TED(21)–5001 **Reg.No……..**

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FIFTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING AND TECHNOLOGY/COMMERCIALPRACTICE /MANAGEMENT, APRIL 2025

INDUSTRIAL MANAGEMENT AND SAFETY

ANSWER KEY

Time: 3 hours **Maximum Marks: 75**

PART A

I. Answer all the following questions **(9 x1 =9 Marks)**

		Module outcome	Cognitive level
1	Private Limited Company – Reliance India Private Ltd Public Limited Company - BHEL	M1.01	R
2	Staffing is the process of selecting, training, promoting and retiring the workforce.	M1.01	R
3	It means "Unity is strength"	M1.01	R
4	Indian Registrar Quality Systems (IRQS) Bureau of Indian Standards (BIS)	M2.02	R
5	Quality is the fitness for use.	M2.01	R
6	Path on the network along which no slippage is allowed. In this path slack is negative or zero.	M3.01	R
7	Event is the start or completion of a task represented by circle and do not consume time and resources.	M3.02	U
8	An accident is an event that has unintentionally happened, that results in damage, injury or harm.	M4.01	U
9	Improper safety wearing ,Operating equipment without authority	M4.01	A

PART B

II. Answer any Eight questions from the following **(8 x 3= 24 Marks)**

		Module outcome	Cognitive level
1	A general meeting is mandatory for public companies, whereas for private companies, it is not mandatory. There is a tremendous regulatory burden on the public limited company, whereas the private company has no burden. Public companies mandatorily choose a company secretary, but the private companies can appoint by choice. The minimum capital for a public company is 5 lakh rupees, but it is only 1 lakh rupees in a private company.	M1.01	U
2	The advantages of training: Increased productivity. Reduced Supervision. Reduced Accidents. Encourages teamwork. Increased knowledge and skill.	M1.03	U

3	**i historic estimate** **ii. trend line techniques** **iii. sales force estimation** **iv. correlation techniques** **vi. Sampling techniques**	**M2.03**	**U**
4	• **Receipt of Material into Storage** • **Record Keeping** • **Storage of Materials** • **Maintaining Stores** • **Issuing Stores** • **Co-ordination with Materials Control**	**M2.03**	**R**
5	**Inventory means materials held in stock for later use. Inventories include raw materials, general stores, spare parts, manufactured parts, semi-finished parts, tools and gauges, packaging materials, work in** **process, and finished products.**	**M2.04**	**U**
6	**(i) Optimistic time – The least amount of time it can take to complete a task.** **(ii) Most likely time – Assuming there are no problems, the best or most reasonable estimate of how long it should take to complete a task** **(iii) Pessimistic time – The maximum amount of time it should take to complete a task.**	**M3.01**	**U**
7	**(EFT) Early finish Time is the earliest time the activity can end. (LFT) Late finish Time is the latest time the activity can end and still allow the project to be completed on time.**	**M3.01**	**U**
8	**Step 1: Write down the start and end time next to each activity.** **The first activity has a start time of 0, and the end time is the duration of the activity.** **The next activity's start time is the end time of the previous activity, and the end time is the start time plus the duration.** **Do this for all the activities.** **Step 2: Look at the end time of the last activity in the sequence to determine the duration of the entire sequence.** **Step 3: The sequence of activities with the longest duration** **is the critical path.**	**M3.03**	**U**
9	**(i) Factory - a building or set of buildings with facilities for manufacturing.** **(ii) Accident - Accident/Accidental means an event or incident that occurs which is unforeseen and unexpected which resulted directly in the death or injury of the Person Covered.** **(iii) Frequency Rate-The frequency rate is the number of occupational accidents (work stopped more than one day) arisen during a period of 12 months by one million hours worked.**	**M4.01**	**U**
10	**Mechanical mismatch - due to timer or mechanical malfunction. Linkage failure - shaft, gear, coupling, belt, chain broken or failure.** **System leakage - in the pressurized air or fluid system such as hydraulic power.** **Fair wear and tear - due to old age.**	**M4.02**	**U**

