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CAMPUS(ES)	APK
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ASSESSMENT DATE	13 November 2019	**SESSION**	08:30 – 11:30
ASSESSOR(S)	Mr GJ Heyns		
MODERATOR(S)	Dr PJ Kilbourn		
DURATION	3 hours (180 min)	**TOTAL MARKS**	140

NUMBER OF PAGES (Including cover page)	12

INFORMATION/INSTRUCTIONS:

- This is a closed-book assessment.
- There are 6 questions in Section B.
- Use the multi-choice answer sheet provided to register your answers.
- Read the questions carefully and answer only what is required.
- Number your answers clearly and correctly as per the question paper.
- Write neatly and legibly on both sides of the paper in the answer book, starting on the first page.

SECTION A [50 MARKS]

Important note: Use the multi-choice answer sheet provided to register your answers.

1. Which one of the following is incorrect? Conveying items by air is the most desirable form of transport when the demand is …
   A. unpredictable
   B. price-sensitive
   C. infrequent
   D. in excess of local supply
   E. seasonal

2. Which one of the following is a typical strength of pipeline transport?
   A. Pipelines are able to transport a large range of products commercially.
   B. Pipelines are flexible geographically in that they are designed to serve many locations.
   C. There is a variable and divisible capacity that can be altered to accommodate sudden changes in demand.
   D. Pipelines require low investment cost.
   E. Pipelines are able to move bulk loads of fluids and gas very reliably over long distances at a low unit cost and low risk.

3. Freight forwarders and brokers act as _____ service providers.
   A. first-party
   B. second-party
   C. third-party
   D. fourth-party
   E. multiparty

4. Agents who bring shippers (i.e. consignors) and carriers together in transport transactions are known as:
   A. Freight forwarders
   B. Ancillary operators
   C. For hire operators
   D. Freight consolidators
   E. Freight brokers

5. Which one of the following is NOT a sea transport standing cost item?
   A. Vessel inspection and check-ups
   B. Insurance
   C. Depreciation
   D. Fixed crew costs
   E. Insurance to cover risks on the water

6. As the number of storage facilities increases, total annual transport cost initially decreases to a point where it reaches a minimum, after which it immediately starts to rise. Which one of the following is NOT a reason for the rise in transport costs?
   A. The number of trips decreases.
   B. The trips become shorter.
   C. Vehicle loading and unloading times increase relative to travel time.
   D. More vehicles are required to maintain service levels.
   E. Although the number of storage facilities increases, their individual capacities decrease, so that the proportion of transit stock decreases at the cost of the transport function.

7. ‘Obtaining signed PODs are truly the responsibility of the financial department and not the operation of a facility.’ Do you agree with this statement?
   A. Only in the case of problems
   B. Always
   C. Usually
   D. No, they are the responsibility of the operations department.
   E. The POD is only a paperwork exercise of little importance

8. How far is the equal cost distance for the carriage of standard intermodal containers by road and rail?
   A. Approximately 100 km
   B. Approximately 300 km
   C. Approximately 400 km
   D. Approximately 500 km
   E. Approximately 700 km

9. Which of the following are the correct rating of the different transport modes in respect to its relative performance in general terms what concerns flexibility as service characteristic?
   A. Road (High); Air (High/moderate); Water (Moderate); Pipeline (Moderate/low); Rail (Low)
   B. Road (High); Rail (High/moderate); Air (Moderate); Water (Moderate/low); Pipeline (Low)
   C. Air (High); Road (High/moderate); Rail (Moderate); Water (Moderate/low); Pipeline (Low)
   D. Rail (High); Air (High/moderate); Road (Moderate); Pipeline (Moderate/low); Water (Low)
   E. Air (High); Road (High/moderate); Rail (Moderate); Pipeline (Moderate/low); Water (Low)

