

SET 1  
Scoring Indicators

Pages: 4/9 (10)

COURSE NAME : MATERIAL HANDLING

COURSE CODE : 5023 B

QID : 2102240058

Q No	Scoring Indicators	Split score	Sub Total	Total score
<b>PART A</b>				<b>9</b>
I. 1	A . Horizontal flow line. B. vertical flow lines, C) Unidirectional or Retrational flow, D) vertical or inclined flow	1/4X4	1	
I. 2	Stacking is one way to make maximum use of storage space. The different methods of stacking: Block Stacking, Brick Stacking, Pin wheel Stacking and Irregular Stacking Block stacking is a warehousing method in which goods are stacked directly on the floor. Brick stacking: This method is similar to block stacking, but on each level you turn the item 90 degrees. The items will then stay in place better if the stack is bumped. Pinwheel stacking: Pinwheel stacking adds even more security than brick stacking. When using the pinwheel stacking method, turn each quadrant of items 90 degrees to lock everything in place. Irregular stacking: This applies to items which are irregular shapes. Add a sheet of plywood between each layer of items for more stability.	1 <i>Only List needed</i> <i>1/2x2</i> <i>&gt; 1</i>	1	
I. 3	Industrial hemp is a sustainable and eco-friendly material that provides many benefits to the user , it is more durable than other types of rope.	1	1	
I. 4	Welded load chains, Roller chains, Hemp ropes, Steel wire ropes	1/4X4	1	
I. 5	(i) Standard hooks. (ii) Rams horn hooks . (iii) Solid triangular eye hooks . (iv) Hinged triangular hooks	Any two (1/2x2)	1	
I. 6	Conveyors are gravity or powered equipment commonly used for moving bulk or unit load continuously or intermittently, uni-directionally from one point to another over fixed path.	1	1	
I. 7	Belt conveyors, Roller conveyors, Chain conveyors.	Any two (1/2x2)	1	
I. 8	Lever operated hoist, Differential hoists, Worm geared and Spur geared hoists	Any two (1/2x2)	1	

I. 9	The stacker is used for preparing the stockpile with the incoming material.	1	1	
<b>PART B</b>				24
II. 1	1.Storage and handling equipment, 2.Bulk material handling equipment, 3.Engineered systems and 4.Industrial trucks.	3/4x4	3	
II. 2	Containerization uses principle of unit load. In this system, big metal containers have number of small products filled in them. These containers are placed on the truck or in the trailers which are pulled by tractors or trucks. Afterwards, the containers can be loaded on railway trailers and can be taken to places from where, with the help of cranes, they can be shipped.	3	3	
II. 3	Welded chain sling attachments are just that, welded to both sides of the chain, and then, heat treated. These are permanent connections to the chain sling assembly. "Mechanical" chain sling attachments are connected to a welded chain and held in place by pins. It creates a high-strength chain for heavy-duty use. Welded chain is stronger than a non-welded chain, so it is typically used for overhead lifting and tow applications. It is made of steel or stainless steel and is coated with a vinyl sleeve.	3	3	
II. 4	A Transfer Table is a length of rail that traverses a locomotive or rail car to any number of parallel tracks. A single track (or more) can feed one end of the Transfer Table and the locomotive or rail car can continue on to many other tracks on the opposite end of the pit, possibly into a locomotive or rail car repair facility. The amount of trucks and drives for the Transfer Table depend on the capacity and length required. These drives utilize variable speed motors for smooth start and stop functions, as well as quiet operation. Optional features include automatic wheel chocks, track alignment locking mechanisms, enclosed operator stations (cabs), multiple walkways, and more.	3	3	
II. 5	Winch is an equipment for pulling a heavy load by winding one or two ropes on a rope drum. It is a stationary equipment which is fixed to the floor or wall. Winches, like hoists, are rugged and simple equipment with minimum maintenance. Winch may be hand operated or motor powered. Winches are used as an independent pulling equipment at construction sites. However, they are also used as an integral part of various other equipment like skip hoist, certain types of cranes etc.	3	3	

