Office of the
Chief Personnel Officer,
Garden Reach, Kolkata-43.

Estt.Srl.No.38 /2017   RBE. NO. 15/2017

No.SER/P-HQ/Ruling/0/942   Dated

All concerned

Sub: **Syllabus for professional paper for Selection from Group 'C' to Group 'B' posts in EDP Centres/IT Department of Railways/Production Units.**

Ref: **This office Estt. Srl. No. 154/2004.**

Railway Board's letter No.E(GP)I-2016/2/25 dated 27-02-2017, is forwarded for information, guidance and necessary action.

Encl: as above.

(B.N.Soren)
Dy.Chief Personnel Officer (HQ),
for Chief Personnel Officer.

Railway Board's letter No. E(GP)I-2016/2/25 dated 27.02.2017 addressed to General Managers, All Indian Railways & others is as under:

Sub: **Syllabus for professional paper for Selection from Group 'C' to Group 'B' posts in EDP Centres/IT Department of Railways/Production Units.**

A revised syllabus for professional paper for Selection for promotion from Group 'C' to Group 'B; posts in EDP Centres/IT Department of Railways/Production Units is enclosed for guidance. This may be given wide publicity and circulated amongst the eligible candidates.

2.   The revised syllabus shall be effective from the date of issue of this letter. However, Selections which have been notified, need not be disturbed.

Establishment Rules &   **50 Marks**
Financial Rules

Professional Subject: **100 Marks**

The Candidates are expected to supplement their experience by a few hours of study on each topic and in this regard certain websites for reference purpose have also been indicated.

Professional Subject:

1.   **Basics of computing and information processing**

1.1   **Business Data Processing**

1.1.1.   Basic features of off-line systems, transaction processing systems, management information systems, decision support systems. Graphical user interfaces and presentation of information.

1.1.2   Full familiarity with word processor, spreadsheet package, presentation package, email Clinent and web-browser. Basics of data storage in a database management system.

1.2   **Computer organisation and Data structures**

1.2.1   Fundamentals of digital logic circuits, binary number system, registers and counters, microprocessor arhitecture, memory and input/output devices, basics of assembly language.

1.2.2   Data types, stacks, queues, linked lists and other basic data structures, searching and sorting algorithms, and basic idea of complexity.

1.2.3.   Basic features of PCs and servers, printers, backup devices.

2.   **Operating system, DBMS and netwroking concepts** (candidates are expected to specialize in any one area out of Operating Systems, DBMS, or Networkig, with a basic idea of all three areas)

2.1   **Basics of operating systems** (proficiency in one Unix flavour or one Windows Server version is expected)

2.1.1. The file system, process management, memory management, system administration concepts, networking tools in operating systems, OS level backup and archival, retrieval and disaster management.

2.1.2 Unix flavours, the vi editor , shell programming, basics or grep and awk, user management, security features in Unix, Linux.

2.1.3 The Windows operating system, including basics of Windows server; file management, FAT, FAT32 and NTFS, user management, the active directory, the Windows registry.

2.2 Basics of DBMSs

2.2.1. The relational model, ER model, database normalization concepts.

2.2.2 Basics of SQL, simple queries, joins, nested queries, grouping, query parsing, indexing concepts.

2.2.3. Database administration, tuning concepts, locking and concurrency control, transaction roll-back and roll forward, database backup and archival.

2.2.4. Proficiency in any one DBMS out of Oracle, Sybase, SQL Server, covering the concepts given above.

2.3 Networking and data communication concepts

2.3.1. Basics of data communication, transmission media, network topologies, the OSI seven layer model, TCP/IP concepts.

2.3.2. LANs annd LAN devices, concept of IEEE 802.3, IEEE8-02.11b, LAN media, switching, basics of LAN design.

2.3.3. WANs and WAN devices, concepts of routing, switched and packet networks signal multiplexing methods, network management.

2.3.4 Basics of network security, the Internet, Internet security, viruses, worms and malicious code, intrusion detection.

3. Software development

3.1 Basics of systems analysis and design

3.1.1. Modular application design; methods to elicit user requirements; DFDs, ERDs and process mapping methodologies, screen, report and menu design.

3.1.2 Basic idea of component based design, interface design, directory services, web services, object orientation.

3.2 **Application Development** (Proficiency is expected in any one GUI tool, 3GL, or COBOL, with a basic idea of all three)

3.2.1. Using GUI front-end tools, screen building, connecting to back-end databases, and report-writing (any one of VB, D2K/iDS, Power Builder, or other standard GUI tool).

3.2.2 Application development in a structured 3 GL (C, Java, C++, C#) proframme constructs in 3 GLS, data types, memory management working with files, working with databases, using standard libraries; the JVM and CLR.

3.2.3. Application development in COBOL, COBOL, data structures, file handling in COBOL, sorting and merging, managing databases using COBOL, reporting and screen development.