10. Which of the following statements are correct?
    A. Vehicle capacity can increase at a greater rate than the costs of transporting the increased capacity
    B. Economies of scale are achieved when an expanded level of output results in reductions in the total unit cost of transport
    C. The prerequisite for economies of scale is a cost structure that is characterized by a high ratio of variable to total costs
    D. A and B
    E. B and C

11. Which of the following statements are correct in respect to the airfreight transport market?
    A. Since deregulation there is a trend towards a monopolistic structure in the market
    B. There is no technical limit to the economies of scale that one can achieve with increasing the fleet size
    C. On condition that intermediate landing is not necessary, longer route lengths give rise to significant economies of scale
    D. A and B
    E. A and C

12. Which of the following statements are correct?
    A. Relative to other modes of transport, road transport does not enjoy significant economies of distance
    B. Road transport infrastructure such as terminals, provides further opportunities for economies of scale
    C. Increased vehicle sizes coupled with productive utilization result in increased economies of scale
    D. None of the above is correct
    E. All of the above are correct

13. A high ratio of variable costs to total costs per transport unit is a characteristic of which mode of transport?
    A. Air transport
    B. Road transport
    C. Rail transport
    D. Pipeline transport
    E. Sea transport

14. Which of the following are variable costs for an air transport operation?
    A. Maintenance of buildings
    B. Insurance of assets other than aircrafts
    C. Training costs
    D. Engine and component overhaul costs
    E. Salaries

15. Which mode of transport ranks highest in terms of accessibility as service characteristic?
    A. Sea transport
    B. Road transport
    C. Pipeline transport
    D. Air transport
    E. Rail transport

16. When a consignee receives a rail wagon, the rail carrier allows the firm a specified amount of free time to unload the wagon. When the rail wagon is retained beyond the allowable time, the rail carrier assesses …
    A. a tracking charge
    B. an expediting charge
    C. a diversion charge
    D. a demurrage charge
    E. a detention charge

17. Which one of the following cost items continuously accumulates as flying time increases?
    A. Fuel cost
    B. Airframe maintenance necessitated by the number of landings
    C. Overhead costs
    D. Landing charges
    E. Terminal services

18. Which one of the following is NOT a road transport overhead cost item?
    A. Land and buildings (premises, offices and warehouses)
    B. Terminal facilities (vehicle depots, parking areas, garages, fixed loading facilities and equipment)
    C. Managerial and administrative expenditure and other support functions
    D. Expenditure relating to support functions
    E. Vehicle insurance payments

19. Which of the following is NOT a quality principle on which TQM is based?
    A. Focus on continuous improvement
    B. Consistency of input/output ratio
    C. Involvement of all employees
    D. Customer focus and customer involvement
    E. Consistency of purpose

20. The third step of the problem-solving discipline (PSD) of TQM is …
    A. aimed at identifying as many possible causes of the problem.
    B. the standardisation of the quality improvement process.
    C. the planning and implementation of proposed improvements.
    D. the identification of the root cause of the problem.
    E. the generation of possible solutions to the root cause.

21. Diagnostic performance measures can be defined as being …
    A. based on facts and can be measured directly and accurately.
    B. strategic in nature and describe how well a business is prepared for the future.
    C. indirect measures of business performance that measure critical success factors.
    D. intangible in nature and have to be measured indirectly.
    E. direct measures of business achievement that have limited predictive validity.

22. Which of the following performance measures would you use to measure the performance of customer service?
    A. Inventory turnover
    B. Asset utilisation
    C. System up-time
    D. Fill rate
    E. Order picking time

23. Which of the following performance measures would you use to measure the performance of the procurement function?
    A. Standardisation quota
    B. Total cycle time
    C. Fill rate
    D. Percentage of demand met
    E. Inventory turnover

24. Non-operating transport service providers can be classified into two groups. These are …
    A. freight consolidators and ancillary carriers.
    B. freight agents and ancillary carriers.
    C. freight forwarders and freight brokers.
    D. freight forwarders and ancillary carriers.
    E. freight brokers and ancillary carriers.