II. 6	Material handling operations must meet the constant challenge of increasing production without jeopardizing quality or dependability. Moving raw materials or consumer goods quickly with minimal machinery downtime means investing in highly efficient motors, motor brakes and power transmission components for the conveyor belts that drive large scale production processes across many industries. Different types of motor brakes for conveyors and other bulk material handling systems to slow and stop movement on machines, conveyors, lifts, cranes and other material handling equipment. Conveyor brakes provide reliable braking (including emergency braking) that can support heavy load weights even in the event of a power failure or electricity outage, ideal for conveyors located in fully-automated facilities or individual belt machines.	3	3	
II. 7	A <b>trailer</b> is an unpowered vehicle towed by a powered vehicle. It is commonly used for the transport of goods and materials. Industrial trailers and commercial trailers are pulled behind a powered vehicle to carry goods, livestock, or equipment. They are used to move cargo from factories to warehouses, warehouses to distributors, and distributors to retailers. Depending on the type of cargo, industrial trailers and commercial trailers may be heated, refrigerated, ventilated or pressurized.	3	3	
II. 8	Vibrating conveyors use vibrational energy to impart static and dynamic forces on aggregate materials and cause them to move up or down a pathway. The conveying surface is typically a smooth <u>trough</u> with vibratory components attached to cause this trough to shake lengthwise. This action allows bulk product such as coal, limestone, food materials, sand, gravel, and more to "hop" with the frequency of the vibration towards one end of the trough. When this hopping action happens at many cycles a second, it causes the bed of materials to convey, and it can even drive deep beds of bulk such as the woodchips .	3	3	
II.9	A <b>differential pulley Hoist</b> —also called "Weston differential pulley", sometimes "differential hoist", "chain hoist", or colloquially "chain fall"— is used to manually lift very heavy objects like car engines. It is operated by pulling upon the slack section of a continuous chain that wraps around two pulleys on a common shaft. (The two pulleys are joined together such that they rotate as a unit on the single shaft that they share.)	3	3	
II.10	Bridge cranes essentially consists of one or more hoisting devices mounted on a bridge consisting of one or two horizontal girders, which are supported at each end by trucks	3	3	

	<p>riding on elevated runways installed at right angles to the bridge. Runways are installed on building columns, overhead trusses or frames, much above floor level. The hoisting device moves along the bridge while the bridge moves along the runway. Depending on the lifting capacity of these cranes, the hoisting device may be a hand operated trolley type hoist, an electric hoist or a drum-type crane trolley or crab.</p>			
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	PART C			42
III	<p>Following are the principles of material handling:</p> <p>1. Planning principle 2. Systems principle 3 .Space utilization principle 4. Unit load principle 5. Gravity principle 6. Material flow principle 7. Simplification principle 8. Safety principle 9. Mechanization principle 10. Standardization principle 11. Flexibility principle 12. Equipment selection principle 13. Dead weight principle 14. Motion principle 15. Idle time principle 16. Maintenance principle 17. Obsolescence principle 18. Capacity principle 19. Control principle 20. Performance principle</p> <p>Planning principle: All handling activities should be planned. The planning principle states that all material handling operations should be the results of a deliberate plan. The performance objectives, the need of the operation and the functional specification should be defined from the very beginning.</p>	(1x4)+3 =7	7	7
IV.	<p>Need for maintenance of MHE</p> <p>Not only proper maintenance of material handling equipment prevents MHE breakdowns, but it also improves production line flow. This will certainly help us warehouses are a fast-paced and busy environment. So, you need a properly maintained warehouse MHE for optimum work.</p> <p><b>Four general types of maintenance philosophies can be identified, namely</b></p> <ul style="list-style-type: none"> <li>• Corrective,</li> <li>• Preventive,</li> <li>• Risk-based and</li> <li>• Condition-based maintenance.</li> </ul>	7	7	7
V.	<p>Overhead single track (i.e., mono-rail) or track network on which one or more carriers ride Carriers: powered (electrically or pneumatically) or non powered Carrier can range from a simple hook to a hoist to an intelligent-vehicle-like device</p> <p>Single-carrier, single-track monorail similar to bridge or gantry crane Multi-carrier, track network monorail similar to both a trolley conveyor, except that the carriers operate independently and the track need not be in a closed loop, and a fixed-path automatic guided vehicle (AGV) system, except that it operates overhead</p> <p>Termed an Automated Electrified Monorail (AEM) system when it has similar control characteristics as an AGV system.</p>	7	7	7
VI.	<p>Turntables are horizontal, rotatable powered table mechanisms for transferring objects between conveyors that are in angular relation to one another. They often provide both loading and unloading of their contents to and from a conveyor. In order to increase productivity and ergonomics in any manufacturing operation, equipment such as turntables are a small but integral part of the total process to maximize workplace efficiency. By using turntables operator fatigue can be reduced. Operators can focus on assembly or other production process rather than have</p>	7	7	7

