

INTERNAL ASSESSMENT PAPER (7thSem)

Internal Test: III	Internal Quiz: III	Academic Year: ODD /2021-22
Subject :Industrial Safety	Sub-Code:18ME753 (Open Elective)	Sem: VII
Date:29/01/2022	Time:9.00 a.m to 10.45 a.m	Dur:1.45 min
Internal Test max marks: 50		Internal Quiz max marks: 10
Staff-Incharge:Vanishree T S		

I. Quiz (Answer all multiple-choice question in first sheet of your answer book)

Question No	Multiple choice question	BTlevel	CO Mapped
1	The desire to maintain a safe laboratory environment for all begins with _____? a. prevention b. microbiology c. ubiquity d. accidents	L2	CO5
2	When a chemical splashes in the eye rinse for _____? a. 10 seconds b. 5 minutes c. 30 seconds d. 15 minutes	L2	CO5
3	Chemical, reagents or broth cultures should be pipetted by _____? a. mouth .b pipetter c. ear d. nose	L2	CO5
4	Good work practices include, a. smelling and tasting chemicals b. not washing hands before and after lab c. confining long hair and loose clothing d. using damaged equipment and glassware.	L2	CO5
5	After a biohazard spill is covered with paper towels and disinfectant solution, it must sit for _____ minutes? a. 5 b. 60 c. 30 d. 20	L2	CO5
6	Lab coats much be taken off when exiting the lab and entering a non-laboratory area. A. True B.False	L2	CO5
7	As per the Diamond Symbol of the chemical label, Blue represents A. Fire Hazard B. Health Hazard C. Reactivity Hazard D. Personal Protective Equipment	L2	CO5
8	It is necessary to inspect a cylinder's valve for gas leakage? A. True B. False	L2	CO5
9	Personnel, including rescue workers, should not enter areas where the oxygen concentration is below----- unless provided with an SCBA or air-line respirator. A. 19.8% B. 19 % C. 19.5 % D. 20%	L2	CO5
10	Cylinders that contain corrosive gases should not be stored for longer than: A. 3 months B. 6 months C. 1 year D. 1 week	L2	CO5

**II. Internal Test (Answer any two full questions choosing one from each part)
(Each full question carries 25 marks)**

Main Ques	SubQues	Full Question	Marks	BT Levels	CO -PO Outcome
Part A					
1.	A)	Enmeruate safe handling and storage of different types of chemicals	12.5	L2	CO5 PO1,PO6
	B)	Explain the various methods implemented for Labeling of Chemicals.	12.5	L2	CO5 PO1,PO6
OR					
2.	A)	Illustrate various personal protective equipments used while working with chemicals	12.5	L2	CO5 PO1,PO6
	B)	Explain procedure for confined space entry	12.5	L2	CO5 PO1,PO6
Part B					
3.	A)	Describe the standard measures/policies should be taken by the chemical industries.	12.5	L2	CO5 PO1,PO6
	B)	Explain the inspection criteria check list for piping in an LPG installation.	12.5	L2	CO5 PO1,PO6
OR					
4.	A)	Illustrate Safety precautions should be taken while using CNG	12.5	L2	CO5 PO1,PO6
	B)	Write a short notes on eyewashers and shower stations.	12.5	L2	CO5 PO1,PO6

Comments:

Accepted

Vanshika T-S

Signature of Faculty

Scrutinizer

HOD



Sri Adichunchanagiri Shikshana Trust (R)

SJB Institute of Technology

(Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi.)

Department of Mechanical Engineering**TEST-****Scheme and solution**

INTERNAL TEST : <u>III</u>	ACADEMIC YEAR : <u>2021-22</u>		
SUB : <u>Industrial Safety [Open Elective]</u>	SUB-CODE : <u>18MET53</u>	CLASS : <u>VII</u>	
DATE : <u>29-01-2022</u>	TIME : <u>9.00 am to 10.45 am</u>	DUR : <u>1.45 min</u>	MAX MARKS: <u>50</u>
STAFF INCHARGE: <u>Nanishree S</u>			

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes Manned
1		<u>Quiz</u>			
2	a.	Prevention	1	LR	C05
3	d.	15 minutes	1	LR	C05
4	b.	Protection.	1	LR	C05
5	c.	Confining long hair and loose clothing.	1	LR	C05
6	b.	60 minutes	1	LR	C05
7	A.	True.	1	LR	C05
8	B.	Health hazard.	1	LR	C05
9	A.	True	1	LR	C05
10	C.	19.5 %	1	LR	C05
11	A.	3 months.	1	LR	C05

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes Manned
Q	A1	Explanation of Safe handling of Chemicals	6.5		
	A2	Explanation of Storage of different types of chemicals a) Acids b) Bases c) Dry Chemicals d) Peroxides	6	LR C05	
	B1	Explanation of Various methods implemented for labeling of chemicals.			
Q2	A1	Various personal protective Equipments used while working with chemicals.			
	a)	Goggles			
	b)	Lab Coat			
	c)	Face shields			
	d)	Masks			
	B1	Explanation for procedure for Confined space Entry.	12.5	LR C05	

Main Question	Sub-Question	Description	Marks	BT-Level	Course
					Manned
	A1	<p>Safety precautions during CNG.</p> <p>Explanation of safety precautions need to take while using CNG.</p> <p>Explanation of safety precautions need to take while during storage and transportation of CNG.</p>	12.5 L2	05	
	A2	<p>Short Note on Eye washers</p> <p>Short Note on Shower stations</p>	6 L2	05	
			6.5 L2	05	

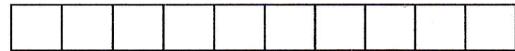
Vaishnavi T.S

Prepared by

[VANISHREE T.S.]


Scrutinizer (IASC Member)

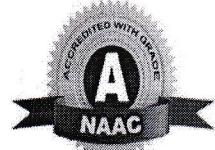
HOD



Sri Adichunchanagiri Shikshana Trust (R)

SJB Institute of Technology

(Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi.)