3.3 **Software engineering concepts**

3.3.1 Software development cycle, basics of software sizing and estimation, software project management, project risk management (basic idea), system audit and security, disaster management strategies.

3.3.1 Basics of software testing and quality assurance, test plans, block box and white box testing, module and integration testing, verification, validation and inspection.

3.3.2 Basics of software testing and quality assurance, test plans, black box and white box testing, module and integration testing, verification, validation and inspection.

3.3.3 Basics of information security, encryption, digital signature, PKI.

4. **Other Topics in IT (for persons operating in specialized areas)**

4.1 Basics of CAD/CAM

4.1.1. Graphic devices, 2-D geometry and display algorithms, graphic operations, 3-D rendering, animation, graphic standards.

4.1.2. CAD basic, 2-D drafting, surfacing, 3-D solid modelling (proficiency in using a CAD package):

4.1.3. FEA, part programme generation (proficiency in using FEA and part program generation tools

4.2   Basics of embedded software

4.2.1   Firmware devices, coding and burning, embedded OS, embedded application software, basics of PLCs, ladder logic, using PLC program development tools, data loggers etc.

5.   EDP centres in Indian Railways

5.1   Data Centre basics

5.1.1   Data centre basic design features, secure areas and access control, workspace planning; air-conditioning and humidity control; rack-mounted servers and other devices, structured cabling, clean power supply and earthing, UPS basics.

5.1.2.   Data centre operations manual, backup strategies, disaster management, basic housekeeping and filling of records.

5.2   IT applications in Indian Railways (as per areas of working of the candidate)

5.2.1   FMIS, Payroll, Workshop system, Inventory control system, Traffic accounts system: detailed knowledge of processes.

5.2.2.   SDT applications: PRIME/AFRES, PMIS, MMIS, PAS, FAS, OSS: knowledge of processes.

5.2.3.   PRS, UTS, NTES, FOIS: Basic working.

5.2.4.   Locally developed applications: for example STORMS, PURSYS, PINS, EASY, PLANS, FACT in RCF; Stores, finance ad workshop applications in RWF, DLW, ICF etc.

5.2.5.   Other developments on Railway: MIS applications, IR websites, Internet ticketing, IVRS.

6.   ICT Infrastructure

6.1   Server Consolidation and Virtualization.

(searchserverervirtualization. Techtarget.com)

6.2 Virtualization System: VMWare, RHEV, Citrix, Open Stack etc.

(www.redhat.com)

6.3   Software Defined Data Centre and Networks

(https://en.wikipedia.org)

6.4   Cloud Computing and its standards, certification
(www.cio.com)

6.5   Service Oriented Architecture
(http://www.service-architecture.com)

7. Mobility

7.1   Mobile Apps Technology Architecture and Programming
(http://www.smartbridge.com)

7.2   Mobile Data Management
(searchmobilecomputing.techtarget.com)

7.3   Mobile Devices Management
(https://www.mobileiron.com)

8. UIDAI

8.1   Knowledge of UIDAI Authentication framework
(https://authportal.uidai.gov.in)

8.2   API
(https://www/webopedia.com)

9. Data Analytics

9.1   Use of Desktop/Cloud based Data Analytical Tools
(https://www.computerworld.com)

10. Performance based logistics

10.1   Parameter definition and determination of SLA's
(https://help.sap.com)

10.2   Measurement using Application Performance Measurement tools
(www.gallop.net)

11. Knowledge of standards

11.1 ITIL V3
(www.itilcertification.org)

11.2 ISO 20000
(http://www.iso.org)

11.3. ISO 27000
(www.iso.org)

11.4. ISO 15288
(www.15288.com)

11.5 CMMI
(https://en.wikipedia.org)

12. **Cyber Security Laws and guidelines**
(http://www.cyberlawsindia.net)

12.1 IT Act
(http:/www/itlaw.in)

12.2 MHA Guidelines
(http://mha.mic.in/policy-guidelines)

12.3 NCIIPC Guidelines
(http://cis-india.org)

12.4 CERT-IN Guidelines
(http://www.cert-in.org.in)

12.5 Digital Inndia Policies
(http://meity.gov.in)

12.6 Social Media Guidelines
(http://meity.gov.in)

12.7. Password Policy
(https://mail.nic.in)

12.8. Guidelines for India Government Websites (GIGW)
(http://guidelines.gov.in)

13. **Use of Social Media**

13.1 Twitter
(https://twitter.com/twitter)

13.2 Facebook
(www.facebook.com/)

13.3 You Tube
(https://in.youtube.com/)

13.4 Google + etc.
(http://www.zigzigger.blogspot.in)

14. **Website Development**

14.1 HTML5
(http://www.w3schools.com)

14.2 XML
(http:www.xmlfiles.com/xml/)

14.3 PHP
(www.php.net)

14.1 Open Source Web CMS Systems: Liferay, Drupal, Joomla, Wordpress.
(https://colorlib.com)