PART C

III. Answer all questions from the following (6x7= 42 Marks)

		Module outcome	Cognitive level
I	**Separation of Planning and doing:** **Taylor introduced the separation of Planning from actual doing we know that in before Taylor's Scientific management, a worker used to plan about how he had to work and what instruments were necessary for doing that work for the reason of being that this was creating lot of problems.** **Functional Foremanship:** **At above we have seen that all planning has been moved to shoulder of supervisor shoulder therefore development of supervision system. For this purpose. Taylor developed the concept of functional foremanship based on specialization of functions.** **Job analysis:** **The best way of doing a job is one which requires the least movement, consequently less time and cost.** **Time study involves the determination of time. A movement taken to complete.** **Motion study involves the stud of movements which involved in doing job.** **Standardization:** **For this point, instruments and tools, period of work, amount of work, working condition and cost of the production have to be standardized on the basis of job analysis.** **Scientific Selection and Training of Workers** **Taylor suggested that workers should be selected on scientific basis which would their education, work experience, aptitude, physical, strength weakness etc. Apart from selection given to them training to make them efficient and effective.**	**M1.01**	**U**
	OR		
II	**Similarity** **i. Universality of management** **ii. Scientific methods** **iii. Importance of personnel** **iv. Improvement of practice** **v. Idea through experience** **vi. Books written** **Dissimilarity** **i. Taylor for shop floor management, Fayol for top level management** **ii. Taylor for bottom to upwards, Fayol from top to bottom** **iii. Taylor for productivity, Fayol for theoretical approach** **iv. Taylor for management, Fayol for administration.**	**M1.01**	**U**
III	**There are many different types of training, including soft skills training, compliance training, safety training, technical training, product training, skills training, diversity training, and leadership training.** **Safety training** **Protects employees from work-related injuries** **Includes fire drills, evacuation plans, and workplace violence procedures** **Technical training** **Helps employees understand the technicality of their jobs and perform well** **Can be part of onboarding training programs**	**M1.03**	**U**
	OR		
IV	**i. Gaining assistance** **ii. Greeting job evaluation committee** **iii. Finding the job to be evaluated** **iv. Analyzing and preparing job description** **v. Selecting methods of evaluation**	**M1.02**	**U**

	vi. Classifying jobs **vii. Installing the program** **viii. Reviewing periodically**		
V	**i. Selection of possible sources of supply** **ii. Determining the time, price, quality and quantity** **iii. Making request for quotations** **iv. Receipt and analysis of quotations** **v. Selection of right sources of supply** **vi. Placing the purchase order** **vii. Following up and expediting of order** **viii. Inspection** **ix. Checking and approving vendor's invoices for payment** **x. Closing completed orders**	**M2.01**	**U**
	OR		
VI	**i Receipt ii. Storage iii. Retrieval** **iv. Issue v. Records vi. House keeping** **vii. Control viii. Surplus management** **ix. Verification x. Coordination and cooperation**	**M2.03**	**U**
VII	**i.To create an excellent culture** **ii. Produce quality product** **iii. To prepare guide lines of various elements of quality** **iv. Identify opportunities for excellence** **v. Development of quality control technique** **vi. Analysis of quality costs** **vii. To build up a basis for total quality management culture** **viii. Conducting process capability studies.** **ix. Defining quality standards and preparing product specifications.**	**M2.02**	**U**
	OR		
VIII	**ISO – 9000 helps to** **i)Organization in promoting their products in international market** **ii) Organizations in creating confidence to the customers regarding the product quality** **Which improves profits.** **iii) Organizations in withstanding competition from other producers of product in** **iv) He global market** **v) Suppliers in improving the quality of new materials, semi-finished and finished** **products.** **vi) Consumers in getting good quality products.** **vii) The quality system improves the efficiency, reduces the wastages, inspections and** **also rework.**	**M2.03**	**U**
IX	**C.P.M** **i) Construction of civil and mechanical projects** **ii) Electrical and electronic product manufacturing and assembling** **iii) Equipment maintenance, plant maintenance, over holding etc** **iv) Setting up new industries** **v) Shifting manufacturing location from one place to another.**	**M3.01**	**U**
	PERT **1. Research and development activities** **2. Military operations** **3. Design and development of new product innovations** **4. Weather fore casting**		
	OR		
X	**Activity oriented system** **Deterministic model with well known activity times based on past Experience Expected time is actual time taken**	**M3.02**	**U**