**Department of Mechanical Engineering****INTERNAL ASSESSMENT PAPER**

Internal Test: 2	Internal Quiz: 2	Academic Year: ODD / 2021-22
Subject : TQM	Sub-Code: 18ME734	Sem: 7 th A & B Sec
Date: 28/12/2021	Time: 9 am to 10.45 a.m	Dur: 1.45 min
Internal Test max marks: 50		Internal Quiz max marks: 10
Staff-Incharge: Dr. Kiran Kumar P/Girija V		

I. Quiz (Answer all multiple-choice question in first sheet of your answer book)

Question No	Multiple choice question	BT level	CO Mapped
1	Who among the following is not a hidden customer? a) Regulators b) Critics c) Opinion leaders d) Managers	L2	CO3, PO1
2	Those who are not currently using the product but have the capability of becoming customers in future are called _____ a) Potential Customers b) Hidden Customers c) Suppliers d) Processors	L2	CO3, PO1
3	In the modern world, warranty attached to a product attracts and build markets. a) True b) False	L2	CO3, PO1
4	Which among the following is not a factor influencing customer perception of quality before making a purchase? a) Company's brand name and image b) Opinions of friends c) Spare parts availability d) Published Test Results	L2	CO3, PO2
5	Which of the following is not the best way to gather information about customer needs? a) Information on competitor's products b) Personal visits to customer locations c) Employees with special knowledge of the customer d) Threatening customers to tell their needs	L2	CO3, PO2
6	Which among the following is not a contribution made by Juran? a) Juran's Quality Control Handbook b) Quality Planning and Analysis c) Juran on Leadership for Quality d) Quality is Free	L2	CO4, PO1
7	Which among the following is not a contribution made by Juran? a) Internal Customer b) Cost of Quality c) Quality Trilogy d) Quality Loss Function	L2	CO4, PO1
8	Which among the following is not part of Juran's 'Three Role Model'? a) Supplier b) Process c) Customer d) Deming	L2	CO4, PO1
9	PDCA cycle is used for _____ a) Continuous improvement b) Discontinuous improvement c) Intermittent improvement d) Seldom improvement	L2	CO4, PO1
10	Which of the following is not a method that can be implemented by the Quality Council team to promote quality consciousness in the organization? a) Seminars b) Study Tours c) Training d) Threatening the workforce to follow the quality policy	L2	CO4, PO2

**II. Internal Test (Answer any two full questions choosing one from each part)
(Each full question carries 25 marks)**

Main Ques	Sub Ques	Full Question	Marks	BT Level s	CO -PO Outcome
Part A					
1.	A)	Explain the role of customer perception towards quality	12.5	L2	CO3, PO1
	B)	Discuss the tools for the Industry to implement the voice of customer	12.5	L2	CO3, PO1
OR					
2.	A)	Explain the importance of employee motivation in success of Industry	12.5	L2	CO3, PO1
	B)	Enumerate the importance of team, team leader and team member in the Industry	12.5	L2	CO3, PO1
Part B					
3.	A)	Explain PDSA cycle of problem solving as continuous process improvement	12.5	L2	CO4, PO1
	B)	Explain cause and effect diagram in an Industry with an example of case study	12.5	L2	CO4, PO2
OR					
4.	A)	Explain how histogram, scatter diagram and control charts can be used in Industry	12.5	L2	CO4, PO1
	B)	Explain the Six sigma concept, also explain the types of variance and sources of variation.	12.5	L3	CO4, PO2

Comments:

Accepted


Signature of Faculty


Scrutinizer


HOD



Sri Adichunchanagiri Shikshana Trust (R)

SJB Institute of Technology

(Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi.)

Department of Mechanical Engineering**TEST- 2****Scheme and solution**

INTERNAL TEST : 2	ACADEMIC YEAR : ODD. 2021 - 22		
SUB : T&M.	SUB-CODE : 18ME 734	CLASS : 7 th AEIB	
DATE : 28/12/21.	TIME : 9 - 10:45 a.m	DUR : 1:45 m	MAX MARKS: 50
STAFF INCHARGE: DR. Kisan Kumar / Gireja.v			

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes Manned
1	A	<p>Quiz :</p> <p>1) a. 2) a. 3) a) 4) c) 5) d. 6) d) 7) d 8) a 9) a) 10) d.</p> <p><u>Part A -</u></p> <p>Customer perception of quality showed the following ranking .</p> <p>(1) <u>Performance</u> : involves the fitness for use phase . To consider the satisfaction of the customer viz availability , reliability & maintainance of the product .</p> <p>(2) <u>Features</u> : indicates the sense of the aesthetic about product . Ex : Watch's characteristic in time along with light , temp .</p> <p>(3) <u>Serviceability</u> : degree to which the servicing of an item can be accomplished with given resources & within time frame .</p> <p>(4) <u>Warranty</u> : It represents the organization's public promise of a quality product . It focuses on customer's def'g of a quality product & service quality .</p> <p>(5) <u>Price</u> : It's customers constant evaluation of organization's product & services against those of competitors .</p> <p>(6) <u>Reputation</u> : Total customer satisfaction is based on the entire experience with the organization , not just the product .</p>	10	L2	C03 C04 P01 P02

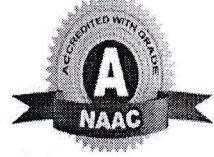
Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes
	B	<p>Following are tools for listening to the voice of the customer</p> <p>(1) Telephone survey (2) Mail Survey (3) One-on-one interview (4) Intercept (5) User testing (6) Customer complaints.</p>	12.5	12	C03 P01
2 A		<p>Employee motivation is imp because of following benefits:</p> <p>(1) Puts human resource into action : i.e. human resources can be utilized by making full use of it. This can be done by building willingness in employees to work.</p> <p>(2) Improve level of org. employees : For getting best of employee's work performance the gap b/w ability & willingness has to be filled to improve level of org. of subordinates.</p> <p>(3) Leads to achievement of organizational goal: It can be achieved by following factors.</p> <ul style="list-style-type: none"> ① best possible utilization of resources. ② Co-operative work experience ③ employees are goal oriented ④ Goals can be achieved if co-ordination & co-operation takes place simultaneously. <p>(4) Leads to stability of work force : It is imp : as reputation & goodwill of concern.</p>	12.5	12	C03 P01
B.		<p><u>Team</u> : comprises a group of people linked to accomplish a common purpose. Teams have members with complementary skills to generate synergy thru' a co-ordinated effort which allows each member to make use of strengths & minimize use of weaknesses.</p> <p><u>Team leader</u> : has following functions.</p> <ul style="list-style-type: none"> - Schedule, arrange, conduct meeting. - clarifies purpose & helps the team to identify goals. - Ensures that all team functions are assigned. - Asks Q's to clarify comments & restates if members are confused. 	12.5	12	C03 P01