25. Transportation, both inbound and outbound, is one of the most significant areas of logistics management because of its impact on _____ levels and the firm's _____ structure.
    A. Inventory; organisational
    B. Customer service; cost
    C. Price; profit
    D. Managerial; organisational
    E. Price; costs

26. External areas for trucks moving to receiving or dispatch need to be big enough …
    A. to allow the truck to park.
    B. for the largest possible truck to reverse comfortably to the door.
    C. for an average truck to reverse comfortably to the door.
    D. to allow two trucks to pass.
    E. for the average truck to back up against the door.

27. Should the temperature-controlled area determine the layout of the facility in all cases?
    A. Yes, as the cheapest method of creating a temperature-controlled area is to use the external walls.
    B. Only when the temperature-controlled area is located within the building.
    C. No, the flows and layout within the facility should determine the most effective layout.
    D. (A) and (B)
    E. None of the above

28. Someone states that the floor area needed to house their storage racks is approximately three times larger than the floor area of the actual racks. Is this the correct proportion?
    A. It is the correct proportion.
    B. They made a calculation error.
    C. This would require special equipment to be correct.
    D. This is not a cost-effective design.
    E. This would require special racks to be correct.

29. To handle inventory in high racks, the best piece of equipment is the …
    A. reach truck
    B. pallet truck
    C. reach stacker
    D. crane
    E. turret truck

30. The movement of containers for some distance on the quayside is best done by …
    A. spreaders
    B. straddle carriers
    C. cranes
    D. mobile crane
    E. reach stacker

31. Small items that are of high value and that need to be accessed frequently are best stored in …
    A. small boxes
    B. shelves
    C. mobile shelves
    D. carousels
    E. storage cabinets

32. Which stacking method gives the densest stacking per floor area where the boxes, which are 300 mm by 400 mm by 300 mm, can support 20 boxes on top of one another?
    A. Block stacking
    B. Racking
    C. Mobile racking
    D. Narrow aisle racking
    E. All of the above

33. The connection to a container is done via a support frame and special equipment. The equipment comprises of:
    A. Frame and relay
    B. Twistlock and frame
    C. Spreader and Twistlock
    D. Spreader and frame lock
    E. Twistlock and relay

34. The supportive role of logistics in the returns management process can be regarded as being …
    A. physical and supportive
    B. analytical and physical
    C. supportive and technical
    D. operational and strategic
    E. physical and strategic

35. Which of the following is NOT one of the most important factors determining the size of a firm's warehouse?
    A. Size of markets served
    B. Number of segments served via competitors
    C. Material handling systems used
    D. Stock layout
    E. Throughput requirements

36. Are the basic operating principles the same for a paper terminal in a port as for a grocery distribution centre?
    A. Always
    B. Sometimes
    C. Mostly
    D. It depends on the terminal type
    E. Never

37. How many processes are there in a warehouse facility?
    A. 5
    B. 12
    C. 13
    D. 19
    E. Differs from facility to facility

38. An error is made in the physical operation of a facility. What is the consequence of rectifying the error?
    A. Twice as much work
    B. Two additional steps in the process
    C. Three times as much work
    D. Four times as much work
    E. None of the above

39. All the processes in a facility have an influence on …
    A. inventory
    B. management of receipts
    C. delivery
    D. confirmation of orders
    E. picking and packing operations

40. How big should the receiving area be?
    A. Twice the size of the largest load
    B. Half the size of the largest load
    C. Large enough to identify the goods and the quality before moving inventory into the facility
    D. The size of an average load
    E. Sized for the smallest truck

41. Packaging has an impact on the cost and service characteristics on which of the following logistics system component(s)?
    A. Transportation
    B. Inventory management
    C. Warehousing
    D. Communications
    E. All of the above

