DETAILED SYLLABUS FOR THE POST OF COMPUTER OPERATOR IN FACTORIES AND BOILERS DEPARTMENT
(Cat.No. 244/2023)

TOTAL - 100 MARKS

Distribution of Marks and Detailed Syllabus

I. General Knowledge and Current Affairs	
i. History	2
ii. Geography	2
iii. Economics	2
iv. Indian Constitution, Kerala – Governance and System of Administration and Important Acts	9
v. Physics	2
Vi. Chemistry	2
vii. Life Science and Public Health	2
viii. Basics of Computer	3
ix. Commerce	10
II. Current Affairs	6
III. Simple Arithmetic and Mental Ability	10
IV. General English	10
V - COMPUTER HARDWARE MAINTENANCE	20
VI - DATABASE MANAGEMENT SYSTEM (III Plus)	20

Detailed Syllabus

PART - 1 (40 Marks)

I. GENERAL KNOWLEDGE

(i) HISTORY (2 Marks + 1 Current Affairs)

- **KERALA** - Arrival of Europeans-Contributions of Europeans- History of Travancore from Marthanda Varma to Sree Chithirathirunnal- Social and Religious Reform movement- National movement in Kerala- Literary Sources of Kerala History- United Kerala Movement- Political and Social History of Kerala after 1956.

- **INDIA** – Political History- Establishment of the British- First War of Independence – Formation of INC- Swadeshi Movement- Social Reform movement- Newspapers - Literature and Arts during the freedom struggle – Independence Movement & Mahathma Gandhi - India's independent – Post independent period - State reorganization – Development in Science, Education, and Technology – Foreign policy.

- **WORLD** – Great Revolution in England- American War of Independence – French Revolution- Russian Revolution – Chinese Revolution- Political History after Second World War- UNO and other International Organizations

ii) GEOGRAPHY   (2 Marks + 1 Current Affairs)

Basics of Geography – Earth Structure – Atmosphere, Rocks, Landforms, Pressure Belt and Winds, Temperature and Seasons, Global Issues- Global Warming- Various forms of Pollution, Maps- Topographic Maps and Signs,

Remote Sensing – Geographic Information System, Oceans and its various movements – Continents, – Nations and their specific features.

INDIA – Physiography- States and its features, Northern Mountain Region, Rivers, Northern Great Plain, Peninsular Plateau, Coastal Plain, Climate – Natural Vegetation - Agriculture – Minerals and Industries- Energy Sources, Transport system – Road- Water- Railways- Air.

Kerala – Physiography- Districts and its features - Rivers- Climate – Natural Vegetation - Wild life - Agriculture and research centers – Minerals and Industries - Energy Sources - Transport system – Road - Water- Railway- Air

(iii) <u>ECONOMICS</u> (2 Marks + 1 Current Affairs)

India : Economy, Five Year Plans, New Economic Reforms, Planning Commission and Niti Aayog, Financial Institutions, Agriculture – Major Crops, Green Revolution, Minerals. Direct and indirect taxes in India, GST in India-rationale and structure of GST, benefits of GST.

(iv)INDIAN CONSTITUTION, KERALA – GOVERNANCE AND SYSTEM OF ADMINISTRATION AND IMPORTANT ACT
(9 Marks)

(i) <u>INDIAN CONSTITUTION</u>
Constituent Assembly-Preamble-Citizenship- Fundamental Rights, Writs -Habeas Corpus, Mandamus, Prohibition, Certiorari and Quo warranto. Directive Principles of State Policy- Fundamental Duties- Structure of Governments- Union Executive, Parliament and Judiciary- State Executive, Legislature and Judiciary- Local Self Government Institutions (LSGIs)-Important Constitutional Amendments (42, 44, 52, 73, 74, 86, 91, 97, 101, 102,

103, 104)- Constitutional Authorities and their functions - Comptroller and Auditor General, Attorney General, Advocate General, Election Commission of India, State Election Commission, Union Public Service Commission, State Public Service Commission- Finance Commission- State Finance Commission- GST Council- Distribution of legislative powers- Union List- State List- Concurrent List- Services under the Union and the States- Tribunals-National Commission for Scheduled Castes- National Commission for Scheduled Tribes- National Commission for Backward Classes- Official Language-Regional Languages-Language of the Supreme Court, High Courts, etc-Special directives relating to languages

