



**UTHM**

Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2022/2023**

- COURSE NAME : BUILDING TRANSPORTATION SYSTEM
- COURSE CODE : BNB 31803
- PROGRAMME : BNB
- EXAMINATION DATE : JULY/AUGUST 2023
- DURATION : 2 HOURS 30 MINUTES
- INSTRUCTIONS : 1. ANSWER **ALL** QUESTIONS.
2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **SEVENTEEN (17) PAGES**

**TERBUKA**

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**SECTION A: MULTIPLE CHOICE QUESTIONS**

Indicate the best choice for each question in the given space. Each correct answer is worth 1 mark. Select only one answer per question, or your answer will be counted as incorrect.

1. One of the needs for a lift in the building is?
  - A. To bring users horizontally from one space to another
  - B. Effectively and optimized used in low rise buildings
  - C. Efficient working environment for high rise office buildings
  - D. Do not have to install a firefighting lift
2. Which one of the following is not a type of lift?
  - A. Electric Lift
  - B. Escalator Lift
  - C. Hydraulic Lift
  - D. Paternoster Lift
3. Which one of the following things is not considered as the element of a lift?
  - A. Lift Shaft
  - B. Lift Door
  - C. Lift Floor
  - D. Lift Pit
4. Which of the following is NOT a safety device on an elevator?
  - A. Overspeed Governor
  - B. Call button
  - C. Limit Switch
  - D. Door lock
5. What does COP stand for?
  - A. Cheap Olive Prices
  - B. Car Outside Panel
  - C. Car Operating Panel
  - D. Clean Oil Pits
6. Which of the following is NOT likely to be found on a standard, non-roped hydraulic elevator?
  - A. Door locks
  - B. Overspeed Governor
  - C. Hydraulic ram
  - D. Pit valve
7. Which of the following elevator drives is not suitable for a high rise building of 50 floors?
  - A. SCR-DC
  - B. VVVF
  - C. 2 speed AC
  - D. Ward-Leonard

8. What is the purpose of compensating chains or ropes?
  - A. To compensate for overbalance
  - B. To compensate for feeling insecure
  - C. To compensate for the difference in weight of the car, counterweights and cables
  - D. To keep engineers in a job
9. All elevator machine rooms are located on the roofs of buildings.
  - A. True
  - B. False
10. What principle does rope elevators work on?
  - A. Pressure
  - B. Friction
  - C. Traction
  - D. Hope
11. Elevators is the safest form of transport.
  - A. True
  - B. False
12. Elevator was contrived by an inventor named ...
  - A. Sir James Collip
  - B. Sir Frederick Banting
  - C. Dr Abraham Gesner
  - D. Werner Von Siemens
13. When fluid is subjected to ..... it is pushed into the cylindrical chamber where the ram gets a push in the upward direction.
  - A. Pressure
  - B. Force
  - C. Momentum
  - D. Acceleration
14. The two types of pulleys in a hydraulic lift are ..... and .....
  - A. fixed, fixed
  - B. movable, fixed
  - C. movable, movable
  - D. semi-movable, movable
15. Working period is defined as the ratio of the height of lift to the .....
  - A. acceleration of the lift
  - B. pressure of the lift
  - C. velocity of the lift
  - D. displacement of the lift



16. The device that opens and closes the electric current in an elevator when it has reached the designated end of a travel course is termed as:
  - A. Automatic Transfer Switch
  - B. Current Overload Safety Switch
  - C. Emergency Switch
  - D. Disconnect Switch
  
17. Refer to Q16, there shall be installed in the pit of each elevator where the pit extends more than ..... below the sill of the pit access door.
  - A. 2.30 meters
  - B. 600 millimeters
  - C. 2.0 meters
  - D. 660 millimeters
  
18. This device records calls even when a car is in use. It answers calls starting from the lowest floor and so on while ascending.
  - A. Descending Collective Control
  - B. Up Collective Control
  - C. Down Collective Control
  - D. Ascending Collective Control
  
19. This device records calls even when a car is in use. It answers calls starting from the highest floor and so on while descending.
  - A. Descending Collective Control
  - B. Up Collective Control
  - C. Down Collective Control
  - D. Ascending Collective Control
  
20. The safety device of a passenger elevator is activated if the car travels faster than its rated speed by grasping the guide rail to stop the car safely.
  - A. Governor
  - B. Pit
  - C. Winding Drum Machine
  - D. Buffer
  