	to struggle with the material handling aspect of their operation. Turntables are also ideal for loading and unloading of pallets and other containers when minimum floor space is a concern. Turntables keep production operations moving without interruption.			
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<p>VII.</p>	<p>An <b>escalator</b> is a moving staircase which carries people between floors of a building or structure. It consists of a motor-driven chain of individually linked steps on a track which cycle on a pair of tracks which keep them horizontal. Escalators are often used around the world in places where lifts would be impractical, or they can be used in conjunction with them. Principal areas of usage include department stores, shopping malls, airports, transit systems (railway/railroad stations), convention centers, hotels, arenas, stadiums and public buildings. Escalators have the capacity to move large numbers of people. They have no waiting interval (except during very heavy traffic). They can be used to guide people toward main exits or special exhibits and may be weatherproofed for outdoor use. A non-functional escalator can function as a normal staircase, whereas many other methods of transport become useless when they break down or lose power.</p>	<p>7</p>	<p>7</p>	<p>7</p>

<p>VIII.</p>	<p>Among different manufacturers, the term oscillating conveyor will sometimes appear. Oscillating conveyors are sometimes described as being a specific type of vibrating conveyor wherein they operate using a relatively low frequency and a larger amplitude of motion than would typically be employed with a vibrating conveyor. As a result, oscillating conveyors are used to bulk materials such as in the timber industry or waste management/recycling industry. For example, these conveyors may be used to transport wooden scraps from an upstream system and send these to a discharge point. When contrasted with vibrating conveyors that operate at lower amplitudes and higher frequencies, the motion or movement of the material is gentler with a vibrating conveyor than with an oscillating conveyor. In quarrying applications, oscillating conveyors are sometimes referred to as jump conveyors and are called grasshopper conveyors in hard rock mining applications. OSCILLATING CONVEYORS are utilized to convey sand or other granular particles at a desired rate. The conveyor is generally placed under a vibrating shakeout or a grid to eliminate direct handling of hot sand by the belt conveyor. In the process of reciprocation, the oscillating conveyor cools the hot sand to some extent which increases the life of the return sand conveyor belt.</p> <p>The equipment comprises a metallic trough carried on inclined arms which are fitted with rubber bushes to handle the reciprocating motion of the trough. The oscillating motion of the trough is achieved via specially designed inclined arms and an eccentric shaft driven by a motor through V-belts.</p> <p>The eccentric shaft is mounted on anti-friction bearings and has V-pulleys at both ends with weights on them to counteract the unbalancing force. The rotation of the eccentric shaft provides a forward and backward motion to a connecting arm attached to the trough through a rubberized pin. A retaining spring assembly at the back of the trough absorbs shock load.</p>	<p>7</p>	<p>7</p>	<p>7</p>
<p>IX.</p>	<p><b>Roller Conveyor</b> is a type of Conveyors with a series of rollers supported in a frame over which objects are advanced manually, by gravity, or by power. A roller conveyor is a conveyor that consists of a series of parallel rotating bars that move goods along to their end destination. Roller conveyors are used in environments like warehouses and manufacturing facilities. These conveyors are containing sprocket at one terminal and a bearing housing at other. A roller shaft runs through the rollers, which are mounted on the extruded aluminum rails. Roller conveyors are the proper choice when you need to side load, push off, accumulate a product or adjust pressure on carrying rollers. Roller conveyor types are chain driven, belt driven, line shaft driven, accumulation, or non-powered (gravity). Using roller conveyors instead of slider bed conveyors adds versatility to the type of transfers, diverters and stops that can be used in a system. Rollers are available in mild steel, galvanized, plastic or</p>	<p>7</p>	<p>7</p>	<p>7</p>

