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SET 2 Pages:1/9

Scoring Indicators

COURSE NAME : MATERIAL HANDLING

COURSE CODE : 5023 B QID : 2109230042

Q No	Scoring Indicators	Split score	Sub Total	Total score
	PART A			**9**
I. 1	1.Storage and handling equipment, 2.Bulk material handling equipment, 3.Engineered systems and 4.Industrial trucks.	Any two (1/2x2)	1	
I. 2	**Stacking** is one way to make maximum use of storage space.	1	1	
I. 3	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.	1	1	
I. 4	(A) Hooks (B) Grabs of different types (C) Grab buckets for bulk load (D) Ladles for liquid materials (E) Electrical lifting magnets and (F) Vaccum Lifter etc.	Any two (1/2x2)	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 which are driven with the help of power known as traction conveyors.	1	1	
I. 7	(a) Flat Belt Conveyor. (b) Troughed Belt Conveyor. (c) Closed Belt Conveyor. (d) Metallic Belt Conveyor. (e) Portable Conveyor. (f) Chain or Rope Driven Belt Conveyor. (g) Submerged Belt Conveyor.	Any two (1/2x2)	1	
I. 8	A floating crane is one mounted on barge, lighter or self-propelled towed pontoons. They are used for salvage, along shore and off shore duties.	1	1	

I. 9	Stackers, Industrial lifts, Passenger lifts, hydraulic lift	Any two (1/2x2)	1	
	PART B			24
II. 1	A . Horizontal flow line. a)I-flow or Line flow b)L-flow c) U-flow d) S-flow e) O-flow B. vertical flow lines a) Processing downward and upward b) centralized or decentralized elevation c) Unidirectional or Retractional flow d) vertical or inclined flow	3	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 load chains, Roller chains, Hemp ropes, Steel wire ropes	(3/4x4)	3	
II. 4	(i) **Standard hooks** are defined as the commonly used hooks which have a single curved horn. (ii) **Ramshorn hooks** are defined as the commonly used hooks which have two horns like that of a ram. Saddles of each horn are smaller than the saddle of a standard hook of same capacity.	1.1/2 each	3	
II. 5	Winches, Capstans, Turntables, Transfer tables, Monorail conveyors	3	3	
II. 6	Arresting gear is used to hold the load being lifted without interfering in the hoisting process but preventing the load from coming down due to gravity. They are three most common arresting gear types: i.Ratchet gearing ii.Friction arresters iii. Roller ratchets	3	3	
II. 7	An **escalator** 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	3	3	

	stations),convention centers, hotels, arenas, stadiums and public buildings.			
II. 8	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.9	Lever operated hoist, Differential hoists, Worm geared and Spur geared hoists	1x3	3	
II.10	An Industrial lifts also called freight elevator, or goods lift, is an elevator designed to carry goods, rather than passengers. Freight elevators 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.	3	3	

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	PART C			
III	Bulk material handling equipment covers equipment that transports, stores and controls bulk materials. Generally, manufacturers design bulk handling material equipment to move and store materials in a loose form. It can find these pieces of equipment handling food, liquid, metal items and minerals. Some of the main types below: Hoppers, Reclaimers, Conveyor belts, Stackers, Bucket and grain elevators	7	7	7
IV.	1.Storage and handling equipment, 2.Bulk material handling equipment, 3.Engineered systems and 4.Industrial trucks. Areas of application: **1.Storage and handling equipment,** These are shelves and racks where you store your material in between receiving it and shipping it.It helps safely store and organize materials while they await another stage in the production or distribution process. Depending on a company's needs, they may use this storage equipment to hold materials for short or long periods. **2.Bulk material handling equipment,** Bulk material handling equipment covers equipment that transports, stores and controls bulk materials. Generally, manufacturers design bulk handling material equipment to move and store materials in a loose form. It can find these pieces of equipment handling food, liquid, metal items and minerals. **3.Engineered systems.** Bulk material handling equipment made to help transport and store materials. They're very popular since they remove the need for manual labor to complete various tasks. **4.Industrial trucks.** Industrial trucks cover a wide swath of equipment, and they're all designed to assist with material transportation. These industrial trucks can range from small, hand-operated equipment to large, driveable equipment.	(1/2x4)= 2 + Appln:5	7	7
V.	**Advantage of Welded Loaded chain.** -Good flexibility in all direction. - Possibility to use small diameter pulleys and drums. - Simple design and manufacture. **Disadvantages of Welded Loaded chains.** - Heavy weight. - Susceptibility to jerks and overload. - Sudden failure. - Concentrated wear at the link joints and - Low safe speed of movement.	Adv:1x3 =3 Dis adv:1x4 =4(any four) 3+4=7	7	7

