

Qn.No.	Scoring Indicators	Split Score	Total Score
PART - A			
1	staffing is the process of selecting, training, promoting and retire the work force		2
2	job evaluation is a systematic way of determining the value or worth of a job in relation to other jobs in an organisation		2
3	Product planning Managerial and operational planning Quality plan preparation		2
4	Any activity which does not consume either any resource or time is known as dummy activity		2
5	.engineering methods Education Enterprising enforcement		2
PART-B			
1	Voluntary association Democratic management Not profit motive Self help and mutual help Open door policy Distribution of surplus		6
2	<p>According to 50-50 halsey plan</p> $\text{Wage} = RT + \left(\frac{S-T}{2}\right) \times R$ $R = 10$ $T = 8$ $S = 20$ $\text{Wage} = 10 \times 8 + \left(\frac{20-8}{2}\right) = 80 + 60$ $= 140 \text{ Rs.}$ <p>2. According to 33 1/3 % Halsey plan</p> $\text{Wage} = RT + \left(\frac{S-T}{3}\right) \times R$ $= 10 \times 8 + \left(\frac{20-8}{3}\right) = 80 + 40$ $= 120 \text{ Rs.}$		6
3	Adequacy audit Compliance audit System audit Product audit First party audit (Internal audit) Second party audit (Customer audit) Third party audit(External audit)		6

4	<p> $D = 4000$ units $C_o = Rs 30$ $C_h = \frac{10}{100} \times 30 = 3$ $EOQ = \sqrt{\frac{2 C_o D}{C_h}} = \sqrt{\frac{2 \times 30 \times 4000}{3}}$ $= 400$ units Reorder point = Safety stock + lead time consumption safety stock = 30 units (given) lead time consumption = Daily consumption \times lead time in days. $= 4000 \times 9 = 120$ units Hence Reorder level = 30 + 120 = 150 units. </p>		6
5	<p> $\begin{bmatrix} -6 & -10 \\ 10 & -6 \end{bmatrix}$ Row min -10 -6 Col max 10, -6 Maximum = Maximum of row minimum = $\max(-10, -6) = -6$ Mini Max = Minimum of Column max = $\min(10, -6) = -6$ Saddle point exists, Value of the game = $(10, -6) = -6$ Gain of X = -6 and so gain of Y = $-(-6) = 6$ </p>		
6	<p> Unsafe conditions include 1) Improper lighting and ventilation. 2) Inadequate machine guarding. 3) Equipment which poorly designed or worn out. 4) Inadequate personal protective equipment such as goggles or helmets. 5) Poor house keeping. 6) High temperature. 7) High humidity etc. 8) Excessive noise 9) Radiation exposure 10) Inadequate warning system </p>		

7	<p>9.2 FUNCTIONS OF AN ENTREPRENEUR</p> <ol style="list-style-type: none"> 1. Manage business and take decisions. 2. Study the market and select the profitable business. 3. Select the plant size. 4. Select the plant site. 5. Organise the sales and hold the customers. 6. Promote new inventions. 7. Coordinate different factors of production. 8. Arrange raw materials, machinery and finance. 9. Employ the labourers. 10. Deal with government departments such as sales tax, labours, electricity, export-etc. 11. Decide pricing policy. 12. Distribute wages of labours, interests to the capitalist etc. 		
PART C			
III a	<ol style="list-style-type: none"> a) He developed the principles of breaking a task into elements for timing the same. b) He conducted time study to recognise losses of efficiency in industrial operations. c) He defines 'A fair days task', and undertook studies on fatigue incurred by the worker and the time necessary to complete a task. d) He evolved the principles of - Investigate a work on scientific basis, selecting the best worker for a task, and training him to acquire desired skill, developing cooperative spirit between management and workers. f) He developed the functional organisation in which each specialists or foreman was made in-charge for each function. g) He establishes work standards through time study. h) He introduced a wage incentive scheme known as "Taylor's differential piece rate system". i) He introduced and operated various costing systems. 		
III b	<ol style="list-style-type: none"> 1. To increase the efficiency of workers/supervisors. 2. To reduce wastage of materials, machine and man hour. 3. To increase productivity and reduces production cost. 4. Reduced supervision and improved product quality 5. It gives job satisfaction. 6. It reduces labour turnover and chances of accidents. 7. Less fatigue to the workers. 8. Increased organisational stability and flexibility. 9. Specialisation and standardisation is easy. 10. It can boost the morale, cooperation and good relation. 11. It helps to build team spirit. 		

