CODE : 5001 **VERSION : 2015**

COURSE : INDUSTRIAL MANAGEMENT AND SAFETY

BLUE PRINT

Sl No	Module	Type of Questions							
		Part A		Part B		Part C		Total	
			Score		Score		Score		Score
1	I	1	2	2	12	4	30	7	44
2	II	1	2	2	12	4	30	7	44
3	III	2	4	1	6	4	30	7	40
4	IV	1	2	2	12	4	30	7	44
TOTAL		5	10	7	42	16	120	28	172

QUESTION WISE ANALYSIS

CODE : 5001 **VERSION : 2015**

COURSE : INDUSTRIAL MANAGEMENT AND SAFETY

Qn No	Specific Outcome (as per syllabus)	Module	Content Details	Score	Time in Minutes
I 1	1.2.8	I	Define labour turn over.	2	4
2	3.1.10	III	Compute the project duration ,slack and mark the critical path.	2	4
3	2.2.6	II	Explain inventory models such as EOQ and ABC. 2	2	4
4	3.1.2	III	List different applications of CPM and PERT	2	4
5	4.1.2	IV	Define the meaning of the terms - accident proneness	2	4
II 1	1.2.6	I	Explain the objectives of training.	6	11
2	1.1.5	I	Explain different types of ownership .	6	11
3	2.2.6	II	Explain inventory models such as EOQ and ABC	6	11
4	4.1.5	IV	Discuss the role of safety council and safety officer.	6	11
5	4.1.1	IV	Explain the importance and need for safety measures in industries	6	11
6	2.1.1	II	List the dimensions (characteristics) of quality.	6	11
7	3.2.2	III	Formulation of Linear Programming Problem (LPP).	6	11
III a	1.1.3	I	State and explain the functions of management .	9	16
b	1.2.1	I	Outline the importance of HRM.	6	11
IV a	1.1.6	I	Explain different types of organizational structure .	9	16
b	1.3.0	I	Understand the principles of wage payment system and incentives	6	11
Va	2.1.7	II	List the steps for ISO 9000 installation.	9	16
b	2.1.8	II	List the objectives of quality audit.	6	11

VIa	2.2.0	II	Understand the functions of material and sales management.	9	16
b	2.2.8	II	Explain the functions of store keeping	6	11
VII a	3.1.10	III	Compute the project duration ,slack and mark the critical path.	9	16
b	3.1.6	III	Distinguish between CPM and PERT.	6	11
VIII a	3.2.5	III	Compute the initial feasible solution of transportation problem by using Least cost method	9	16
b	3.2.7	III	Compute the saddle point, optimum strategy of the game, two - person - zero sum using max- min and min-max principle	6	11
IX a	4.1.4	IV	Discuss the 4 E's of accident prevention technique.	9	16
b	4.2.9	IV	Describe the procedure for the registration of SSI	6	11
X a	4.1.7	IV	Discuss the precautions to be observed in preventing accident while working in hazardous environment.	9	16
b	4.1.3	IV	Identify the various accident factors, mechanical factors, environmental factors, and personal factors.	6	11

Q No	Scoring indicators CODE – 5001 VERSION - 2015	Split score	Total score
	PART A		
I 1	This may be defined as the ratio of number of workers who have left their job on their accord to the average number of workers employed in a factory during a given time.	2	
2	It is the difference between latest finish time and earliest finish time of activities in network diagram.	2	
3	The ordering quantity which give maximum economy in purchasing the material is called the economic ordering quantity.	2	10
4	Military operations , Weather forecasting , Design and development of new products (Any two relevant applications)	2	
5	Accident proneness may be defined as the continuing tendency of a person to have more accidents as a result of his persisting characteristics.	2	
	PART B		
II 1	1.To increase the efficiency of workers/ supervisors 2.To reduce wastage of materials, machine and manhour 3.To increase productivity and reduce production cost 4. To reduce supervision and improve product quality 5. To give job satisfaction 6. To reduce labour turnover and chances of accidents 7. To reduce fatigue of the workers 8. To increase organisational stability and flexibility 9. To make specialisation and standardisation easy 10 .To boost the morale 11. To build team spirit (Any six relevant points)	6	