VI.	Electromagnetic brakes are also called electro-mechanical brakes or EM brakes. They slow or stop motion using electromagnetic force to apply mechanical resistance, or friction. An electrical current goes through a coil on the brakes to create a magnetic field strong enough to move an armature on or off a magnetic face. There are two armatures i.e. inner armature and outer armature and coil also. When electric power will be supplied, the coil will be energized and there will be produced magnetic field and both armatures will be attracted with each other due to produced magnetic field and therefore torque spring will be compressed. As torque spring will be compressed and armatures will be attracted with each other, Brake shoe will move away from brake drum and brake drum will be able to rotate When power supplied will be off, in that situation coil will be de-energized and hence compressed torque spring will come in its original position and simultaneously both armatures will be separated with each other and therefore brake shoe will be pressed against brake drum and brake drum rotation will be stopped. Let us consider the operation of DC electromagnetic brake in EOT crane, Toque spring of DC electromagnetic brake will provide the ability to EOT crane to hold the load at any point.	7	7	7
VII.	A chain conveyor is a type of conveyor system for moving material through production lines. Chain conveyors utilize a powered continuous chain arrangement, carrying a series of single pendants. The chain arrangement is driven by a motor, and the material suspended on the pendants are conveyed. Chain conveyors are used for moving products down an assembly line and/or around a manufacturing or warehousing facility Chain conveyors are primarily used to transport heavy unit loads, e.g. pallets, grid boxes, and industrial containers. These conveyors can be single or double chain strand in configuration. The load is positioned on the chains, the friction pulls the load forward. Chain conveyors are generally easy to install and have very minimum maintenance for users. The term chain conveyor means a group of different types of conveyors used in diverse applications, characterised by one or multiple strands of endless chains that travel entire conveyor path, driven by one or a set of sprockets at one end and supported by one or a set of sprockets on the other end. Materials to be conveyed are carried directly on the links of the chain or on specially designed elements attached to the chain. The load carrying chain is generally supported on idle	7	7	7

	sprockets or guide ways. The endless chains are kept taught by suitable chain tensioning device at the non-driven end Chain, compared to belts of a belt conveyor, have certain advantages as well as disadvantages. The major advantages are that the chain easily wraparound sprockets of small diameter, and the drive is positive i.e. no slippage takes place between chain and sprocket. The chain stretch is also little. The disadvantages of chain are its high weight, high initial cost, higher maintenance cost and most importantly, limited running speed because of dynamic loading that come into play in chain-sprocket drive causing intensive wear at high speeds Maximum length and maximum lift of chain conveyors are limited by the maximum allowable working tension of the chain used.			
VIII.	Pneumatic conveying is the process of conveying granular / powdered materials by floating the materials in a gas, primarily air, and then allowing it to flow to the destination through a closed pipe. The operating principle common to all types of pneumatic conveying is that motion is imparted to the material by a fast moving stream of air. Thus any pneumatic conveyor consists of an air supply equipment (blower or compressor), pipelines, product storages, air lock feeders and dust filters. 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 .	7	7	7
IX.	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	7	7	7