	stainless steel.			
X.	<p>Every pneumatic system, would makes use of pipes or ducts called transportation lines that carry mixture of materials and a stream of air. These materials are such as dry pulverized or free flowing or light powdery materials like cement, fly ash etc. These materials can be transported conveniently to various destinations by means of a stream of high velocity air through pipe lines. Products are moved through various tubes via air pressure , allowing for extra vertical versatility. Pneumatic conveyors are either carrier systems or dilute-phase systems; carrier systems simply push items from one entry point to one exit point, such as the money-exchanging tubes used at a bank drive-through window. Dilute-phase systems use push-pull pressure to guide materials through various entry and/or exit points. It is important to note that either air compressors, vacuums, or blowers can be used to generate the air. This will all depend on what the engineers think will be the most efficient and economical way of developing the system.</p>	7	7	7
XI	<p>A hoist is a device used for lifting or lowering a load by means of a drum or lift-wheel around which rope or chain wraps. A <b>Lever Hoist</b> is a piece of high-quality equipment used to lift and lower heavy loads without the aid of machinery. Lever Hoists have the ability to lift items in most positions, including horizontally. Different from the Chain Block or Hoist, which can only lift items vertically, the Lever Hoist's ability to lift items horizontally is a great benefit. A Lever Hoist is usually fitted with a <b>heavy-duty safety cap</b> to hold your items comfortably and a <b>top swivel connection</b> which will allow easy lifting from all angles. The <b>hand wheel</b> can then be turned to release or retract as much chain length as required. The <b>ratchet lever</b> attached to the side of the lever hoist allows the chain to be free-willed when placed in the neutral position. When placed in the up position, it tightens the chain allowing the load to be lifted with the tension.</p>	7	7	7
XII	<p>The characteristic feature of Rotary cranes is presence of a structural arm called boom, which can be rotated through 360° about a vertical axis. The lower end of the boom is affixed to a mast, base, carriage or support against which it can be pivoted and moved up and down which is called luffing or booming. The upper end of the boom supports a hook or other end attachments for lifting of load. Mechanism employed for rotating the boom is called slewing mechanism. As the name suggests a revolving crane swings the load through 360 degree. Revolving cranes are of different</p>	7	7	7

	<p>varieties.</p> <ul style="list-style-type: none"> <li>• These are following:</li> <li>• Jib crane</li> <li>• Tower crane</li> <li>• Cranes with rotary turntable</li> </ul> <p>Rotary cranes are used for lifting material and moving it to points covered by a boom pivoted to a fixed or movable structure.</p>			
XIII	<p>An Industrial lift / freight elevator, or goods lift, is an elevator designed to carry goods, rather than passengers. Industrial lifts are generally required to display a written notice in the car that the use by passengers is prohibited (though not necessarily illegal), though certain freight elevators allow dual use through the use of an inconspicuous riser. In order for an elevator to be legal to carry passengers in some jurisdictions it must have a solid inner door. Freight elevators are typically larger and capable of carrying heavier loads than a passenger elevator, generally from 2,300 to 4,500 kg. Freight elevators may have manually operated doors, and often have rugged interior finishes to prevent damage while loading and unloading. Although hydraulic freight elevators exist, electric elevators are more energy efficient for the work of freight lifting.</p>	7	7	7
XIV	<p>Conventional hydraulic lifts, they use an underground cylinder, are quite common for low level buildings with 2–5 floors (sometimes but seldom up to 6–8 floors), and have speeds of up to 200 feet per minute (1 m/s).</p> <ul style="list-style-type: none"> <li>• Hole less hydraulic elevators were developed in the 1970s, and use a pair of above ground cylinders, which makes it practical for environmentally or cost sensitive buildings with 2, 3, or 4 floors.</li> <li>• Roped hydraulic elevators use both above ground cylinders and a rope system, allowing the elevator to travel further than the piston has to move. The low mechanical complexity of hydraulic elevators in comparison to traction elevators makes them ideal for low rise, low traffic installations. In India, Safety and Health regulations and rules are dispersed over various different Acts and Rules. They are less energy efficient as the pump works against gravity to push the car and its passengers upwards; this energy is lost when the car descends on its own weight. The high current draw of the pump when starting up also places higher demands on a building's electrical system. There are also environmental concerns should either the lifting cylinder leak fluid into the ground. The modern generation of low cost, machine room-less traction elevators made possible by advances in miniaturization of the traction motor and control systems challenges the supremacy of the hydraulic elevator in their traditional market niche.</li> </ul>	7	7	7