1979
- The Pakistan WAPDA Leave Rules for WAPDA Employees 1982
- The Pakistan WAPDA TA Rules 1982
- WAPDA Act
- Conduct Rules
- Medical Attendance Rules.

Reference Books

- WAPDA Manual of General Rules amended upto 2014 (including addendums)

PAPER-II **TECHNICAL** — **100 Marks** (Pass marks 50)

Short and detailed questions on: Geological time scale, types of rocks, Earthquake, Earthquake types, Faults, Investigation Models of faults, locating earthquake, magnitude, intensity and energy release, reservoir induced seismicity.

Process of remote imaging, remote image processing with special reference to tectonic structures, seismic activity of faults and their hazards to the life, cultural activities, lab sessions, overview of GIS applications.

Tectonics and the deep structures of the Earth as revealed by investigations of earthquakes, earthquake waves, the Earth's gravitational and magnetic fields and heat flow. Application Geophysical software, Lab sessions, Geoelectrical, Geophysical well logging, VLF.

Introduction to field methods of geophysical exploration, especially as applied to environmental issues. Emphasis is on seismic refraction, cross-hole method, electrical, ground penetrating radar, Gravity and magnetic techniques. Field surveys carried out at the beginning of the semester are analyzed and interpreted.

Director (Exams) WAPDA
333-WAPDA House, Lahore

Qualitative prediction of earthquakes, Quantitative prediction, prediction based upon earth uplift, ground micro movements, radon, oxygen temperature, Resistivity, water table, pore pressures, P, S Waves velocity ratio, case histories, determination of causative fault, status of site specific faults in seismic hazard, seismic zoning, deterministic procedure, probabilistic procedure for seismic hazard assessment.

Seismic hazard evaluation: Concept of plate tectonic, types of plates, No. of plates, The plates in the vicinity of Pakistan and it's relation with the earthquake occurrence in Pakistan, Disaster Management and Rehabilitation.

Volcanoes: Magma and Volcanoes, Volcanic features, theory of continental drift, motions of plates, sea floor spreading and predicting future positions of continents.

Seismology studies in WAPDA Projects with specific reference to Diamer, Basha, and Tarbela & Mangla Dam Projects – Problem Areas & Solutions.

Definitions of terms, short and detailed notes / questions on: importance of Geophysics in sub surface investigation for dams, methods of acquisition of field data in details, geophone and its importance in geophysical surveys, Methods of Seismic Refraction Survey and Electrical Resistivity Survey, importance of Seismic Refraction Survey in WAPDA projects, importance of shear velocity at 30m depth (Vs.30), analysis and interpretation of seismic refraction field data in detail, earthquake focus, epicenter, intensity and magnitude, origin and types of seismic waves, seismic gradient seismograph and seismogram, seismic instrumentation on large dams, Statistical analysis of earthquake catalogue, area source and fault source, deterministic and probabilistic approaches for seismic hazard assessment and finding out Operating Basis Earthquake (OBE), Safety Evaluation Earthquake (SEE) and Reservoir-Triggered Earthquake (RTE), Seismology studies in WAPDA Projects with specific reference to Tarbela, Mangla and Diamer Basha Dam Projects.

Computer (Information Technology): Introduction to Computer System, M.S. Word and M.S. Office: Characteristic of computer, types of computer, computer hardware and software, types of memory and functions, operating systems, input/out and storage devices, types of computer languages, programming and functions of compiler, main features of utility of MS Word, MS Excel, MS Power Point, Internet and E-mail.

Reference Books:

- Elementary Seismology by C.F. Richter.
- Earth's Sciences by Scott, Foresman.
- Technical Reports material on Tarbela and Mangla Dam Projects regarding seismology.
- Microsoft Office 2007/2010, by Gary B. Shelly, Thomas J. Cashman and Misty E. Vermaat.
- Window 7 Step by Step by Joan Lambert and Joyce Cox (Available Online).

NOTE (1) One question from Computer (Information Technology) is **compulsory** to be included in Paper-II (Technical).

NOTE (2): The paper will be 50% objective and 50% subjective.

Director (Exams) WAPDA
333-WAPDA House, Lahore