

Supply Chain Management Master Programme
Final Exam questions 2022
A Items

- 1. The concept of logistics, logistics systems.** Concept of reasons, purpose, of logistics. Reasons for the spread of logistics, 7M, 9M, tasks and areas; the relationship between logistics and inventory, the concept of the logistics system (Push and Pull); the quality of logistics services (customer service level, maximum principle and minimum principle) and the relationship between logistics costs (full or total cost approach, the relationship between logistics and marketing costs); main logistics processes, supplementary processes. Operation of logistics controlling; indicators (measures) to analyse performance and costs and customer service level.
- 2. Material handling and storage units (moved materials).** „Material moving material multiplier”, „Material moving frequency (loading) multiplier”. Characteristics of moved materials; the tasks and forms of packaging; the purpose and significance of unit load formation; classification of unit load forming devices; material handling and material flow characteristics (main/supplementary logistics processes-, moving- and material flow characteristics).
- 3. Material handling and moving systems (tools).** The concept of material handling; classification and characteristics of material handling equipment (strategic aspects of choice); analytic methods (analysis tools) concerning material flow or material handling.
- 4. Storage systems.** The concept of storage systems and storage, models of storage systems (inventory system model); the main features of storage systems: (characteristics, processes, tools, infrastructures); classifying of warehouses; the storage methods; Piece- goods (brake-bulk) storage systems, Warehouse and storing types, classification. Processes and tools (static storing, dynamic storing, automated high-bay warehouse or storage systems, lean lift) and strategic factors influencing the choice; material handling in warehouses.
- 5. Picking, picking warehouse goods (commissioning)** The concept and operation elements of picking, the machines of picking, picking systems. Freight systems (classification of goods transportation systems). Tasks of freight (or goods) transportation systems; characterization of supply chains, route construction solutions: key characteristics of rail, road, air, water transport
- 6. Combined transportation systems.** The concept of combined transport; road-rail, road-water, rail-water, river-sea (huckepack: swap-body, semi-trailer, container).
- 7. Carrying and Forwarding Agents CFAs - shipping or delivery fulfilment service providers or shipping agent companies, shippers/forwarders/carriers (comparing to courier, transporters, 3PLs).** The concept of shipping contract, actors (logistics transporter as logistics contractor or forwarder as contractor); the duties and responsibilities of the carrier; INCOTERM and tariffs (standards of commerce); freight groupage FTL or LTL.
- 8. Purchasing (input) logistics or supply chain.** Tasks of procurement logistics; procurement planning (identification of needs, exploration of procurement market, selection of suppliers, carriers); centralized and decentralized procurement.

- 9. Distribution (output) logistics.** Tasks of distribution logistics; the concept of marketing and distribution channel and the role of intermediaries (product mix, customer service level, cost advantage); channels of physical distribution; the role of logistics service providers, outsourcing of distribution tasks; order processing management (order cycle, path of customer order, ordering or order release / order receive or receiving orders).
- 10. Production and supply logistics.** Tasks of supply and distribution solutions. JIT and Kanban delivery, Vendor Managed Inventory (VMI), Cross-Docking (CD), Continuous Replenishment (CR), Quick Response, “make or buy” decisions; the concept of outsourcing, insourcing, co-sourcing, partner relationships (CRM), inverse logistics
- 11. Inventories types and their classification,** model of inventory system and operation. The nature of the output process (stock outflow); concept of demand and service; the nature of the input process (filling up). Dependent and independent demand. Service principles; inventory monitoring methods; inventory mechanism. Inventory-warehouse management, inventory management.
- 12. Inventory or holding costs.** Classification and factors of inventory costs: stock holding costs or warehousing costs, ordering or setup costs (replenishment), stockout costs (cost of loss due to unmet needs or shortages), revenue, income, residual value, residual cost, lost revenue or discounted capital cost (opportunity cost). Cost volume by function of inventory size (Q) (ordering quantity).
- 13. Electronic commerce, e-logistics.** The concept and logical structure of electronic commerce and e-business; the logistical challenges and development of the ; e-commerce; the impact of e-logistics on the supply chain (e-procurement, e-distribution, disintermediation, intermediation and reintermediation); organization of e-logistics (actors of e-logistics) warehousing and transport in e-logistics.
- 14. Production logistics and production systems.** Classification and characteristics of production systems (according to the arrangement of workstations or tools: job shop / flow shop production, or cell production, flexible manufacturing systems), (according to management system: batch production, synchronous production, kanban manufacturing, JIT).
- 15. Production planning and scheduling.** The concept and aims of production planning; stages of production program or production planning; interpretation of independent and dependent demand: (forecasting: experiment, subjective estimation (analogy, intuitive), time series analysis, regression analysis; use-oriented procedures (synthetic, detailed): (material norm, yield); product assembly tree, BOM, Gozinto graph, program-oriented material requirements planning interpretation. Definition of gross and net material requirements; MRP; time and capacity planning. MRP I. and MRP II. systems, OPT system, JIT and Kanban systems, and application.
- 16. Logistics information systems and management information systems.** CIM, CIL The concept of an integrated enterprise resource planning (ERP) system; MRPII closed-loop resource (or requirements) planning; Logistics functions of ERPs: (product data management, material management, sales, production planning, project management, quality control and assurance, maintenance).