II 2	In case of public limited company the minimum number of members is 7 and maximum number is unlimited. The shares are transferable and public can subscribe the shares of a public limited company. The affairs of company are managed by an elected body known as board of directors. The company have to issue prospectus and have to disclose the account details to public. The public limited company can be started only after getting commencement of business certificate. **Application**: Large scale industries (Any four relevant points)	6	
3	In large industries thousands of items are purchased and stored. Purchasing and storing of all these items required lots of money and man hours. In order to minimise the cost of material control and to have better control of stock , ABC control policy is widely used. ABC control policy is a technique popularly known as Always Better Control.In ABC control policy stock item are grouped into three categories 1.A items 2. B items 3.C items This grouping is done according to the money value of items. The costlier items are given more attention and cheaper items are given less attention. High valued items are called A items .It is about 10 percentage of total number of items, which consume 70 percentage of total inventory cost. Medium valued items are called B items. These items are about 20 percentage of total number of items which consume 20 percentage of total inventory cost. Low valued items are called C items. These items are about 70 percentage of total number of items , which consume 10 percentage of total inventory cost.	6	

II 4.	The safety officers are specialists, employed by the management to direct the work of employees and advise them with regard to safety. Their main duties are 1.Short term and long term planning of safety activities 2.Monitoring safety performance continuously 3.Advising managers in matters relating to safety 4.Conducting safety inspections and accident investigation 5.Overall direction of activities aimed at prevention of accidents (Any four relevant points)	6	
5.	1.For Increasing rate of production 2. For Reducing accidents 3. For Preventing premature death of talented workers who are an asset to the industry 4. For Preventing needless pain and suffering to its employees 5. For Promoting and cultivating a harmonious environment 6. For Providing a healthy working atmosphere.7. For Reducing damage of equipment and machinery (Any four relevant points)	6	
6	1.Suitability 2.Durability 3.Dependability/reliability 4.Safe workability 5.Affordability 6.Applicability 7.Value for the money (Any Six)	6	
7	Maximise Profit $Z = 4 X_1 + 6 X_2$ $3 X_1 + 6 X_2 \leq 54$ $6 X_1 + 3 X_2 \leq 66$ $X_1, X_2 \geq 0$	6	

PART - C

III a **functions of Management**

1 Planning
2 Organizing
3 Directing
4 Controlling
5 Staffing
6 Decision making

9

I Planning

Planning means thinking before doing. Planning is anticipating future and designing strategies to achieve organisational goals.

Before starting the actual work we should plan

What to be produced
How much to be produced
How to be produced
When to be produced
Where to be produced etc....

II Organising

Organising is the process of allocating physical resources such as men ,material ,money etc... for achieving organisational goals and establishing a framework in which authorities and responsibilities are assigned.

III Directing

Directing involves motivating , guiding and supervising employees towards objectives of the organisation .

Directing involves

1. Giving instructions to subordinates.
2. Guiding the subordinates to the work.
3. Supervising the subordinates as per the plan established.
4. Integrate activities of workers.
5. Motivate the workers to meet the targets.

IV Controlling

Controlling is the process of comparing the actual performance with that of standard and taking corrective measures to minimise the deviation .

V Staffing

Staffing is the process of selecting, training, promoting and retire the workforce. It is the process of ensuring right kind of people in right place at right time.

VI Decision making

Decision making is the process in which a course of action is consciously chosen from available alternatives for the purpose of achieving organisational goals.

III b

1 It discovers the talented experienced ,qualified , competent workers to take up various jobs
2 It ensures maximum productivity per worker by providing the right man on the right job
3 It helps in foreseeing manpower requirements for the present and for the near future
4 It develops personnel for higher positions with greater challenges and responsibilities
5 It enables best possible utilisation of human resources resulting in reduction of labour cost per unit of production.
6 It gives workers job satisfaction and essence of happiness due to proper placement
7 It ensures attractive pay which provides mental satisfaction two workers
8 It keeps the management informed of the present and future requirements due to transfers, promotions, labour turnover or death etc....

(Any four relevant points)

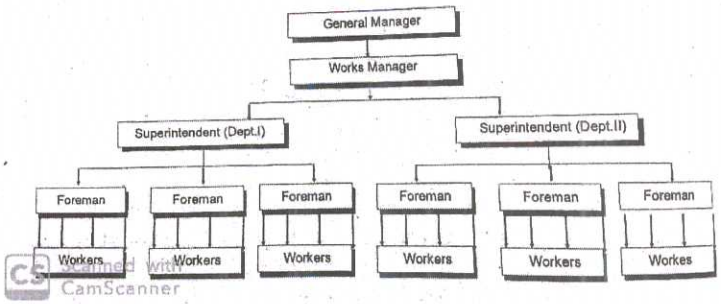
6

IV a

Line / military or scalar organisation

This is the simplest form of organisation. In this type of organisation, the authority flows directly from top to bottom. The supervisor gives orders to subordinate officers, assigns duties , takes disciplinary actions against them etc.