	sand conveyor belt. 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. 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.			
X.	**Gravity Conveyors** enable you to mechanize operations while keeping your expenses down. These cost effective conveyors effortlessly move items in almost any direction with minimal operating and maintenance costs. Gravity conveyors are useful in operations including work-in-process, shipping, receiving, and storage. Generally used in declining or manual push applications. A gravity conveyor consists of two types, wheel or roller. Wheel Conveyors is constructed of a series of wheels mounted on a common axle supported in a channel frame. Roller Conveyors is constructed of metal tubes with bearings in each end and mounted on an axle supported in a channel frame. Roller axles are spring loaded so they can be moved to one side for easy removal or replacement of the roller in the frame. The spring also holds the roller in place. Product is transported directly on either wheels or rollers.	7	7	7
XI	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 **Lever Hoist** 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 **heavy-duty safety cap** to hold your items comfortably and a **top swivel connection** which will allow easy lifting from all angles. The **hand wheel** can then be turned to release or retract as much chain length as required. The **ratchet lever** 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.	7	7	7
XII	**Bridge Cranes** :These cranes essentially consists of one or more hoisting devices mounted on a bridge consisting of one or	7	7	7

	two horizontal girders, which are supported at each end by trucks riding on elevated runways installed at right angles to the bridge. Runways are installed on building columns, overhead strusses 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. Crane trolley is an independent machine consisting of the drum-type hoisting equipment built on a framework, which is fitted with runner wheels, and driven by a motor through gearings. The hoisting motion is also motorised. The long travel of a bridge may also be manual through chain operation or motorised. Control of all the movements (hoisting, cross travel of hoisting devices and long travel of the bridge) of an electric overhead travelling (abbreviated as EOT) crane can be through pendant from floor, or may be remote operated through radio or other devices. Many of these cranes are provided with a cab fixed to the bridge, from which an operator controls the crane. Electrical power is fed to the crane by means of festooning cable or from bare conductors running along the runway through collectors connected with the bridge structure.			
XIII	**Derrick Cranes**: is an apparatus consisting of one or two masts or fabricated strut members supported at the bottom by a pivoting arrangement and held at the top by guys or braces, with or without a boom, for use with a hoisting mechanism and operating rope, for lifting and lowering a load and moving it horizontally. Derricks are principally used in construction work for erection of technological structures and heavy components to a height. Advantages of derricks are: (i) inexpensive, (ii) very easy to erect and dismantle, (iii) simple in des.ign and may be fabricated easily at the working site, (iv) a number of derricks may be used together for manipulation of a large and/or weighty component. Derricks may be of different types. Some of the common types of derricks are: (a) Guy Derrick, (b) Gin Pole Derrick, (c) A-frame Derrick, (d) Stiffleg Derrick	7	7	7
XIV	Safety principle of materials handling, demands that the "handling methods and handling equipment use must be safe". A safe materials handling means the activity is free from recognized hazards that can cause or likely to cause physical harm including death to employees or public and damage to materials. Materials should always be handled such that injuries or damages are brought to the minimum, if cannot be eliminated altogether . In order to achieve a safe materials handling operation, it is	7	7	7

	essential to follow a safety policy in the plant or workplace. This safety policy provides guidelines for elimination or reduction of accidents causing injuries and damage due to both manual and equipment assisted materials handling. The safety policy generally include training provisions, guidelines for manual and equipment assisted materials handling, materials storage and also provides guidelines on housekeeping, securing load on vehicles, fire-fighting, requirements for guarding, illumination, labels, signs, makings etc. The safety policy may also specify the responsibility towards safety procedures of various personnel and departments of an organization. Different countries have developed and adopted their National Health and Safety Standards and proper administrative bodies to overview whether industry and other areas of employment are adhering to such standards. In India, Safety and Health regulations and rules are dispersed over various different Acts and Rules.			