	Uses terminologies like arrow diagram nodes, and float **Use of dummy activity not necessary** **Marks critical activities** **Suitable for plant maintenance,** **construction projects** **Event oriented** **Probabilistic model with uncertainty in activity duration** **Expected time is calculated from tD, tm and tp** **Uses terminologies like network diagram, events and slack** **Dummy activities required for representing proper sequencing** **Does not demarcate between critical & non-critical activities** **Suitable for defense projects and R & D works**		
XI	**Formulate the theoretical knowledge to solve linear programing problem (LPP) using graphical method.** **The Graphical method** **Step 1: Formulate the LP (Linear programming) problem** **Step 2: construct a graph and plot the constraint lines** **Step 3: Determine the valid side of each constraint line** **Step 4: Identify a feasible solution region** **Step 5: Plot the objective function on the graph** **Step 6: Find the optimum point.**	**M3.02**	**U**
	OR		
XII	**(i)Event (ii) Activity (iii) Critical Activity (iv) Critical Path** **(i)Event -The event is a specific instant of time which makes th start and the end of an activity. The event consumes neither time no resources. It is represented by a circle and the event number is written within the circle.** **(ii) Activity- Every project consists of a number of job operations o tasks which are called activities.** **An activity is shown by an arrow and it begins and ends with a n event. An activity consumes time and resources.** **An activity may be performed by an individual or a group of individuals.** **The activity may be classified as critical activity, non-critical activit and dummy activity.** **The activity is called critical if its earliest start time (E S T) plus th time taken by it, is equal to the latest finishing time (L F T)** **(iii) Critical Activity -A project's critical activities are those tha have zero float, meaning any delay in completion delays the entir project.** **(iv) Critical Path- It is that sequence of activities which decide the total project duration. It is formed by critical activities.** **In A critical path consumes maximum resources.** **It is the longest path and consumes maximum time.** **A critical path has zero float or slack.**	**M3.03**	**U**
XIII	**Mechanical factors that cause accidents total less than 10% of the number of industrial accidents. These are caused by a number of factors that are reasonably controllable.** **Mechanical failures that have the potential to cause accidents include:** **Power failure - total or partial input/output power failure** **Broken or damaged part - within the engine or machine due to poor quality metal part** **Fire breakout - within the engine or machine due to cooling failure or spark**	**M4.01**	**R**

	Explosion - due to high pressure or uncontrollable situation **Fuel factor - poor quality or no fuel may lead to stop the engine** **Mechanical mismatch - due to timer or mechanical malfunction** **Linkage failure - shaft, gear, coupling, belt, chain broken or failure** **System leakage - in the pressurized air or fluid system such as hydraulic power** **Fair wear and tear - due to old age** **Control system failure - mechanical, electrical or electronic** **Circuit or program malfunction - due to printed circuit board or electronic component failure**		
	OR		
XIV	**The main thrust of accident prevention and control across the world has been on 4 E's i.e.** **(i) Education;** **(ii) Engineering;** **(iii) Enforcement; and** **(iv) Emergency care of road accident victims.** **Education** **Various Road Safety Campaigns involving audio-visual and other print media, as well as NGOs, are used to raise awareness. The government has been undertaking various publicity measures through TV spots/Radio spots, cinema slides, distribution of posters, books on road safety signage & signs, organizing Road Safety Week, Seminars, and Exhibitions to raise road safety awareness among the general public.** **Enforcement** **Nearly 15 million reported traffic violations take place annually. These violations lead to collisions and accidents. It is practically impossible to detect such a large number of traffic violations and penalize them manually. As a result, a lot of violators are never caught and penalized, thus encouraging others.** **Engineering** **Efficient engineering methods which is a combination of technology and skills will help to get a better safety measure. Creating road environment safe and suitable for all users and needs reliable data to identify where, when, how and why accidents occur Key approaches - Accident investigation, road safety management, road safety audit.** **Emergency Care of Road Accident Victims** **Post-accident emergency care is a serious concern in India as nearly 50% of people die on the spot or while transiting to the hospital/trauma centers. If the occurrence of accidents and location can be shared to provide emergency care within golden hours a lot of lives can be saved. Similarly, if traveller can be informed about rest areas & their occupancy status and repairs workshops on the fly, it can be very helpful to them and will reduce fatigue & stress while driving.**	**M4.02**	**U**