(ii) Kerala Governance and System of Administration

Kerala State Civil Service- Quasi-judicial bodies, various Commissions, Basic facts of socio-economic development- Planning Board-Commercial Planning and Policies- Disaster Management- Watershed Management- Employment and Labour-National Rural Employment Programmes- Land Reforms- Social Welfare and Security- Protection of Women, Children and Senior Citizens- Population, Literacy, E-governance, Delegated Legislation and its controls- Legislative and Judicial controls- Constitutional law remedies against Administrative Arbitrariness- Administrative Discretion and its Controls- Administrative Adjudication-Principles of Natural Justice.

(iii.) Important Acts

1. Right to information: Right to Information Act, 2005- information exempted- third party information- constitution of Information Commissions-powers and functions

2. Right to public services: The Kerala State Right to Service Act, 2012

3. Protection of consumers: Consumer Protection Act, 2019- rights of consumers

4. Protection of vulnerable sections: Protection of Civil Rights Act, 1955- SC & ST (Prevention of Atrocities) Act, 1989- The Kerala State Commission for the Scheduled Castes and the Scheduled Tribes Act, 2007- Kerala State SC/ST Commission- Protection of Human Rights Act, 1993- National Human Rights Commission and State Human Rights Commission- Maintenance and Welfare of Parents and Senior Citizens Act, 2007- The Rights of Persons with Disabilities Act, 2016- The Transgender Persons (Protection of Rights) Act, 2019

5. Protection and Safeguarding of Women: Offences against women, Offences affecting public decency and morality, Dowry Prohibition Act, 1961- National Commission for Women Act, 1990- Kerala Women's Commission Act, 1991- National and State Commission for Women- Protection of Women from Domestic Violence Act, 2005- The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013

6. Protection and Safeguarding of Children- Offences against children Protection of Children from Sexual Offences Act, 2012 (POCSO)- Juvenile Justice (Care and Protection of Children) Act, 2015

7. Prevention of corruption and mal-administration- The Prevention of Corruption Act, 1988- The Central Vigilance Commission Act, 2003- The Lokpal and Lokayuktas Act, 2013- The Kerala Lok Ayukta Act, 1999

8. Public servant: Definition - Offences by/against public servants

9. The Administrative Tribunals Act, 1985- Central Administrative Tribunal- Kerala Administrative Tribunal – Composition- Powers

(v) Physics (2 Marks + 1 Current Affairs)

1) Branches of Physics –Matter - Units, Measurements - Physical Quantities.

2) Motion - Newton's Laws of Motion - Third law – Momentum - Projectile Motion - Uses of Third Law - Achievements in space missions in India- ISRO.

3) Light- Lens, Mirrors - Problems based on $r = 2f$ - Different phenomena of Light - Rainbow - Colours of different materials - Electromagnetic Spectrum – IR rays- UV rays - X rays - Photoelectric Effect.

4) Sound - Different types of Waves - Velocity of Sound in different media - Resonance – Reverberation.

5) Force - Different types of Forces – Friction - Advantages and disadvantages of Friction - Liquid Pressure - Buoyant Force – Archimedes Principle - Pascal's law – Density - Relative density- Adhesive Cohesive forces- Capillarity - Viscous force - Surface tension.

6) Gravitation - Centripetal Force - Centrifugal Force - Escape Velocity, Satellites - Escape Velocity - Weight Mass - value of 'g'- 'g' in different places.

7) Heat - Temperature - Different types of thermometers – Humidity - Relative Humidity.

8) Work - Energy - Power - Simple problems relating to Work, Energy, Power, Levers - Different types of Levers.

(vi) Chemistry (2 Marks + 1 Current Affairs)

1. Atom – Molecule - States of Matter – Allotropy - Gas laws - Aqua regia.

2. Elements - Periodic Table-Metals &Non metals-Chemical Physical changes- Chemical reactions-Solutions, Mixtures, Compounds.

3. Metals-Non metals – Alloys – Acids, Bases - pH value - Alkaloids.

(vii) Life Science and Public Health (2 Marks + 1 Current Affairs)

Basic facts of Human Body

Vitamins and Minerals and their Deficiency Diseases

Communicable Diseases and Causative Organisms, Preventive and -

Remedial Measures

Kerala – Welfare activities in Health Sector

Lifestyle Diseases.