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes	Manned
	B.	<p>Control charts: follow $\pm 3\sigma$ limits. Control charts are used to identify the presence of assignable causes.</p> <p>Six Sigma is a disciplined, data driven approach methodology which uses a set of tools in <u>tech</u> to eliminate defects in any process.</p> <p>Sigma as 'a quality programme that, when all is said & done, improves your customer's experience, lowers your costs & builds better leaders.'</p> <p><u>Types of variance:</u> They are termed as assignable causes or chance causes. 1st type causes are special in nature: Ex: Accidents in a shop floor, untrained working on m/c, improper light etc. 2nd type causes are common in nature Ex: Fatigue of a worker, wear & tear of a m/c etc.</p> <p><u>Sources of variation:</u> In a combination to variations are equipment, operators, material environment. Variation in finished goods is seen due to variations in raw material itself. Temp, humidity, radiation, light are <u>source</u> reasons for variations in products due to environment.</p>	12.5	L2	P04 P02	

Oeeija Manna
Prepared by

Pranay
Scrutinizer (IASC Member)

HOD
Pranay



Department of Mechanical Engineering

INTERNAL ASSESSMENT PAPER (5th Sem A and B)

Internal Test: 1		Academic Year: ODD /2021-22
Subject :Design of Machine Elements 1	Sub-Code:18ME52	Sem: V
Date:18/11/2021	Time: 2.00 P.M to 3.45 P.M	Dur:1.45 min
Internal Test max marks: 50		
Staff-Incharge: Dr.Chandrashekhar.K/Dr.J.Satheesh		

Internal Test (Answer any two full questions choosing one from each part)
(Each full question carries 25 marks)

Main Ques	SubQues	Full Question	Mark s	BT Levels	CO -PO Mapped
Part A					
1.	A)	Explain the phases of design with flow diagram	4	L1	CO1, PO1
	B)	List the factors which govern the selection of appropriate material for a machine element	4	L1	CO2, PO1
	C)	A circular shaft of diameter 50mm fixed at one end is subjected to an axial tensile load of 10kN and torque of 300N-m. Determine the principal stresses and maximum shear stress.	8.5	L2	CO2, PO1
	D)	A point in a structural member is subjected to plane stress as shown in Fig. Q.1 (D). Determine the values of normal and tangential stresses on a plane inclined at 45° with vertical. $\sigma_x = 120 \text{ N/mm}^2$, $\sigma_y = 70 \text{ N/mm}^2$, $\tau_{xy} = 40 \text{ N/ mm}^2$	8.5	L3	CO2, PO2
OR					
2.	A)	State and explain the following theories of failure: (i) Maximum normal stress theory (ii) Distortion energy theory	6	L1	CO1, PO1
	B)	A bar of rectangular section is subjected to an axial pull of 500kN. Calculate its thickness if the allowable tensile stress in the bar is 200MPa.	9	L2	CO1, PO1
	C)	A rod of circular section is to sustain a torsional moment of 300 kN-m and bending moment 200 kN-m. selecting C45 steel ($\sigma_y = 353 \text{ MPa}$) and assuming factor of safety =3 , determine the diameter of rod as per following theories of failure i) Maximum shear stress theory ii) Distortion energy theory iii)Total energy theory	10	L3	CO2, PO2

Part B						
3.	A)	Derive an expression for the stress induced in a member subjected to axial impact.	12.5	L2	CO3, PO1	
	B)	A steel rod is 1.5 m long. It has to resist longitudinally an impact 2.5 KN falling under gravity at a velocity of 0.99 m/sec. Maximum computed stress is limited to 150 MPa. Determine i) Diameter of rod required ii) Impact fact use $E=206$ GPa	12.5	L3	CO3, PO2	
OR						
4.	A)	Derive an expression for impact stress induced in a member subjected to bending	12.5	L2	CO3, PO1	
	B)	A cantilever beam of width 60mm, depth 140mm is 1.2 m long. A weight of 1kN is dropped from a height of 20mm at its free end. Determine, (i) Impact factor (ii) Instantaneous maximum deflection (iii) Instantaneous maximum stress (iv) Instantaneous maximum load. 18ME52 E=200Gpa.	12.5	L3	CO3, PO2	

Comments:

- Accepted -

CLIC
Signature of Faculty

Scrutinizer

HOD



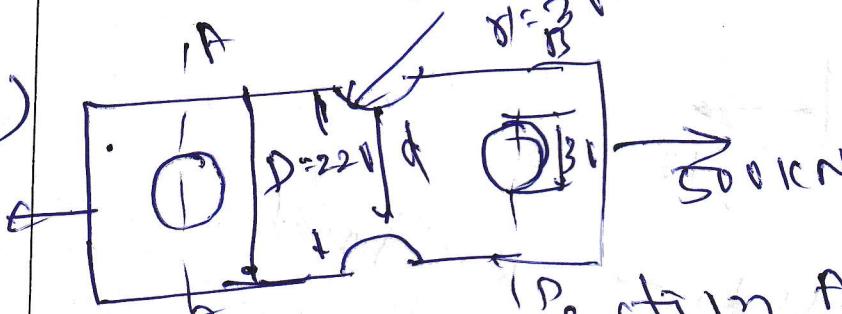
TEST-

Scheme and solution

INTERNAL TEST : 1	ACADEMIC YEAR : 2021-22
SUB : DOME-I	SUB-CODE : 18ME52 CLASS : 5 th SEM
DATE : 18/11/21	TIME : 2 PM DUR : 1-45 MAX MARKS: 50
STAFF INCHARGE: Dr. Chandrasekhar K / Dr. Sathish J	

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes Manned
1)	a)	Phases of design with flow diagram	4	4	C01P01
	b)	Selection of material for m/c parts	4	4	C02P01
3)		<p>1) Direct stress due to axial load</p> $\sigma = \frac{F/A}{\text{length}} = \frac{10 \times 10^3}{\frac{\pi \times 50^2}{4}} = 5.09 \text{ N/mm}^2$ <p>2) Shear stress due to torsion</p> $T = \frac{M r}{J} = \frac{300 \times 10 \times 50}{\frac{\pi \times 50^3}{4}} = 2.22 \text{ Nmm}$	25		