42. Which of the following statement is correct?
    A. The packaging of air shipments is regulated by the South African Revenues Services.
    B. The packaging of air shipments is regulated by the South African Association of Airfreight Forwarders.
    C. The packaging of air shipments is regulated by the International Air Transport Association.
    D. Every airline regulates itself in terms of packaging requirements.
    E. None of the above

43. What is the standard international pallet size?
    A. 1 m x 1 m
    B. 0,8 m x 1 m
    C. 1,2 m x 1,2 m
    D. 0,8 m x 1,2 m
    E. 1 m x 1,2 m

44. Which of the following is NOT an ISO standard container length?
    A. 20 ft
    B. 40 ft
    C. 60 ft
    D. 45 ft
    E. 53 ft

45. The Logistics performance measure ‘Average cost per order’ is calculated with the following formula: Total cost of orders / _____
    A. Market Price
    B. Total Number of orders
    C. Price and cost
    D. Total demand
    E. Cost of goods sold during the time period

46. The logistics performance measure ‘Inventory turnover’ is calculated with the following formula: _____/ Average inventory valued at cost during the period
    A. Total turnover
    B. Total number of items shipped
    C. Price and cost
    D. Cost of goods sold during a time period
    E. Purchasing price of goods

47. Which of the following is NOT a performance measure for warehousing?
    A. Order picking time
    B. Inventory turnover
    C. Warehouse throughput
    D. Equipment utilisation
    E. Picking speed per hour

48. Which of the following is NOT a step in the benchmarking process?
    A. Ensure management support and set objectives
    B. Recruit new staff for vacant positions
    C. Compare performance
    D. Find benchmarking partner
    E. Develop best practice

49. What is the correct term for the relationship between the mass and the volume of an item?
    A. Density
    B. Value
    C. Stowage ability
    D. Form
    E. Destructibility

50. Which of the following is generally NOT a factor influencing package design?
    A. Standardization
    B. Globalisation
    C. Price and cost
    D. Protection level
    E. handling

SECTION B [90 MARKS]

QUESTION 1 **[30 MARKS]**

World's longest train saves Transnet R1bn

Transnet Freight Rail runs the world's longest production trains between Sishen in the Northern Cape and Saldanha port 861km away. Transnet Freight Rail (TFR) saved more than R1bn by successfully testing the world's longest train with the intention of serving growing demand from SA's manganese miners for access to export markets for the key steel ingredient, adding 1-million tons of extra capacity on its network.

SA has the world's largest manganese deposits and is a leading player in supplying the mineral to steel mills, but mining companies have long complained about limited rail capacity being the bottleneck on exports. Transnet had looked at options of expanding capacity on the line between Hotazel and Port Elizabeth and introduce new rolling stock in an expensive programme. The use of the Sishen-to-Saldanha line with a mega-train meant a 90% saving worth more than R1bn.

Transnet was keen to address these concerns and exploit its existing infrastructure and rolling stock combined with enhanced technology to meet demands from the

sector, said Lloyd Tobias, TFR's chief operating officer. The September test with 375 wagons in a 4km-long train proved the concept that TFR could haul manganese in this configuration, topping the longest production train in the world, the 342-wagon iron-ore trains running on the same 861km Sishen-to-Saldanha line.

A train with this many wagons would haul 22,500 tons of manganese ore. The train would give TFR an extra 1-million tons a year of capacity, running 44 loads to Saldanha, which is primarily an iron-ore export facility. "The project will maximise the manganese volumes railed between the mines in Hotazel via Sishen to Saldanha. This will be achieved by optimising the use of existing assets, locomotives and wagons, within the installed infrastructure constraints, doing more with what is currently available," Tobias said.

Transnet is using innovative ways to step up its share of manganese moving out of the Northern Cape to offshore markets and wants to capture the full 14-million tons transported to the coast every year, Gert de Beer, the parastatal's chief business development officer, told Business Day in July. Transnet has upped its manganese capacity to 12.8-million tons a year from five-million tons a year in 2012 and is using almost all of SA's ports served by its rail network, but the focus was on the Port Elizabeth and Saldanha harbours, both of which are at the end of heavy-haul lines, he said.