Basic Health Facts

Environment and Environmental Hazards

viii. Basics of Computer   (3 Marks)

1. Hardware

1. Input Devices (Names and uses)
2. Output Devices (Names and uses/features)
3. Memory devices - Primary and Secondary (Examples, Features)

2. Software

1. Classification – System software and Application software
2. Operating System – Functions and examples
3. Popular Application software packages – Word processors, Spreadsheets, Database packages, Presentation, Image editors (Uses, features and fundamental concepts of each)
4. Basics of programming – Types of instructions (Input, Output, Store, Control, Transfer) (*Languages need not be considered*)

3. Computer Networks

1) Types of networks – LAN, WAN, MAN (Features and application area)
2) Network Devices – Media, Switch, Hub, Router, Bridge, Gateway (Uses of each)

4. Internet

- Services – WWW, E-mail, Search engines (Examples and purposes)
- Social Media (Examples and features)
- Web Designing – Browser, HTML (Basics only)

5. Cyber Wrongs (Awareness Level)

10. Types of Cyber Wrongs (Awareness level)
11. Information Technology Act, 2000 (Awareness level)

ix. Commerce   (10 Marks)

Module 1: I Management Concepts and Thought: Meaning and importance of management, management levels -Nature of management - science, art or profession-Evolution and development of

management thought, Management thinkers, Management process, Management principles, Functions of management.

Module 2: Introduction to Accounting – Meaning and objectives of accounting – types of accounting – financial accounting, cost accounting and management

accounting - Accounting concepts and conventions - GAAP- Indian Accounting Standards- Procedure for setting various Accounting Standards.

Module 3: Financial and Capital Market – structure of financial and capital market – Classification – Primary & secondary - Methods of floatation of capital –Functions of stock exchange – Securities

traded in the stock exchange - Major stock exchanges in India- Role and functions of SEBI.

Module 4: Banking Theory and Practice: Evolution and structure of banking – Types of Banks in India – Public sector banks, private sector banks, scheduled banks, foreign banks, new generation Banks -

Innovations and reforms in banking sector– E-banking, CORE, ECS, EFT, RTGS, NEFT, SWIFT, mobile banking, internet banking, retail banking - Banking Ombudsman.

II. Current Affairs

III. Simple Arithmetic, Mental Ability and Reasoning - (10 Marks)

(i). Simple Arithmetic

1. Numbers and Basic Operations
2. Fraction and Decimal Numbers
3. Percentage
4. Profit and Loss
5. Simple and Compound Interest
6. Ratio and Proportion
7. Time and Distance
8. Time and Work
9. Average
10. Laws of Exponents
11. Mensuration
12. Progressions

(ii). Mental Ability & Reasoning

1. Series

2. Problems on Mathematical Signs

3. Verifying Positions.

4. Analogy- Word Analogy, Alphabet Analogy, Number Analogy

5. Odd man out

6. Numerical Ability

7. Coding and Decoding

8. Family Relations

9. Sense of Direction

10. Time and Angles

11. Time in a clock and its reflection

12. Date and Calendar

13. Clerical Ability

IV. GENERAL ENGLISH - (10 Marks)

i. English Grammar

- Types of Sentences and Interchange of Sentences.
- Different Parts of Speech.
- Agreement of Subject and Verb.
- Articles - Definite and Indefinite Articles.
- Uses of Primary and Modal Auxiliary Verbs
- Question Tags
- Infinitive and Gerunds
- Tenses
- Tenses in Conditional Sentences
- Prepositions
- The Use of Correlatives
- Direct and Indirect Speech
- Active and Passive voice
- Correction of Sentences

- Degrees of Comparison

ii   Vocabulary

- Singular & Plural, Change of Gender, Collective Nouns
- Word formation from other words and use of prefix or suffix
- Compound words
- Synonyms
- Antonyms
- Phrasal Verbs
- Foreign Words and Phrases
- One Word Substitutes
- Words often confused
- Spelling Test
- Idioms and their Meanings
- Expansion and meaning of Common Abbreviations

PART V - - Certificate in Computer Hardware Maintenance (20 Marks)