26

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcome
		Consider in point A max normal stress at A $\sigma = \frac{\pi}{2} + \sqrt{(\frac{\pi}{2})^2 + T^2} = 15.0392$ min stress $\sigma = \frac{\pi}{2} - \sqrt{(\frac{\pi}{2})^2 + T^2} = -9.9642$	3		
		Consider in point B $T = \sqrt{(\frac{\pi}{2})^2 + T^2} = 12.2491$			
2) a)		max normal stress at B $\sigma = \frac{\pi}{2} + \sqrt{(\frac{\pi}{2})^2 + T^2}$ $T = \sqrt{(\frac{\pi}{2})^2 + T^2} = 12.2491$	3		
	b)	Theory of failure a) max normal stress Theory b) Distortion energy Theory	3		
	b)				
	c)	Consider the IP section A-A $W=22\text{mm}$ $d/w = \alpha/w = \frac{31}{320} = 0.0969$ $I_C \sigma = 2.65$	2.5		
	d)	$K_T = \frac{\sigma_{max}}{\sigma_{min}}$ $\sigma_{min} = \frac{2\pi}{2.65} = 75.4572\text{N/mm}^2$	2		
g)		$\sigma_A = 135\text{N/mm}^2$ $\theta_1 = 28.99^\circ$ $\tau_Q = 50\text{N/mm}^2$ $\theta_2 = 118.991^\circ$			

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcome
2	C	$M_f = 300 \text{ kN-m} = 3 \times 10^8 \text{ N-mm}$ $M_b = 200 \text{ kN-m} = 2 \times 10^8 \text{ N-mm}$ $\sigma_1 = \frac{M_b C}{I d^4} \times d^2 = \frac{64 \times 10^8}{\pi d^3} (\text{Eq})$ $\sigma_2 = \frac{48 \times 10^8}{\pi d^3} (\text{Eq})$ <p>By principle of superposition $\sigma_1 = \frac{\sigma_x}{2} + \sqrt{\left(\frac{\sigma_x}{2}\right)^2 + \sigma_y^2}$</p> $\sigma_1 = \frac{64 \times 10^8}{2 \pi d^3} + \sqrt{\left(\frac{64 \times 10^8}{2 \pi d^3}\right)^2 + \left(\frac{48 \times 10^8}{\pi d^3}\right)^2}$ $\sigma_1 = \frac{2.855 \times 10^9}{d^3}$ <p>By principle of $\sigma_2 = \frac{\sigma_x}{2} - \sqrt{\left(\frac{\sigma_x}{2}\right)^2 + \sigma_y^2}$</p> $\sigma_2 = \frac{64 \times 10^8}{2 \pi d^3} - \sqrt{\left(\frac{64 \times 10^8}{2 \pi d^3}\right)^2 + \left(\frac{48 \times 10^8}{\pi d^3}\right)^2}$ $\sigma_2 = -0.8177 \times 10^9 / d^3$ <p>Right shear stress theory</p> $\sigma_{max} = \frac{\sigma_1 - \sigma_2}{2} = 1.83635 \times 10^9$ $\sigma_{max} = \frac{\sigma_y}{F_s} = \frac{\sigma_y}{2 F_s}, d = 314.855 \text{ mm}$ $d = 315 \text{ mm}$	4	3	N

Main Question	Sub-Question	Description	Marks
			BT-Level Course Outcomes Manned
		$\sigma_{NOM} = \frac{F}{A} = \frac{F}{(w-a)h} = \frac{50 \times 10^3}{(220-30)h}$ $h = 34.868 \text{ mm}$ <u>Consider the section B-B</u> $w = D = 220 \text{ mm}$ $d = D - 2R = 220 - 2 \times 30 = 160 \text{ mm}$ $\sigma_{max} = 207 \text{ MPa}$ $\Rightarrow P = F = 502 \text{ kN}$ $D/d = \frac{220}{160} = 1.375$ $\delta/d = \frac{30}{160} = 0.1875$ (Fig 4.24) $K_G = 2.05$ $\sigma_{max} / K_G = 207 / 2.05 = 97.51 \text{ N/mm}^2$ $\sigma_{NOM} = \frac{50 \times 10^3}{h \times 160} = 97.51 \text{ N/mm}^2$ $97.561 = \frac{50 \times 10^3}{h \times 160}$ $h = 32 \text{ mm}$ $\therefore \text{Thickness of plate } h = 34.868 \text{ mm}$	2.0 2.0 2.0 2.0 2.0 2.0 2.0

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcome
2)	C	$M_f = 300 \text{ KN-m} = 3 \times 10^8 \text{ N-mm}$ $M_b = 203 \text{ KN-m} = 2 \times 10^8 \text{ N-mm}$ $\sigma_c = \frac{2 \times 10^8}{\pi d^4} \times d_b = \frac{64 \times 10^8}{\pi d^3} (\text{Eq})$ $T = \frac{3}{2} \sigma_g = \frac{48 \times 10^8}{\pi d^4} \times d_b = \frac{48 \times 10^8}{\pi d^3} (\text{Eq})$ $\text{Max principle of stress } \sigma_1 = \frac{\sigma_x + \sqrt{(\frac{\sigma_x}{2})^2 + T_y^2}}{2}$ $= \frac{64 \times 10^8}{2\pi d^3} + \sqrt{\left(\frac{64 \times 10^8}{2\pi d^3}\right)^2 + \left(\frac{48 \times 10^8}{\pi d^3}\right)^2}$ $\sigma_1 = \frac{2.855 \times 10^9}{d^3}$ $\text{Min principle of } \sigma_2 = \frac{\sigma_x - \sqrt{(\frac{\sigma_x}{2})^2 + T_y^2}}{2}$ $= \frac{64 \times 10^8}{2\pi d^3} - \sqrt{\left(\frac{64 \times 10^8}{2\pi d^3}\right)^2 + \left(\frac{48 \times 10^8}{\pi d^3}\right)^2}$ $\sigma_2 = -0.8177 \times 10^9 / d^3$ $\text{max shear stress theory}$ $T_{max} = \sigma_y - \sigma_2 = 1.83635 \times 10^9$ $T_{max} = \sigma_y / F_{RS} = \frac{\sigma_y}{2F_{RS}} d^3, d = 314.855 \text{ mm}$ $d = 315 \text{ mm}$	4	3	