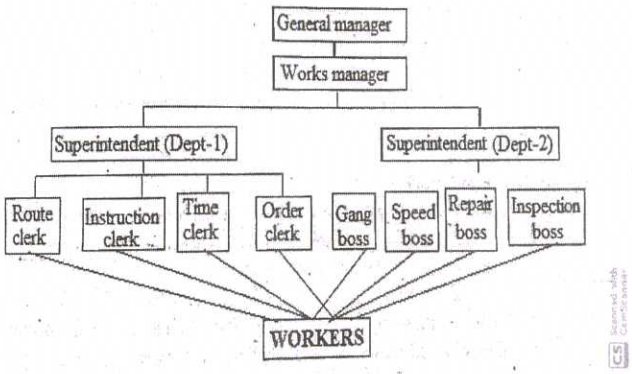
Since the authority and communication flow is from top to bottom in a vertical line , this is also called line or scalar organisation or military organisation. It explains a well defined authority and responsibility for every position. It also ensures strong discipline.



Functional organisation

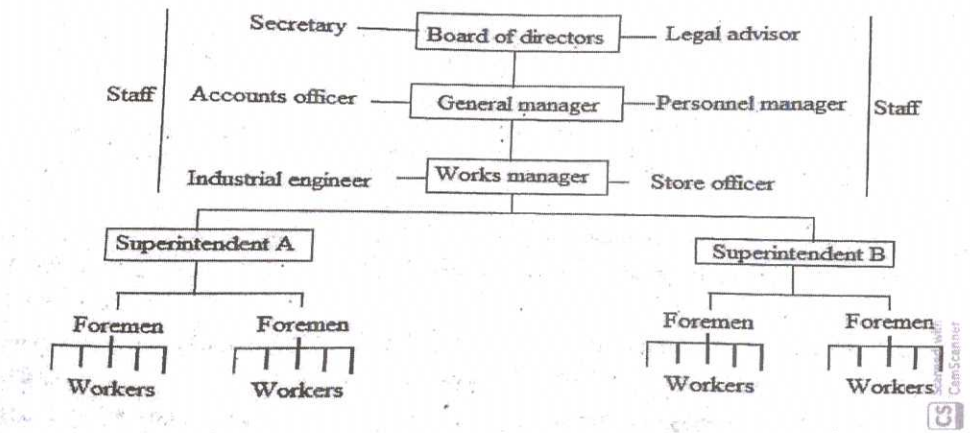
F.W. Taylor suggests functional organisation. In this type specialist people like chemist, designer, repair boss, speed boss, inspector, rout clerk, disciplinarian etc... are having direct and equal authority over the workers. Each functional foreman who is a specialist in an activity is in charge of one function.

9



Line and staff organisation

In large organisation operating on a big scale, managers busy with ordinary task of production and sales. Hence some staff is deputed to do the work of Investigation, research, recording and they provide expert advice to managers. These staff bring specialization by assisting officers and the line maintains the discipline and stability.



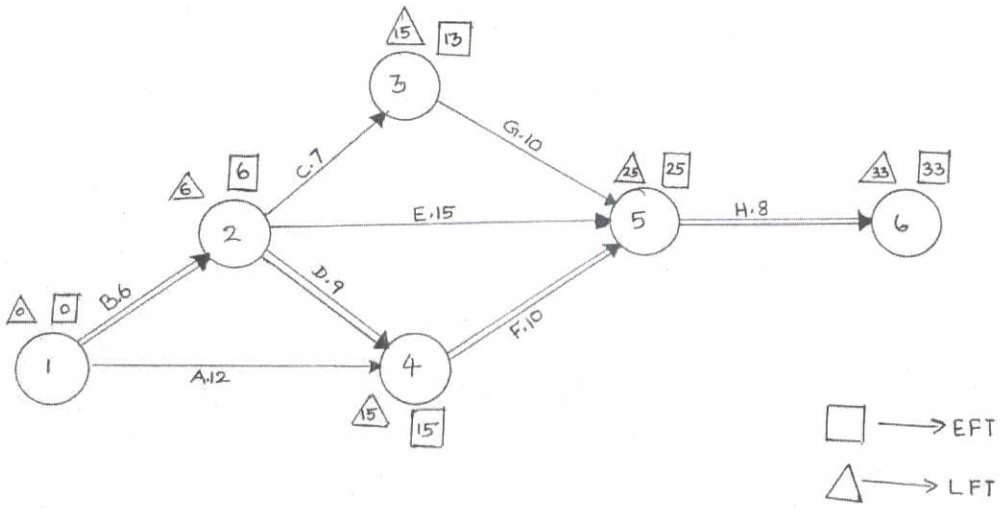
IV b	1. It enables the employee to earn a good and reasonable salary or wage 2. It encourages high-quality work 3. It encourages employees to develop better methods of working 4. It motivates team spirit and cooperation 5. It improves employer- employee relations 6. It gives job satisfaction and job enrichment 7. It promotes peace and harmony in the organisation 8. A good wage system will make the administration easier 9. It improves overall efficiency of the organisation (Any four relevant points)	6	
V a	**I Preparatory step** 1.Management commitment to ISO-9000:- conduct awareness programme for top management 2.Setup and implementation committee and appoint a co-ordinator 3.Start ISO awareness program 4.Find out the current status and prepare an action plan 5.Develop an organisational structure 6.Develop quality system documentation **II Implementation step** 1.Implement the documented quality system 2. Establish internal quality audits 3.Monitor and stabilize the quality system 4. Conduct pre-registration internal audit **III Registration and certificate steps** 1Apply for the registration 2.Adequacy audit by certification body 3.Compliance audit by certification body 4.Certification	9	