17. Info-communication tools for product identification and tracking. Structure, and information content of barcodes; product and cargo identification of the GS1 (EAN / UCC) barcode system. GTIN - Global Trade Item Number; SSCC – Serial Shipping Container Code; GLN - Global Location Number; QR code; RFID - radio frequency identification; interpretation of tracking and trace. EDI system, POS information.

18. Interpretation of supply chain management SCM. Main characteristics (advantages and disadvantages) Comparison of SCM, logistics, relation with marketing and production. The role of supply chain management in case of small and medium-sized enterprises. (push-pull operation, dominant member in the channel, direction of logistics developments). The bull-whip effect (interpretation, main causes and consequences, impact on the logistics system and supply chain, reduction of its effects). The concept and types of strategic alliances (integration). (Advantages/disadvantages of cooperation, types, risks of partnerships, performance measuring). Outsourcing of logistics activities. (outsourcing, insourcing, co-sourcing. 4PL, 5PL)

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B Items

- 1. Inventory control policies (inventory mechanism).** At equal T intervals (fixed periods of time) and fixed order (lot) size Q policy (T-Q mechanism), At equal T intervals (fixed periods of time) with fixed filling up level policy (T-S mechanism), in case of fixed stock level or minimum signal with fixed order (lot) size policy (s-Q mechanism), in case of fixed stock level or minimum signal and fixed filling up level policy (s-S mechanism).
- 2. Determination of (independent) expected needs (value) in inventory management.** **Determining independent needs** by forecasting: experimental methods (supplier assessment, interview, test), opinion formation (subjective, intuitive, brain storming, business plan), time (data), effect analyses (indicator, input/output), series analysis (mean, moving average, exponential smoothing), causal methods (regression analysis).
- 3. Determination of dependent needs (demand), data series analysis,** subjective (estimating, analogy, intuitive opinion), use-oriented procedures, material norms, yield, BOM (regular, direction-like, seasonal), program-oriented procedures (synthetic or summarising estimation, detailed estimation), material requirements planning (product assembly tree, Gozinto-graph, MRP).
- 4. Economic Order Quantity models (EOQ).** Continuous inventory watch (or review) with uniform (fix) demand (not allowing stockout, allowing stockout models and policy). Continuous inventory watch (stock monitoring) with fix demand, in case of joint model of production-consumption and finite replenishment capacity (not allowing stockout, allowing stockout models)
- 5. Lot (or batch) size dependent models and periodic inventory watch (reviewing) models and policy.** Interpretation of the relationship between order (lot) size and order cost in volume discount models. (Continuous inventory monitoring, with fix demand, not stockout not allowed.) **Models with periodic inventory watch.** Interpretation, characteristics and cost function of the periodic inventory monitoring models; the concept and process of dynamic programming.
- 6. Representation of route problems on a network.** The concept and search for the minimum cost spanning tree; the minimum cost path between two points in the network (Vehicle Route Problem VRP), successive approximation, theorem of sequential optimization (or optimal sub policy theorem), sequential optimization with backward approach and forward approach (dynamic programming, Wagner matrix), tabular mapping (or spanning tree), traversal problems (or walk through) (Chines Postman Problem CPP” „Travelling Salesman Problem TSP” „Milkman”); arc routing (branch-and-bound method, separations), arc routing with dynamic programming, route construction).
- 7. Models and applications of the transportation problems.** The concept of the transportation problem, the concept of minimum task, maximum task, prohibition tariff; the special case of the transportation task is the model of the assignment problem. (Vogel-Korda, row-column minimum (or mini-max principle), distribution base solution repair method, Branch-and-Bound method, Hungarian method with independent zeros and overlays; application of methods.)

- 8. Project management.** Network construction, CPM and PERT network, critical path, reserve time. Calculating the cost of the project. Monitoring the implementation of the project. GANT table. PERT net (Program Evaluation Review Technique)
- 9. Route Construction.** Unladen round minimization method and intuitive route construction method (laden rounds table + unladen rounds table = route construction initial working table). One-center route construction with limited vehicle capacity (classic method; concept of savings matrix and constraint bound).
- 10. Location theories.** Classification of location problems; One-centered search, with fixed locations (enumeration); One-centered investigation with partially bounded locations (semi-graphical vector polygonal center investigation); One-centered search or investigation with free locations (weighted centroid or centre of gravity or based on total deviation function of intensities). **Multi-centered investigation** with free locations (setting up a cost matrix; region classification; using center investigation along coordinates). Multi-centered investigation with capacity limits or limited (or fixed) centum capacities fixed center capacity.
- 11. Simulation of logistics processes.** The concept, necessity and conditions of simulation. Operation of the simulation models. Basic modules of a simulation framework (Arena or AnyLogic) and their functions. Inputs and outputs of the simulation. Expected results of the simulation.
- 12. Strategic planning in logistics.** Interpretation of functional strategy and logistics strategy and their relationship with corporate strategy. Interpretation of logistics (full) total cost concept throughout the company or the entire supply chain. Strategic elements, areas. Value chain, supply chain, interpretation of strategic collaboration points, the significance and dilemmas of out-sourcing. Strategy exploration tools, their advantages, disadvantages (PEST, SWOT, BCG).
- 13. Arc routing model and applications.** Solving the arc routing problem with (branch-and-bound method, dynamic programming method, route construction with intuitive method or one-center route construction and route connection).