IV 1	<p>Advantage</p> <ol style="list-style-type: none"> 1. It can be employed when output standard is not accurate. 2. It provides a guaranteed minimum wage. 3. Inferior and fresh workers are not penalised. 4. Management also shares the bonus. <p>Disadvantage</p> <ol style="list-style-type: none"> 1. The worker do not like this plan because they do not get the full benefit of time saved. 2. To some extend it does not demark an efficient worker and less efficient worker. 3. It is not easy to understand and operate. 4. High productive workers get less incentive. 		
IV 2	<p>Earning of the worker under Rowan premium plan.</p> $W = RT + \frac{(S - T)}{S} \times RT$ <p>T = Time taken 48 hours. S = Standard time for 40 dozen articles @ 3 hours per dozen = 120 hrs.</p> <p>R = Rate per hour = 0.75</p> $W = 0.75 \times 48 = \left(\frac{120 - 48}{120} \right) \times 0.75 \times 48$ $= 36 + 21.6$ $= \underline{\underline{57.6}}$		

V 1	<p>4.11 STEPS FOR ISO-9000 INSTALLATION</p> <p>The ISO-9000 installation steps can be Listed as follows</p> <p>1. Preparatory step 2. Implementation step 3. Registration & certification step</p> <p>A brief description of the following step is as follows:</p> <p>4.11.1 Preparatory step:</p> <ul style="list-style-type: none"> i) Management commitment to ISO 9000:- Conduct awareness programme for top management ii) Set up an implementation committee and appoint a coordinator. iii) Start ISO awareness program iv) Find out current status and prepare an action plan v) Develop an organisational structure vi) Develop Quality system documentation. <p>4.11.2 Implementation step</p> <ul style="list-style-type: none"> i) Implement the documented Quality system ii) Establish internal Quality audits iii) Monitor and stabilize the quality system iv) Conduct pre-registration internal audit <p>4.11.3 The registration and certification steps</p> <ul style="list-style-type: none"> i) Apply for the registration ii) Adequacy Audit by Certification body iii) Compliance Audit by Certification body iv) Certification. 		
V 2	<p>Purchasing principles are usually epitomized as buying materials of right quality, in the right quantity, at the right time, at the right place and from the right source. The main objectives are:</p> <ol style="list-style-type: none"> 1. To make the user departments of the organisation from time to time aware of the range of quality materials available in the market and to maintain the right quality of purchased materials based on standards, technical specifications and suitability as determined by the user departments. 2. To purchase at the lowest possible cost consistent with quality and service requirements. 3. To ensure the minimum possible investment in service operations related to purchase materials, such as transportation, inspection, storing, record keeping etc. 4. To maintain continuity of supply to ensure that scheduled activities are not interrupted. 5. To integrate the requirements of all the department of the organisation in order to take the advantage of economy of scale resulting in wastes and obsolescence. 6. To create goodwill for the organisation through healthy buyer supplier relationship. 		
VI a	<ol style="list-style-type: none"> 1. Countries affiliated to European Free Trade Association (EFTA) made it as mandatory to have bilateral trade with only those parties which have ISO 9001 certification. 2. If the Indian industry adapts the ISO 9001 Quality system, it will get entry into the global market and can compete with the developed countries because Indian products are much cheaper compared to European products. In short Quality system certification is a credibility passport to entry global market. 3. It builds customer satisfaction by supplying assured quality products at reasonable price . 4. The government of India in its Export import policy has given certain concessions to the ISO 9001 companies . 5. It motivates the employees and develop pride in them for achieving excellence in their operations. 		

	<p>6. These Quality systems improve the efficiency and reduce the wastages and inspection and also rework.</p> <p>7. It enhance the Quality image of the company in the eyes of the national public and gives credit in the competition market.</p> <p>8. Systematic operations and processes reduce the work hazards and get more time for further developmental activities.</p> <p>9. In some countries a company without ISO 9001 has to pay more insurance premium . In some countries they denied the insurance coverage.</p> <p>10. ISO 9001 build committed, motivated work force with team spirit.</p>		
VI b	<p>Advantages of centralised stores organisation</p> <ol style="list-style-type: none"> 1. Effective and better supervision and control 2. Reduced personnel requirement, thus involving less related costs 3. Better and efficient layout of stores 4. Better inventory checks 5. Maintenance of optimum stores 6. Fewer redundant and obsolete items 7. Provision of better security arrangements possible <p>Disadvantages of centralised stores organisation</p> <ol style="list-style-type: none"> 1. Increased material handling and associated work. 2. Slow delivery due to one store and different departments. 3. Risk of loss by fire or theft is more. 		
VII a	<p>i) An Event represents a point in time signifying the completion of some activities and the beginning of new ones.</p> <p>ii) The operations which precedes the operation consideration.</p> <p>iii) Post operation are the operations which will follow after the operation under consideration is completed.</p> <div style="text-align: center;"> <pre> graph LR 1((1)) -- A --> 2((2)) 2 -- B --> 3((3)) </pre> </div> <p>A is the preoperation activity B</p>		
VII b	<p>i) It is the shortest possible time in which an activity can be completed if everything goes exceptionally well (t_0)</p> <p>ii) It is the time in which the activity is normally expected to complete under normal conditions. (t_m)</p> <p>iii) It is the time which an activity will take to complete in the case of difficulty. (t_p)</p>		
VIII a			