Transnet was targeting the 1.2-million tons that is hauled to harbour by road, De Beers said. It was increasing the use of container loading facilities at Newcastle in KwaZulu-Natal, where bulk manganese ore is received, put into top-opening containers and railed to Durban or Richards Bay to be emptied into ships.
Source: Adapted from Business Day (12 October 2018)

1.1 How did the railway rolling stock advancement improve TFR's competitiveness? Support your answer by discussing rail transport efficiency by referring to the existence (if any) of economies of fleet size and of vehicle size in railway operations. (10)

1.2 Governments can make use of legislation (e.g. economic or technical regulations) to affect the performance of the transport sector. Discuss five additional policy instruments which government can apply to influence the freight transport industry. (10)

1.3 Road and rail transport persistently competes for break-bulk freight and containerised freight. What makes rail transport such an important and competitive mode? Discuss five typical strengths and five typical limitations of rail transport. (10)

QUESTION 2 **[15 MARKS]**

The efficient and effective operation of a warehouse requires the use of various types of equipment and the combination of a complex series of processes.

2.1 Discuss the following two warehouse processes, (i) receiving of stock and (ii) stock counting. (10)

2.2 Name ten (10) other processes inherent to all warehouse facilities. (5)

QUESTION 3 **[15 MARKS]**

Translog Carriers (Pty) Ltd operates as a logistics service provider and has a fleet of several combination vehicles operating in various industries throughout Southern Africa. One of these vehicles is a 6x4 truck tractor with a tridem axle semi-trailer that covers 110 000 km per annum. Use the assumptions below to answer the following questions (show all calculations):

Overheads - Administration	R 161 800
Cost of capital (% of purchase price per annum)	10.30%
Annual License Fees	R 30 400
Driver Monthly cost	R 41 300
Assistant Monthly cost	R 15 000
Purchase price - TT	R 1 317 000
Overheads - Operations	R 107 800
Depreciation - straight line method	
Truck tractor residual value	25%
Truck tractor economic life (years)	5
Purchase price - Trailer	R 631 000
Tyre usage and cost (c/km)	271
Trailer residual value	0%
Trailer economic life (years)	10
Fuel consumption (liter /100km)	55
Fuel price (c/liter)	1490
Insurance (% of cost price)	7.5%
Maintenance cost (c/km)	363
Distance travelled per annum (km)	110000
Truck Tractor (tyres)	10
Semi-trailer (tyres)	12
New tyre price (each)	R 24 000
Lubricants (% of fuel cost)	2.5%
Working weeks	50
Working days	5 days / week

3.1. Calculate the total vehicle costs per kilometre. (12)

3.2 What will the total vehicle cost (TVC) per annum be at an annual travel distance of 100 000 km and 120 000 km respectively? What do you observe of the total vehicle cost per km? (3)

QUESTION 4 **[15 MARKS]**

Logistics management is perceived as an important competitive factor for most organisations. Logistics performance management is the key to quantifying and evaluating the current state and improvement opportunities within and organisations' logistics activities.

4.1 Discuss why it is necessary for an organisation to implement and use a logistics performance measurement system. (9)

4.2 Explain Total Quality Management (TQM) and discuss the quality principles on which it is based. (6)

QUESTION 5 **[9 MARKS]**

A set of nine principles act as guidelines for promoting efficient freight transport operations when routing and scheduling ***local collection and delivery trips***. Discuss **any three** principles (6) and list the remaining six principles (3).

QUESTION 6 **[6 MARKS]**

Due to increased focus on reducing cycle time, supply chains managers are considering cross-dock facilities. Define a cross-dock facility (3) and discuss the characteristics of a supply chain that will enable it to operate with a cross-dock facility (6).