21. An assembly consisting of a pulley wheel, side plates, shaft, and bearings over which a cable or rope is passed.
  - A. Safety Shoe
  - B. Weighing Device
  - C. Sheave
  - D. Counterweight
  
22. The type of elevator that is raised or lowered quite simply using a movable rod or plunger?
  - A. Pneumatic Elevator
  - B. Hydraulic Elevator
  - C. Freight Elevator
  - D. Electric Elevator

23. The criterion in the selection of an elevator other than interval and average waiting time.
- A. Travel Time
  - B. Power Consumption
  - C. Speed
  - D. Electric Consumption
24. Vertical tracks that serve as a guide for the car and the counterweight.
- A. Bumper
  - B. Guide Rails
  - C. Endless Belt
  - D. Governor
25. The safety device of a passenger elevator that reduces the collision shock of a car or counterweight due to overtravel beyond the lowest stop. It stops the car or counterweight safely. What is this device?
- A. Pit
  - B. Winding Drum Machine
  - C. Buffer
  - D. Governor
26. Is is the vertical passageway for the car and counterweight?
- A. Shaft
  - B. Truss
  - C. Rigid Frame
  - D. Steel Casing
27. On elevators, a gear-driven machine has a drum to which the wire ropes that hoist the car are fastened, and on which they wind.
- A. Governor
  - B. Pit
  - C. Winding Drum Machine
  - D. Buffer
28. Two types of passenger elevators. Hydraulic and .....
- A. Elevator
  - B. Hydraulic Elevator
  - C. Freight Elevator
  - D. Electric Elevator
29. Type of conveyer that transports packages and equipment crates.
- A. Elevator
  - B. Hydraulic Elevator
  - C. Freight Elevator
  - D. Electric Elevator

30. Which is not an advantage of “Hydraulic Elevator”?
- A. Effective for high load capacity requirements
  - B. Lower initial cost of equipment and maintenance
  - C. More efficient building space utilization
  - D. Has a safety device to prevent falling and an accessible ground system for visual safety and leakage
31. What type of elevator is used for low rise buildings where speed is not the main consideration?
- A. Deck elevator
  - B. Hydraulic
  - C. Gear-less traction elevator
  - D. Geared elevator
32. The connections between elevator cars and openings?
- A. Hoist
  - B. Traction
  - C. Sheave
  - D. Guard Rails
33. For a 3-storey building that is intended for a senior citizen centre with a limited budget and space, what is the appropriate type of elevator?
- A. Hydraulic
  - B. Spiral Ramp
  - C. Stretcher
  - D. Traction
34. A ‘bumper’ is designed to...
- A. Stop a descending car beyond its normal limit of travel by absorbing the impact
  - B. Guide the path of the car up and down the elevator shaft
  - C. Keep the car from reaching dangerous speeds
  - D. Keep the car doors from slamming shut
35. Otis has installed the lift at the Eiffel Tower.
- A. True
  - B. False
36. Which type of elevator is used for high rise buildings?
- A. Geared traction elevator
  - B. Pneumatic elevator
  - C. Hydraulic elevator
  - D. Gearless traction elevator
37. Which of the following safety devices is put in place in case of an earthquake?
- A. Seismic Switch
  - B. Derailment Switch
  - C. Collision Switch
  - D. Lock-Up Switch



38. What is the steps clearance through step run in the guide of the escalator?  
A. 1 mm  
B. 3 mm  
C. 5 mm  
D. 7 mm
39. Which component is used in the escalator drive system?  
A. Gear reducer  
B. Controller system  
C. Chain  
D. Rope
40. Which component is an escalator controller component?  
A. Sensor  
B. Miniature Circuit Breaker  
C. Limit's switch  
D. Intermediate switch
41. Where can the live testing of a controller be carried out?  
A. Inside of machinery space  
B. Outside of machinery space  
C. Top of machinery space  
D. Bottom of machinery space
42. Automatic brakes will ensure that the escalator stops smoothly.  
A. True  
B. False
43. Escalator speeds vary from about 17 to 35 meters per minute.  
A. True  
B. False
44. Which of the following statement is parts of an escalator?  
A. Main drive chain, step chain, handrail, drive chain, bottom sprocket main drive chain, step chain, handrail, drive chain  
B. Main drive chain, safety shoe, handrail, drive chain, bottom sprocket  
C. Main drive chain, step chain, handrail, drive chain, bottom sprocket  
D. Main drive chain, step chain, handrail, weighing device, bottom sprocket
45. Minimum angle of inclination of an escalator  
A. 30  
B. 35  
C. 40  
D. 45