Sl. No	Contents	Marks
I	**COMPUTER ARCHITECTURE**	4
	Desktop motherboard components: Motherboard form factors, Chipset, CPU Socket types, CPU fan & Heatsink mounting points, Connectors for integrated peripherals, CMOS Backup battery, Bus & Interconnection slots, South bridge, North bridge, AGP slots, IDE & SATA Connectors- Features, Memory slots, Switches & Jumpers Overview of SMPS and its features Laptop Motherboard Components: Top panel, Base panel, Touchpad, Palm rest assembly, Hinges, Processors, Graphics and Sound Card, Batteries BIOS: Define booting & understand the concept of multi-os booting, BIOS – settings & configuration List & Explain different categories of input & output devices: Physical connection, Virtual connection, Shared, and Dedicated. I/O transfers: Program controlled, interrupt driven and DMA	

	controlled.		
	CPU structure and functions, Processor Organization, ALU, Data Paths, Register Organization System bus structure: Data, Address and Control buses. Processor control, Micro-operations, Hardwired control, Microprogrammed control. Instruction Cycle - Instruction Fetch and Execute – Interrupts, Dataflow Introduction to Pipelined processing & Parallel processing.		
II	**TROUBLESHOOTING AND DIAGNOSTICS OF A COMPUTER SYSTEM**	4	
	Introduction to systematic troubleshooting approaches - Understanding the importance of diagnostic tools - Familiarization with common diagnostic tools (multimeter, power supply tester, etc.) - Safe handling and usage of tools - Identifying and resolving common operating system problems - Practising system restore and recovery procedures - Introduction to software diagnostic tools (e.g., Task Manager, Event Viewer) - Analysing system logs and error messages - Troubleshooting power supply problems - Identifying symptoms of faulty motherboards - Diagnosing and testing RAM modules - Understanding memory-related error messages - Diagnosing and resolving hard drive and SSD problems - Recovering data from damaged storage devices - Identifying symptoms of overheating - Testing and replacing cooling components - Troubleshooting network adapter problems - Resolving issues with wired and wireless connections - Diagnosing issues with printers, scanners, and other peripherals - Addressing USB and other connectivity		

	problems - Identifying and resolving problems related to the system firmware - Updating BIOS/UEFI - Introduction to advanced diagnostic tools (e.g., hardware diagnostics, POSTcodes) - Analysing diagnostic reports - Identifying symptoms of malware infections - Using antivirus and anti-malware tools for detection and removal - Configuring firewalls and security settings - Implementing best practices for system security.	
III	**OPERATING SYSTEM**	**4**
	Introduction to software: System software & application software, examples-System software – assembler, loader, compilers, interpreters and their functions, comparison. Operating system – definition – functions of Operating system - different types of Operating Systems - batch systems - multiprogramming systems - time sharing - multiprocessor systems - real time systems. Define process - process control block (PCB) and its general structure - different states of a process with the help of state diagram.- Schedulers – long, medium and short term- difference between preemptive and non-preemptive scheduling- Various scheduling criteria - FCFS, SJF, Priority, and RR scheduling algorithms with Gantt charts –comparison of various scheduling algorithms-Resource allocation graph-deadlock-its causes-Process synchronization and critical section management.

Memory management - Different address bindings – compile, | |

	link and run time bindings. - Difference between logical address and physical address - Contiguous memory allocation – fixed partition and variable partition – Allocation Strategies - first fit, best fit and worst fit - Define fragmentation – internal and external, and solutions - Paging and paging hardware -Segmentation, advantages of segmentation over paging- Concept of virtual memory - Demand paging - Page-faults and how to handle page faults. - Page replacement algorithms: FIFO, optimal, LRU -Thrashing. File system - Concept of file and directory - Various file operations - File organization concepts – sequential and indexed. Different directory structures – single level, two-level, and tree structured directories. - Different allocation methods – contiguous, linked and indexed allocations. Various disk scheduling algorithms-FCFS, SSTF, Scan, C-Scan, Look & C-Look.		
IV	**THE STORAGE SYSTEM**	4	
	Introduction to different types of storage devices (HDD, SSD, Hybrid) - Understanding storage hierarchies and their use cases - Explore various storage interfaces (SATA, SAS, NVMe) - Hands-on experience with connecting and configuring storage devices - Understanding RAID (Redundant Array of Independent Disks) configurations - Implementing different RAID levels and testing fault tolerance - Implementing RAID using both software and hardware controllers - Comparing the advantages and disadvantages of each approach - Using tools like Disk Management (Windows) or Disk Utility (Linux) for partitioning - Formatting and managing file systems - Implementing and managing logical volumes - Dynamic volume resizing and snapshots - Configuring file sharing protocols (e.g., SMB, NFS) - Introduction to Storage Area Networks (SAN) - Configuring Fibre Channel or iSCSI connections - Implementing storage virtualization techniques - Understanding the benefits of virtualized storage environments - Setting up a		