V b	1.To study the quality of the existing systems and find out the non conformity with the quality system 2.To suggest the corrections to be done in different areas and operations 3.To propose improved methods as per ISO standards 4.To evaluate a supplier before entering a contract with him 5.To suggest best procedures and practices (Any four relevant points)	6	
VI a	1.Analysing markets 2.Studying consumer buying habits and studying demand level of products 3.Studying the competitor's policies and sales strategy. 4. Studying the market fluctuations 5.Prepare market sales and business forecast 6.Assisting in preparation of marketing plan 7.Preparing the sales budget from marketing plan 8.Designing the distribution policy methods and network 9.Planning advertising campaign 10.Creating communication network for the departments 11.Ensuring suitable packing of the products 12.Explore new markets for selling the company's products. 13.Ensuring effective coordination with production and financial departments 14.Ensuring proper supply of material where there is demand (Any nine relevant points)	9	
B	1 To identify all items of stock and plan the store for optimum utilisation of the space 2 To receive all types of materials, goods and equipment including manufactured products in the factory and record them with their cost 3 Correct positioning of all materials and supplies in the stores 4 To maintain stocks safely and good condition by taking all precautions to ensure that they do not suffer from damage , theft and the deterioration 5 To coordinate with purchasing department 6 To make sure that stores are kept clean and in good order 7.To check the bin card balances with the physical quantities. 8. To inform the purchase department before stock level goes minimum. (Any four relevant points)	6	

VII a

ACTIVITY	A	B	C	D	E	F	G	H
EXPECTED TIME	12	6	7	9	15	10	10	8

2



3

Critical path → **B – D – F – H**

2

Project duration = 33 days.

2

b

PERT

1 It is a probabilistic model with uncertainty in activity duration.
2 .Has three time estimates
3.Event oriented technique
4.Suitable in defense and R&D projects
5. It uses statistical method to calculate expected time.
6. Does not give importance to critical path.

6

CPM

1. A deterministic model with well known activity timing.
2. Has only one time estimate.
3. Activity oriented techniques
4. Suitable for civil construction work or mechanical work
5. Need not require Statistical Techniques
6. Give importance to critical path.

(Any four relevant points)

VIII a

	SHOP 1	SHOP 2	SHOP 3	SHOP 4	SUPPLY
FACTORY 1	2 (20)	4 (20)	6	8	40
FACTORY 2	4	5 (10)	3 (50)	7 (10)	70
FACTORY 3	5	8	4	6 (40)	40
DEMAND	20	30	50	50	

7

Transportation cost = $2 \times 20 + 4 \times 20 + 5 \times 10 + 3 \times 50 + 7 \times 10 + 6 \times 40$

= Rs. 630

2

b

Player B

		B1	B2	B3	Row min
Player A	A1	3	2	4	2
	A2	-2	1	-3	-3
	A3	0	-2	3	-2
Column Max		3	2	4	