VIII a		
VIII b	<p>Let X_1 and X_2 be the units of ingredients A and B purchased Hence the problem is to find X_1 and X_2 which Minimise $Z = 30X_1 + 80X_2$ Subjected to</p> $X_1 \leq 800 \quad X_1 + X_2 \geq 2000$ $X_2 \geq 600 \quad X_1 \geq 0; X_2 \geq 0.$	
IX a	<ol style="list-style-type: none"> 1) The safety officer is responsible for safety of the entire industry and he formulate the policies, measures and actions of safety in consultaion with the shop supervisor, executives, workers, union and the R&D etc. 2) He takes initiative to conduct periodic meetings of the safety committees, record the suggestions and complaints and take necessary steps to implement the modifications and improve safety; standards and procedutes. 3) He should note the safety statistics such as frequency rates, severity rates etc. and evaluate the safety standards from time to time. 4) He should conduct safety seminars, safety week or safety month programs periodically. 5) He should consult with the safety councils and government agencies about the new regulations and rules in the subject matter of safety. 6) Implement the safety programs as efficiently as possible. 7) Ensure that the 4E's program of accident prevention is implimenting as per the planning. 	

	8) Educate the employees to develop safety conciseness. 9) Give concrete suggestions to mangement for effective implementation of safty programs. 10) Analyze the progress of the safety program. 11) Conduct job safely analysis, plant safety inspections and accident investigations. 12) Conduct preventive maintenance program. 13) Perodically check the pollution level and take all measures to reduce it. 14) Maintain a good relationship with the community and conduct social welfare programs for the community. 15) Ensure that he himself obey the rules.		
IX b	<p>b) Permanent registration When the party has completed all steps to establish the unit i.e.;</p> <ol style="list-style-type: none"> 1) Factory building is ready. 2) All requested machinery, testing equipments, etc. is installed. 3) Power connection is obtained. 4) An application for permanent registration is made. <p>On being satisfied after inspection that the unit is capable of production, a permanent registration certificate may be issued by the directorate of industries or District Industries Centre, within one month of receipt of application for permanent registration. Permanent registration is required to:</p> <ol style="list-style-type: none"> 1. Get subsidy. 2. Get sales tax exemption 3. Obtain benefits like exemption from electricity duty higher electricity tariffs, power-cut. etc. 4. Get exemption from earnest money deposit and security deposit which is to be given when participating in a tender. 5. To get telephone connection: <p>All registered units should submit half yearly reports of the raw materials received/utilised, stock on hand, production and sales to the directorate of industries in triplicate.</p>		
X a	<p>a) Engineering methods</p> <ol style="list-style-type: none"> 1. Use safe material handling equipment. To avoid premature fatigue of transport workers, full use should be made up mechanised material handling equipment. 2. Use mechanical means of conveyance to ensure the safety of man engaged in material heading. 3. During transport, sharp materials, sharp edged goods, poles etc. should be covered, placed in stable holders and retained by means of wire. 4. Goods should be piled up such that they do not collapse due to impact or vibrations. 5. All material handling equipment should be promptly repaired and adequately maintained on priority basis. 6. Use personal protective device for <ol style="list-style-type: none"> a) Protection of head - safety hard hats, rubberised hats for protection against chemicals, ear protectors. b) Protection of face - face mask, face shield, welding helmets. c) Protection of eye - goggles d) Protection of lunge - Air line respirators, cartridge respirators, oxygen or air breathing apparatus, gas mask. 11. Inflammable material should be stored separately and away from the general store. 12. Electrical connections and insulation should be checked at regular intervals. 		

	<p>13. Control air temperature, air purity, velocity of air, humidity of air, and heat radiation.</p> <p>14. Provide sufficient illumination, ventilation.</p> <p>15. Take measures to control noise pollution.</p>		
X b	<p>Objectives of TBI</p> <ul style="list-style-type: none"> - To create jobs, wealth and business in alignment with national priorities. - To promote new technology/knowledge/innovation based startups. - To provide a platform for speedy commercialization of technologies developed by the host institution or by any academic/technical/R&D institution or by an individual. - To build a vibrant startup ecosystem, by establishing a network between academia, financial institutions, industries and other institutions. - To provide cost effective, value added services to startups like mentoring, legal, financial, technical, intellectual property related services. 		