Main Question	Sub-Question	Description	Marks	BT-Level	Course Outcomes Manned
3) b)		$d = 1.5 \text{ m} = 150 \text{ mm}$, $w = 2.5 \text{ N} = 2500 \text{ N}$ $V = 2.94 \text{ m/s}$ i.e. $\sigma' = 150 \text{ MPa}$ <u>1. Drag load</u> $b = \sqrt{\frac{V^2 g}{2 E}} = \frac{0.99^2}{2 \times 9.81} = 0.0499 \text{ m} = 50 \text{ mm}$ $A = 1563.88 \text{ mm}^2$ $\sigma' = w/A \left[1 + \sqrt{1 + \frac{2hEA}{w^2}} \right]$ $\sigma' = 45 \text{ MPa}$ $d = 44.12 \text{ mm}$ say			
4) a)		<u>Derivation of instantaneous structure</u> <u>Impact bending</u>  $\sigma_{bi} = F_{bi} \left[1 + \sqrt{1 + \frac{2h}{y}} \right]$			
b)		$b = 60 \text{ mm}$ $d = 150 \text{ mm}$ $l = 1.2 \text{ m} = 1200 \text{ mm}$ $w = 1000 \text{ N}$ $\sigma' = 200 \text{ MPa}$ $E = 207 \text{ GPa}$ $F_{bi} = \frac{wl^3}{24EI} = \frac{1000 \times 1200^3}{312 \times 10^3 \times 207 \times 10^9} = 0.2938 \text{ N/mm}^2$ $y = 29.38 = 0.2938 \text{ m}$ $\sigma' = 14.87 \text{ MPa}$ $\sigma_{max} = 4 \times \text{impact factor} = 71.92 \text{ MPa}$ $\sigma_{max} = 29.53 \times 14.87 = 3.107 \text{ MPa}$ $\sigma_{max} = 14.87 \times 3.623 = 53.623 \text{ MPa}$ $\sigma_{max} = 14.87 \times 9.104 = 133.87 \text{ MPa}$ $w = 1000 \times 29.53 \times 14.87 = 16,87 \times 10^3 \text{ N}$ $w = 16,87 \times 10^3 \text{ N}$	3.5	3	2
3)		$\sigma' = F_{bi} \times \text{impact factor} = 91.08 \text{ MPa}$	2		
4)		$w = w \times \text{impact factor}$			

1) Impact factor = 14.87
 2) $\sigma_{max} = 3.107$

Prepared by

Scrutinizer (IASC Member)

HOD



SJBIT

II Jai Sri Gurudev II
Sri Adichunchanagiri Shikshana Trust®

SJB Institute of Technology

(Affiliated to Visvesvaraya Technological University, Belagavi and
Approved by AICTE and Accredited by NAAC with 'A' Grade, CGPA-3.22 - New Delhi)
#67, BGS Health & Education City, Dr. Vishnuvardhan Road, Kengeri, Bengaluru – 560060.
Website : www.sjbit.edu.in

INTERNAL ASSESSMENT BOOK

Student Name : JAYANTH SSemester & Section : 5th A' USN : 1TB19MEO16Subject: Design of Machine Elements Subject Code: 18ME52 Branch: Mechanical.Name of Faculty in charge : Chandru Shekar S

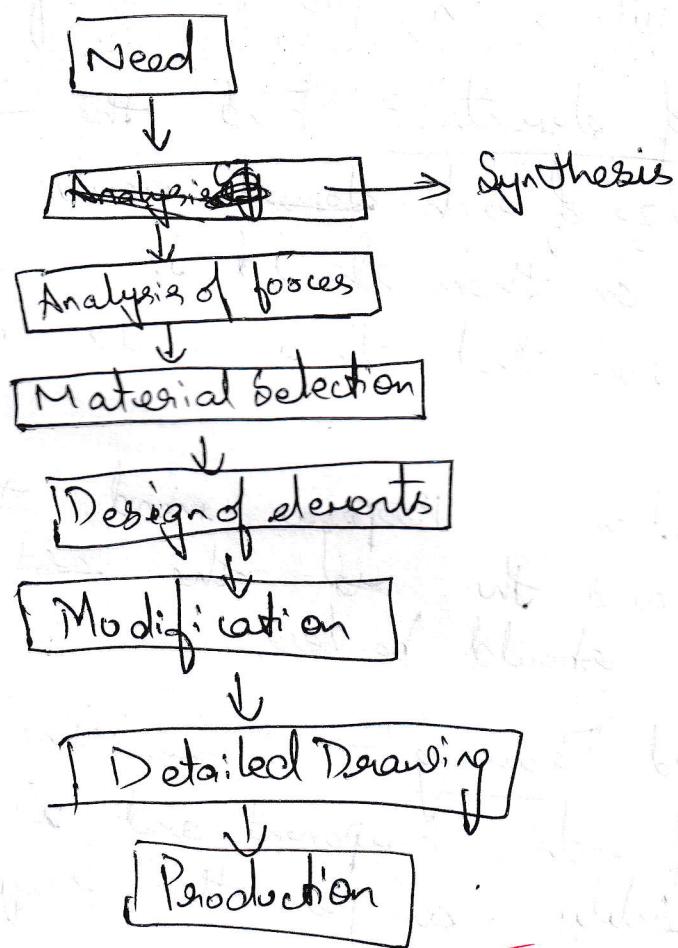
Q No.	Internal Assessment Test - I				Q No.	Internal Assessment Test - II				Q No.	Internal Assessment Test - III					
	Date : <u>18/11/21</u> Max. Marks :					Date : <u>27/12/21</u> Max. Marks :					Date : <u>27/11/22</u> , Max. Marks :					
	PART - A					PART - A					PART - A					
	A	B	C	Total		A	B	C	Total		A	B	C	Total		
1	4	4	4	12	1	7	15	-	22	1				-		
2				-	2				-	2	8	5	8	21		
PART - B					PART - B					PART - B						
3				-	3	7	18	-	25	3				-		
4	12.5	8.5	-	21	4				-	4	11.5	12.5	-	24		
I Test IA Marks Total				33	II Test IA Marks Total				47	III Test IA Marks Total				45		
Quiz 1/Assignment etc.,					Quiz 2/Assignment etc.,					Quiz 3/Assignment etc.,						
Student Signature :					Student Signature :					Student Signature :						
<u>Jayanth S</u>					<u>Jayanth S</u>					<u>Jayanth S</u>						
Signature of Invigilator					Signature of Invigilator					Signature of Invigilator						
<u>John</u>					<u>John</u>					<u>John</u>						
Signature of Faculty in charge					Signature of Faculty in charge					Signature of Faculty in charge						
<u>Chile</u>					<u>Chile</u>					<u>Chile</u>						
Avg. IA Marks for <u>30</u> (A) : <u>25</u>					Assignment /Quiz etc., for <u>10</u> (B) : <u>10</u>					Total IA Marks for <u>40</u> (A+B) : <u>35</u>						

HOD

Principal

Part-A

1) A)



OK

Need:- First of all, we need make a complete statement of the problem and statement for which the mechanism is held.