	basic hyperconverged infrastructure - Integrating storage, compute, and networking components - Designing and implementing backup strategies - Exploring incremental, differential, and full backups - Simulating disaster scenarios and implementing recovery plans - Configuring and testing backup restoration - Implementing access controls and permissions - Configuring encryption for data-at-rest - Implementing data deduplication and compression techniques - Assessing the impact on storage efficiency.		
V	**COMPUTER NETWORKING**		4
	Identify and understand the functions of routers, switches, hubs, and modems - Hands-on configuration of basic settings on networking devices - Learn to create straight-through, crossover, and rollover cables - Practice cable crimping and testing - Configure IP addresses, subnet masks, and default gateways on computers - Practice using command-line tools for IP configuration - Capture and analyse network traffic using Wireshark - Identify and understand common network protocols - Configure a small LAN with multiple computers, switches, and a router - Implement basic security measures for the local network - Configure Virtual LANs (VLANs) on switches - Test VLAN communication and isolation - Connect multiple LANs using routers and simulate a WAN - Implement routing protocols such as RIP or OSPF - Configure a Virtual Private Network (VPN) for secure communication - Understand the principles of tunnelling and encryption - Setup and configure a wireless LAN using Wi-Fi routers and access points - Implement security measures for wireless networks - Diagnose		

and troubleshoot common issues in wireless networks - Optimise wireless network performance - Configure a network firewall to control incoming and outgoing traffic - Understand the principles of stateful inspection - Set up and configure an Intrusion Detection System (IDS) or Intrusion Prevention System (IPS) - Analyse and respond to simulated security incidents - Configure a Domain Name System (DNS) server - Understand DNS resolution and troubleshooting - Implement Dynamic Host Configuration Protocol (DHCP) for automatic IP address assignment - Troubleshoot DHCP-related issues.	

PART VI .Certificate in Data Base Management System (III Plus) (20 Marks)

I	INTRODUCTION TO DATABASES	4
	Data - Database - DBMS, Characteristics of Database System, Applications of Database, Different type of individuals interact with databases, Data Models, Database Schema - Instance - Database state, Three Schema Architecture and Data Independence, Database Languages, Database Interfaces, DBMS Component Modules, Centralised and Client/Server Architecture, Classification of DBMS. Relational Model Concepts: Domain, Attributes, Tuples and Relations, Characteristics of Relations, Relational Model Constraints and Relational Database Schemas, Update Operations and Dealing with Constraint Violations.	

II	SQL	4
	Data Definition and Data Types, Specifying Constraints, Basic Retrieval Queries, Insert, Delete and Update Statements. Advanced Features of SQL: Complex SQL Retrieval Queries, Assertions, Triggers, Views, Schema change statements.	
III	CONCEPTUAL MODELLING	4
	High level Conceptual Data Model for Database Design, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship sets, Roles, Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions Relationship Types of Degree higher than Two. Design ER model for Real applications. Enhanced ER model - Specialization, Generalisation, Aggression Relational Database Design: ER model to Relational Model Mapping	
IV	TRANSACTION PROCESSING	4
	Introduction to Transaction Processing, Concurrency Control, Recovery, Transaction and System Concepts, Desirable Properties of Transactions.	
V	FILE ORGANIZATION	4

| | File organization – various kinds of indexes. Query Processing – Measures of query cost - Selection operation – Projection operation, - Join operation – set operation and aggregate operation – Relational Query Optimization – Transacting SQL queries – Estimating the cost – Equivalence Rules. | |

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.