46. In escalators, which of these stops the escalator if a foreign object becomes wedged at the guard?
- A. Disconnect Switch
  - B. Knife Switch
  - C. Handrail Guard Switch
  - D. Limit Switch
47. Where the endless belt of steps passes around during the operation of an escalator.
- A. Sprocket Assembly
  - B. Closed Nipple
  - C. Coil
  - D. Relay
48. What is the best escalator layout if the prime consideration is cost?
- A. Multiple parallels
  - B. Criss-crossed
  - C. Parallel
  - D. None
49. Why do escalators have a built-in fire alarm system?
- A. Best location for an alarm system as it is located in common areas
  - B. Device and body of the escalator are not 100% fireproof
  - C. It's a hole for each floor
  - D. Device of the escalator have wiring and sensitive parts that are more sensitive to fire and ignition
50. Below are the factors that affect the design of an escalator except ...
- A. Location
  - B. Physical requirements
  - C. Types of materials
  - D. Aesthetic preferences
51. The following are the disadvantages of an escalator except ...
- A. Waste of energy when not in use
  - B. Possible injury when it stops suddenly
  - C. Source of fear for small children
  - D. Adjustable speed for controlling the crowd
52. The definition of an escalator
- A. A machine consisting of an endless belt with scoops attached, used for raising grain to an upper storey for storage
  - B. Vertical transportation in the form of a moving staircase which carries people between floors of a building
  - C. A continuous moving band of fabric, rubber, or metal used for transporting objects from one place to another
  - D. A set of stairs and its surrounding walls or structure



53. What power source is used on nearly all modern escalators?
- A. alternating current motors
  - B. hydraulic pumps
  - C. Steam
  - D. banks of wet cell batteries
54. Basically, an escalator is a variation of which machine?
- A. gas engine
  - B. conveyor belt
  - C. computer
  - D. cotton gin
55. If an escalator moves at a rate of 145 feet per minute, how many people can it carry per hour?
- A. 1,000
  - B. 5,000
  - C. 10,000
  - D. 25,000
56. The escalator was discovered by:
- A. Sir Jesse Reno
  - B. Sir Henry W. Seelay
  - C. Sir Schuyler Skaats Wheeler
  - D. Sir Samuel W. Francis
57. What is the minimum clear headroom of the escalator measured at the edge of steps to the ceiling above?
- A. 2.0 m
  - B. 2.1 m
  - C. 2.3 m
  - D. 2.5 m
58. Which of the following is NOT a safety device on an elevator?
- A. Overspeed Governor
  - B. Call button
  - C. Limit Switch
  - D. Door lock
59. What cannot be achieved by an escalator that is possible with a travelator?
- A. Move pedestrians carrying a heavy object
  - B. Pedestrian with trolley
  - C. Speeds is more flexible and easier to control
  - D. Slopes are higher
60. What is the Maximum and Minimum speed of an escalator?
- A. 30 - 40 fpm
  - B. 90 - 120 fpm
  - C. 85 - 120 fpm
  - D. 80 - 150 fpm

61. What is the most economical layout for an escalator?
  - A. Parallel
  - B. Straight
  - C. None
  - D. Criss-crossed
  
62. Type of conveyor that transports packages and equipment crates.
  - A. Elevator
  - B. Hydraulic Elevator
  - C. Freight Elevator
  - D. Electric Elevator
  
63. What cannot be achieved by an escalator that is possible with a travelator?
  - A. Move pedestrians carrying a heavy object
  - B. Pedestrian with trolley
  - C. Speeds is more flexible and easier to control
  - D. Slopes are higher
  
64. Allow transporting pedestrians or carts at a 12-degree angle?
  - A. Travelator
  - B. Moving Ramp
  - C. Escalator
  - D. Walkalator
  
65. The maximum length of a walkalator is 250 meters. Why?
  - A. Maintenance and safety control
  - B. Allow reversal directions
  - C. To allow users to exit at the sides
  - D. Standard length in the market does not exceed more than 250 meters
  
66. The main purpose of a walkalator, moving walk, travelator?
  - A. Aesthetic
  - B. None
  - C. Convenience of pedestrians
  - D. To control the flow of traffic
  