Synthesis:- Select suitable mechanisms or a group of mechanisms to conduct the design.

Analysis of forces:- Find the forces acting on each member of the machine and energy transmitted by each other.

Material Selection:- Select suitable material required as per the specifications.

Design of elements:- Find the ~~forces acting~~ size of each ~~element~~ member and the forces acting on them should be within permissible limit such that they should not deform or deflect.

Modification:- Keeping in mind the previous analysis and the ~~so~~ the ~~cost~~ overall manufacture cost should be less.

Detailed Drawing:- Draw the detailed structure of each component and arrange them into the assembly as per the required design.

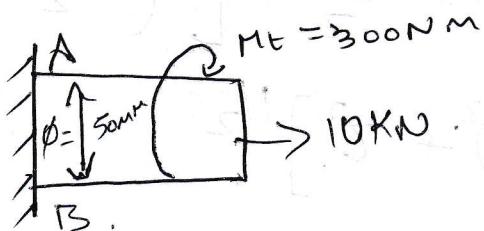
Production:- Start the production as per the with the required specifications in the industry.

Q) The factors which govern the selection of appropriate material for a machine is ,

i) Availability of the material :- The material should be easily available so as to reach the production of the desired amount .

- iii) Suitability of the material as per the required design:- the material should have the required properties needed for producing the design using mechanisms.
- iii) Cost of the material:- The cost of material should be low so that it is budget friendly to manufacture in large quantities.
 It also depends on physical chemical and mechanical properties of the material.

C



$$d = 50\text{ mm}$$

$$F_t = 10\text{ kN}$$

$$Z = 300\text{ NM}$$

OK

~~For~~ Direct stress due to axial load

$$\sigma_t = \frac{F_t}{A} = \frac{10 \times 10^3}{\frac{\pi}{4} d^2} = \frac{10 \times 10^3}{\frac{\pi}{4} (50)^2}$$

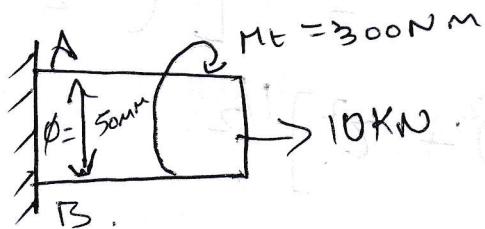
$$\sigma_t = 5.0929 \text{ N/mm}$$

ii) Suitability of the material as per the required design:- The material should have the required properties needed for producing the design using mechanisms.

iii) Cost of the material:- The cost of material should be low so that it is budget friendly.

~~to manufacture in large quantities.
It also depends on physical chemical and mechanical properties of the material.~~

C)



$$d = 50 \text{ mm}$$

$$F_T = 10 \text{ kN}$$

$$Z = 300 \text{ Nm}$$

-OK

~~For~~ Direct stress due to axial load

$$\sigma_t = \frac{F}{A} \xrightarrow{\text{concrete}} = \frac{10 \times 10^3}{\frac{\pi}{4} (d^2)} = \frac{10 \times 10^3}{\frac{\pi}{4} (50)^2}$$

$$\sigma_t = 5.0929 \text{ N/mm}^2$$

$$Z = 300 \text{ NM}$$

$$\sigma = \sigma_e + \sigma_b$$

$$= 5.0929 + 0$$

$$\boxed{\sigma = 5.0929}$$

Principal stresses at point A :-
Maximum principal normal stress :-

$$\sigma_1 = \frac{\sigma}{2} + \left[\left(\frac{\sigma_x - \sigma_y}{2} \right)^2 + \tau_{xy}^2 \right]^{1/2}$$

$$\sigma_{max} = \frac{\sigma}{2} + \left[\left(\frac{\sigma}{2} \right)^2 + Z^2 \right]^{1/2}$$

$$= \frac{5.0929}{2} + \sqrt{\left(\frac{5.0929}{2} \right)^2 + 300^2}$$

$$= 763.96 - 302.55 \cancel{+ .11}$$

Minimum principal stress :-

$$\sigma_{min} = \frac{\sigma}{2} - \left[\left(\frac{\sigma}{2} \right)^2 + Z^2 \right]^{1/2}$$

$$= \frac{5.0929}{2} - \left[\left(\frac{5.0929}{2} \right)^2 + 300^2 \right]^{1/2}$$

$$\sigma_{min} = -297.16 \cdot h, \text{ N/mm}^2$$

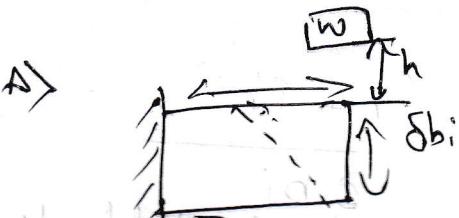
$$\sigma_{max} = \left[\left(\frac{\sigma}{2} \right)^2 + z^2 \right]^{1/2}$$

$$= \left[\left(\frac{5.0929}{2} \right)^2 + 300^2 \right]^{1/2}$$

$$= 300.00 \text{ N/mm}^2$$

The principal stress and the shear stress will be the same at point B since bending stress is 0.

4)



l = length of the beam
 δ_{bi} = Deflection due to impact load
 δ_{st} = Deflection due to static load

σ_{bi} = Stress due to bending load

σ_{st} = Stress due to static load

F_i = Impact force

Potential energy of the falling body -

$$U = \underline{w(h + \delta_{bi})}$$

Strain energy absorbed by the body

$$U = \underline{\frac{F_i \delta_{bi}}{2}}$$

The potential energy of the falling body is equal to the strain energy absorbed by the body.

$$w(h + \delta_{bi}) = \underline{\frac{F_i \delta_{bi}}{2}}$$

~~$$\therefore 2w(h + \delta_{bi}) = F_i \delta_{bi}$$~~

$$F_i = \underline{\frac{2w(h + \delta_{bi})}{\delta_{bi}}} \quad -(3)$$

We know that the static deflection on the centrifugal beam with end load 'w'

$$\delta_{st} = \underline{\frac{wL^3}{3EI}}$$

$$\delta_{bi} = \underline{\frac{F_i L^3}{3EI}}$$

∴ Substituting the value of F_i from n.