6

Min of Column Max = 2

Max of Row min = 2

Saddle point = A1 B2

Value of Game = 2

IX a	The 4 E's are , 1.Engineering 2.Education 3.Enterprising 4.Enforcement **Engineering methods** These are for safety at the design and equipment installation stage. 1. Use of mechanized materials handling equipment to avoid fatigue of transport workers . 2. Use mechanical means of conveyance to ensure the safety of men engaged in material handling 3. During transport, sharp materials, sharp edged goods etc.. should be covered , placed in stable holders and retained by means of wires. 4. Goods should be piled up such that they do not collapse due to the impact of vibrations. 5. Use of personal protective devices for Protection of head - safety hard hats, rubberised hat for protection against chemicals, ear protector Protection of face - face mask, face Shield ,welding helmets Protection Of eye - goggles Protection of lungs - airline respirators , Cartridge respirators, oxygen or air breathing Apparatus ,gas mask 6. Inflammable material should be stored separately and away from General Store 7.Electrical connections and the insulation should be checked at regular intervals 8.Control air temperature, air purifier , humidity and heat radiation 9.Provide sufficient illumination and ventilation 10.Take measures to control air pollution	9	

B) Education

It includes safety training and education to employees. Safety education not only includes awareness programmes , but also displaying boards of safe work practices , safety rules etc...This is essential for employees to think, act and the work safely so that the number of accidents can be minimised. Safety training and education give knowledge about safe working methods and mechanical conditions , personnel practices etc..

C)Enterprising

Enterprising is developing safety consciousness among the workers and Management . It includes ,

1.Hold safety competition and award the prices to winners

2.Report safety activities to all employees

3.Crossmark all accident areas

4.Display safety posters to remind workers of particular hazards and accidents

5.Welcome all safety suggestions and reward for better one.

6.Hold regular safety meeting

7.Conduct safety training lectures periodically

8.Providing simple and convenient safety devices

D)Enforcement

It means to enforce adherence of safety rules and safe practices.

It includes enforcing penalties when safe practices are violated.

The employees should be rewarded for their contribution to implement safety practices.

IX b	Registration should be done in two stages. 1. **Provisional registration** 2. **Permanent registration** **<u>Provisional registration</u>** It helps the party to take necessary steps to bring the units into existence. It should be converted into a permanent registration once the units comes into existence. The provisional registration helps the party to 1.apply for shed Industrial Area 2. apply for power connection 3.apply for financial assistance 4. apply for hire purchasing machinery 5. obtain sales tax, and excise tax registration 6.obtain import licence Provisional registration certificate will be issued on submission of application form with registration fee at Taluk or district Industries office. Provisional registration certificate is valid for 5 years. Provisional registration certificate shows the registration number,name and address of the unit, name and address of the proprietor, location, name of products ,details of raw materials etc… **<u>Permanent registration</u>** When the party has completed all steps to establish the units ie, 1.factory building is ready 2.all requested machinery and testing equipment installed 3.power connection is obtained an application for permanent registration is made. 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. Permanent registration is required to 1. get subsidies 2.get sales tax exemption 3. obtain benefits like exemption from higher electricity tariff 4.to get telephone connection	6	

X a	1.All the moving parts of the Machines must be properly guarded. 2.While overhead cranes are operating, precautions to be taken to keep the workers who are directly under the moving objects and such machinery is to be thoroughly checked and kept in good condition. 3.For high pressure units like boilers and pressure vessels proper divisors liker safety valves and alarms are to be provided to indicate danger. 4.As the fatigue is one of the reasons to cause accidents, proper working methods to minimise the same should be developed. 5.The workers should be properly trained on the machine what they use. 6.The work should be allotted according to the physical and mental abilities of the worker. 7.Proper temperature and lighting should be provided 8.The work place should always keep clean for keep from oily or slippery matter. 9.The machine should be correctly loaded and the speeds and the feeds are also to be maintained at recommended levels. 10.Posters of safety measures and the slogans on prevention of accidents are to be displayed. 11.Fire extinguishers are to be installed at suitable places to meet in case of hazards. 12.Emergency exit points should be provided for reducing the impact of fire hazards. (Any nine relevant points)	9	
b	**Environmental factors** Environmental factors indicate improper physical and atmospheric surrounding conditions of work which indirectly promote the occurrence of accidents Environmental factors includes		

1.Too low temperature to cause shivering

2.Too high temperature to cause headache and sweating

3.Too high humidity to cause discomfort ,fatigue and drowsiness

4.It may also cause asthmatic complaints.

5.Defective and inadequate illumination causing eye strain ,glare, Shadows etc…

6.Presense of Dust, fumes and smoke and lack of proper ventilation

7.Noise, bad odor and flash coming from nearby machinery, equipment ,processes

8.Poor housekeeping

(Any six relevant points)

6