67. A forklift can also be defined as a
  - A. Lift truck
  - B. Lift scooter
  - C. People mover
  - D. Murder weapon
  
68. How many forks does a forklift have?
  - A. One
  - B. Two
  - C. Three
  - D. Four

69. You must have a license to drive a forklift?  
A. True  
B. False
70. A scissor lift should be inspected:  
A. Every Monday  
B. Before each shift  
C. Once a week  
D. When you visually see a leak
71. What ground obstructions could cause issues when driving a scissor lift?  
A. Cracked or uneven floor  
B. Tools on floor or ground  
C. Potholes  
D. Manhole covers or drainage grate  
E. All of the above
72. When using a scissor lift, you should always maintain a minimum safe approach distance of at least 10 feet from overhead electrical lines.  
A. True  
B. False
73. Which of the following is acceptable to gain higher access with a scissor lift?  
A. Stand on the middle railing  
B. Use a ladder inside the lift  
C. Potholes  
D. Use a different lift with higher access  
E. Jump
74. When using a scissor lift, you must always latch the safety chain on the access point of the scissors lift before moving?  
A. True  
B. False
75. If an emergency shutdown is necessary, the first step is to ensure that the lift is lowered and safely resting on its supports.  
A. True  
B. False
76. When selecting the right type of scissor lift, the type of terrain in which the lift will be utilized does not need to be considered.  
A. True  
B. False
77. A lift can be modified as needed if the lift moves too slow.  
A. True  
B. False



78. If a person moves from a lift platform to a nearby structure, only one lanyard is required.
- A. True
  - B. False
79. What statement about the pre-start of a scissor lift inspection is false?
- A. If the lift is insulated, you must make sure it has plenty of oil and lubrication
  - B. Guardrails should be free of damage
  - C. Tires must be properly inflated and inspected for damage
  - D. All safety guards should be checked for malfunctions
80. An aerial lift and a scissor lift are the same things.
- A. True
  - B. False
81. The work platform on a scissor lift is generally never bigger than the base.
- A. True
  - B. False
82. On aerial lifts, the joint on the boom platform can allow the arms to be four times as long.
- A. True
  - B. False
83. Aerial lift operators must:
- A. Make a thorough daily visual inspection
  - B. Have defective parts impairing safe operations fixed
  - C. Fill out an aerial lift inspection form
  - D. Have completed the designated operator training and have a current card in their possession
  - E. All of the above
84. Select the true statement(s):
- A. An operator must wear a full-body harness while operating a man lift with a telescoping boom
  - B. An operator can work in a scissor lift without a full-body harness if he follows all of the rules in the district man lift policy
  - C. An operator of a man lift with a telescoping boom must fully retract the boom whenever travelling on a grade
  - D. An operator of a scissor lift may not drive the lift with the platform raised unless for minor slow adjustments
  - E. All of the above
85. It is safe to position the basket on a building ledge, roof, or any other object and boom down to increase the stability of the basket.
- A. True
  - B. False
86. When moving the machine, the user should visually verify that other people are clear and that potholes or objects that would affect the stability of the lift are avoided.
- A. True
  - B. False

87. Uncommon aerial lift accidents include:
- A. Ejections
  - B. Cuts
  - C. Smashed hands
  - D. All of the above
88. Aerial lift accidents can cause what kinds of injuries?
- A. Fall injuries
  - B. Blunt trauma
  - C. Electrocution
  - D. All of the above
89. What must you check before using a scissor lift?
- A. The surface is level and stable
  - B. No overhead obstructions
  - C. Both
  - D. Neither
90. Load limit stands for what?
- A. Total weight, including body weight, tools and materials, that an aerial lift can safely hold
  - B. Total weight, including the aerial lift itself
  - C. Only the bodyweight of the operator that an aerial lift can safely hold
  - D. None of the above
91. Scissor Lifts are not considered Powered Industrial Trucks.
- A. True
  - B. False
92. Some of the basic safety rules that apply are:
- A. Perform pre-shift equipment inspections
  - B. Operate lifts only on solid & level ground
  - C. Close off-site when doing major overhead work/projects
  - D. All of the above
93. Each company's policy may be different, so follow your company's policies and procedures.
- A. True
  - B. False
94. Some common causes of injuries are:
- A. Operating on an uneven surface
  - B. Climbing above or leaning over the 42-inch minimum top rail
  - C. Inexperienced or untrained operators
  - D. All of the above
95. Blue DANGER tape is used to ensure no one is to enter a hazardous area.
- A. True
  - B. False