eq (3) we get:

$$\delta_{bi} = \frac{2w(h + \delta_{bi})l^3}{\delta_{bi} 3EI}$$

$$\delta_{bi} = 2\delta_{st} + (h + \delta_{bi})$$

$$\delta_{bi} - 2\delta_{st} - h\delta_{st} = 0$$

Comparing with:

$$ax^2 + bx + c = 0 \text{, we get}$$

$$a = 0$$

$$b = -2\delta_{st}$$

$$c = -h\delta_{st}$$

$$\therefore \delta_{bi} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-2\delta_{st} \pm \sqrt{-4\delta_{st}^2 - 4(0)(-h\delta_{st})}}{2(0)}$$

$$\delta_{bi} = \delta_{st} \pm \frac{\sqrt{4\delta_{st}^2 + 8h\delta_{st}}}{2}$$

$$\delta_{bi} = \delta_{st} \pm \sqrt{\delta_{st}^2 + 2^2 + 2h\delta_{st}}$$

Sustituting the
Taking the root:

$$\delta_{bi} = \delta_{st} + \sqrt{\delta_{st}^2 + 2h\delta_{st}}$$

$$\delta_{bi} = \delta_{st} \left(1 + \sqrt{1 + 2h} \right)$$

B) ~~Given~~ Given

$$b = 60 \text{ mm}$$

~~$d = 140 \text{ mm}$~~

~~$l = 1.2 \times 10^{-3} \text{ m}$~~

~~$w = 1 \times 10^3 \text{ N}$~~

~~$h = 20 \text{ mm}$~~

~~$E = 200 \text{ GPa}$~~

> Impact Factor

$$\frac{\tau_{bi}}{\tau_{bst}} = 1 + \sqrt{1 + 2h}$$

$$\delta_{bst} = \frac{wL^3}{3EI} = \frac{wL^3}{3E \times \cancel{bd^3}/12}$$

$$= \frac{1 \times 10^3 \times 1.2 \times 10^{-3}}{3 \times 200 \times 10^{-3} \times \frac{60(140)^3}{12}}$$

$$= \cancel{1.2 \times 10^{-7}} \cdot \cancel{5.4196}$$

~~2) $\delta_{max} = \delta_{st} \left(1 + \sqrt{1 + \frac{2h}{\delta_{st}}} \right)$~~

$$\delta_{max} = \delta_{st} \left(1 + \sqrt{1 + \frac{2h}{\delta_{st}}} \right)$$

$$5.4196$$

$$\delta_{st} = 16 \cancel{.0001} \cdot 5.4196$$

$$2) \delta_{max} = \delta_{st} \left(1 + \sqrt{1 + \frac{2h}{\delta_{st}}} \right)$$

$$= 16 \cancel{.0001} \cdot 5.4196 \left(1 + \sqrt{1 + \frac{2h(20)}{16 \cancel{.0001}}} \right)$$

$$= 33.6026 \cdot 11.375$$

~~6.5 X 2~~
~~8.5 -~~

$$3) \delta_{(b)st} = \left(1 + \sqrt{1 + \frac{2h}{\delta_{st}}} \right)$$

$$= 2.0012 \cdot 3.8949$$

$$4) \delta_{st} = \frac{mb}{I} \times c$$

$$= \frac{wL}{bd^3} \times \frac{d}{2} = 6.12244 \times 10^{-6}$$

$$\Rightarrow * w_i = W \times \text{Impact force}$$

$$= 1 \times 10^3 \times \cancel{1.1577 \times 10^{-4}} \quad S.H 19.6$$

$$= \cancel{1.1577 \times 10^{-4}} \cdot S.H 19.6$$

~~33.50~~



II Jai Sri Gurudev II
 Sri Adichunchanagiri Shikshana Trust®
SJB Institute of Technology
 (Affiliated to Visvesvaraya Technological University, Belagavi and
 Approved by AICTE and Accredited by NAAC with 'A' Grade, CGPA-3.22 - New Delhi)
#67, BGS Health & Education City, Dr. Vishnuvardhan Road, Kengeri, Bengaluru – 560060.
Website : www.sjbit.edu.in

INTERNAL ASSESSMENT BOOKStudent Name : Chaitra.GSemester & Section : VII th BUSN : 1JBJ19ME406Subject: TQM Subject Code: 18ME734 Branch: MechanicalName of Faculty in charge : Girija.V

Q No.	Internal Assessment Test - I				Q No.	Internal Assessment Test - II				Q No.	Internal Assessment Test - III					
	PART - A					PART - A					PART - A					
	A	B	C	Total		A	B	C	Total		A	B	C	Total		
1	12.5	4		16.5	1	12.5	5		17.5	1	12.5	12.5		25		
2					2					2						
PART - B					PART - B					PART - B						
3	12	12		24	3	12.5	5		17.5	3						
4					4					4	12.5	12.5		25		
I Test IA Marks Total				41	II Test IA Marks Total				35	III Test IA Marks Total				50		
Quiz 1/Assignment etc.,				6	Quiz 2/Assignment etc.,				6	Quiz 3/Assignment etc.,				10		
Student Signature :				chaitra.G	Student Signature :				chaitra.G	Student Signature :				chaitra.G		
Signature of Invigilator				<u>Adm 02</u>	Signature of Invigilator				<u>AB</u>	Signature of Invigilator				<u>AB</u>		
Signature of Faculty in charge				<u>8</u>	Signature of Faculty in charge				<u>8</u>	Signature of Faculty in charge				<u>8</u>		

Avg. IA Marks for 30 (A) : 25Assignment /Quiz etc., for 10 (B) : 10Total IA Marks for 40 (A+B) : 35HOD

Principal

Internal Test - II

I

- ① d) Managers ✕
- ② ~~b) Hidden~~ a) Potential customers ✓
- ③ a) True ✓
- ④ b) Opinions of friends ✕
- ⑤ d) Threatening customers to tell their needs ✓
- ⑥ a) Juran's Quality Control Handbook ✕
- ⑦ a) Internal Customer ✕
- ⑧ d) Deming ✓
- ⑨ a) Continuous improvement ✓
- ⑩ d) Threatening the workforce to follow the quality policy ✓

6

PART-A

- (i) A) The role of customer perception towards quality is following below
- Responsibility ✓
 - The facilitors ✓
 - The Recorder ✓
 - Time keepers ✓
 - Team members ✓

Responsibility :- The Responsibility is consist of the

- To guiding the team members.
- Specific the goals.
- Specific the objectives.
- Consulting the meeting.
- clarify the questions.
- assessment of the creative task.