96. Operators must have respect for personal safety and the safety of others.  
A. True  
B. False
97. It is not necessary to inspect the Emergency Stop Buttons during pre-shift inspections.  
A. True  
B. False
98. Electrocutation Hazard is a possibility if safety procedures are not followed.  
A. True  
B. False
99. It is okay to use the scissor lift near moving vehicles or cranes.  
A. True  
B. False
100. The scissor lift is equipped with a high and a low range for travel.  
A. True  
B. False
101. Having the lift's platform extended while exposed to the wind, will ..... the stability of the machine.  
A. Decrease  
B. Increase  
C. Have no effect on  
D. Make it possible to get more work done
102. Aerial platforms are meant to be operated on ..... surfaces.  
A. Rocky  
B. Uneven  
C. Wet  
D. Firm and level
103. Which of the following conditions is most likely to result in a tipping hazard while operating an aerial lift?  
A. Damage tires or low tire pressure  
B. No fire extinguisher  
C. No operator's manual present  
D. It is not possible for an aerial lift to tip over
104. A thorough maintenance plan for aerial lifts and scissor lifts can help prevent accidents?  
A. True  
B. False
105. Who may operate a scissor lift?  
A. Any journeyman  
B. Any supervisor  
C. Any trained and authorized employee  
D. Anyone that has run one previously



106. When does the scissor lift need to be inspected?
- A. Daily
  - B. Weekly
  - C. Monthly
  - D. Whenever your supervisor feels that it might be due.
107. A pre-start check should include which of the following statement?
- A. A complete walk-around inspection of all frame and platform structures to look for cracks or defects.
  - B. Daily lubrication, fluid levels, and tires for adequate tire pressure and make sure there are no nicks or cuts in them.
  - C. Check and verify that all controls, switches and safety devices are working properly.
  - D. All of the above.
108. Because it is equipped with ground controls, it is permissible for you to load materials on the ground and send them to a coworker at a higher elevation, while you stay on the ground, so you won't take up space on the scissor lift?
- A. True
  - B. False
109. If the scissor lift is classified as a "rough terrain" scissor lift, it is permissible to operate it on uneven, soft surfaces in the elevated position.
- A. True
  - B. False
110. What is the minimum distance that needs to be maintained between the machine and its load from an energized power line?
- A. 5 feet
  - B. 10 feet
  - C. 15 feet
  - D. 20 feet
111. It is important to know the locations of drop-offs, shaft openings, excavations etc., when operating a scissor lift.
- A. True
  - B. False
112. When working at elevated positions in the scissor lift it is not necessary to flag off the area below to warn co-workers in the area.
- A. True
  - B. False
113. When the scissor lift does not reach the desired elevation, it is permissible to get a stepladder or use a board on the top rail to achieve the necessary height.
- A. True
  - B. False

114. If the scissor lift is equipped with a tilt alarm and it sounds. What do you need to do?
- A. Continue to work because it might be a false alarm
  - B. The platform is in an unstable condition and no work should continue until the machine has been moved to a more level ground
  - C. Bypass the alarm so it won't activate
  - D. Change with another scissor lift
115. If you encounter any mechanical problems with the machine or the controls, you need to?
- A. Keep working, finish the job and then have it looked at.
  - B. Tag out the machine with a danger tag and notify your supervisor immediately.
  - C. Go get another scissor lift
  - D. Go take a break.
116. It is important to know the capacity of any scissor lift, man lift or any aerial lift platform.
- A. True
  - B. False
117. When you have finished with the scissors lift, you need to?
- A. Make sure the machine is switched off and the brake is set.
  - B. Make sure that the platform has been cleaned off of all debris, dirt, etc.
  - C. If it is electrically powered, plug it into the charger and have it charged for the next use.
  - D. All of the above
118. Who is responsible for checking that the lift truck is in good working order before use?
- A. The management
  - B. The maintenance department
  - C. The operator
  - D. The insurer
119. The truck's maximum carrying capacity will be reduced when:
- A. The load centre is increased
  - B. The load centre is decreased
  - C. The load obscures your view
  - D. When travelling in reverse
120. Whose responsibility is it to ensure the safety of pedestrians while operating a lift truck?
- A. The lift truck operator
  - B. Management
  - C. The pedestrians themselves
  - D. The human resources department

**SECTION B: Answer ALL questions.**

- Q1** (a) A building has five floors with a 3-meter floor to floor spacing, a car capacity of 6 persons and a  $2 \text{ ms}^{-1}$  speed of travel. Calculate Round Trip Time. (14 marks)
- (b) An escalator of  $30^\circ$  incline, one passenger per step, a speed of  $0.5 \text{ ms}^{-1}$  and 400 mm tread or step length. Calculate the capacity of the escalator. (6 marks)

– END OF QUESTIONS –