The facilitors ✓

- The facilitors is the not for the team member.
- It is consist of the
 - starting meeting.

→ clarify the assumption.

→ Guiding the members.

→ To give the feedback for the effectiveness of the team.

→ Encarging

Recorders :-

The recorders is one of the team member.

There are consist of the

→ To keeping the recording

→ Document is important for the customer perception.

→ Producing the Sumering.

→ To collecting the information above the planning aggregation and Sumerization.

Time keepers :-

The time keeper is more important role for the perception of the quality.

→ The Time keeper is ~~tell~~ told the time in group members.

→ Time keeper are guide for the time sense.

→ Time keeper is give to the information about the producing product on time delivery.

v) Team Member

The team members are another one of the main role of customer perception towards quality.

- Identify the goals & objective.
- Concentration
- Not dissapointed to the meeting
- Leasening for the meeting in the group.

12.5
B)

The tools for the Industry to implement the voice of customer is following are.

- Understanding the customer expectation.
- Producing Quality product
- On-Time Delivery
- Good Communication
- Responsibility.
- ~~Leasening~~ Leasening for the customer requirements.
- Identify the problems.
- Give the Rewards.
- Take the Suggestion System
- Agendas
- To take feedback

Customer expectation :-

The industry to identify the customer expectation before the customer requirements.

Quality product :-

The Industry to producing the good Quality product and on time delivery the customer is not ^{give the} Compliants.

Good communication

The Supervises and customer relation is good there are good Communicate. It is the calling for the industry.

Responsibility :-

The Industries take the all the responsibility. The following are the main responsibility for the all industries.

- Guiding team members.
- Identify the goals
- Improvement of the plan
- Safety

Rewards :-

The Industry give the rewards for the customer

The following are the Reward of the customer

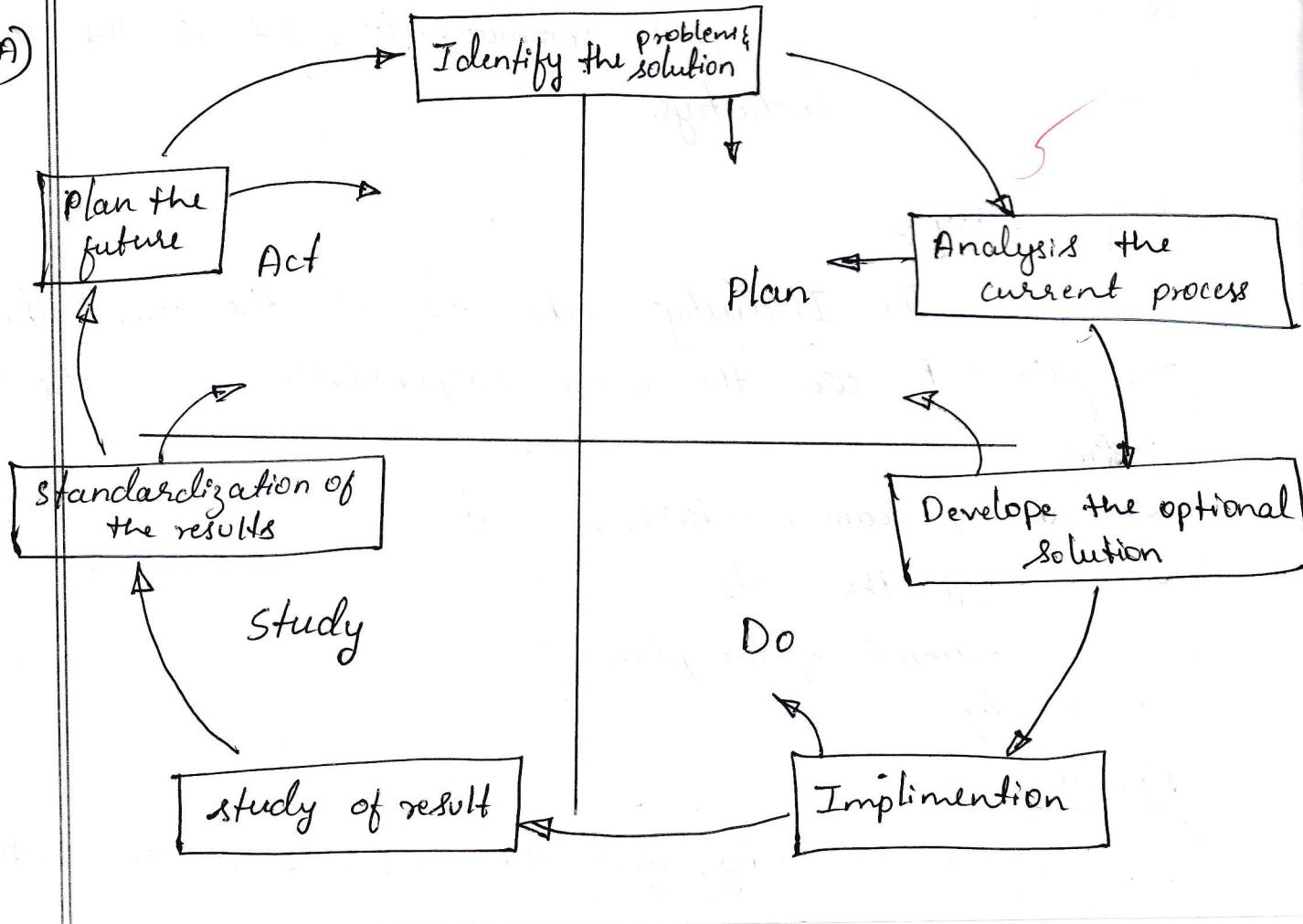
- Implementation
- Affiliation
- Offering the meeting.

Suggestion System

- 5'
- Improve the quality.
 - To give the chance for customer to solving the problems.
 - Rewards Ideas
 - To take the feedback from customer side.

PART - B

③ A)



The fulform of the PDSA is the Following are

P → Plan

D → Do

S → study

A → Act

The PDSA is the processes of the problem solving processes. It is also called as walter shewhart process planning. The PDSA processes consist of the 7 basic phases. The Seven basic phases is following below.

- 1) Identify the solution
- 2) Analysis the current process
- 3) Develop the optional solution
- 4) Implementation
- 5) Study of results
- 6) Standardization of the results
- 7) Plan the future

The PDSA is very important problem solving processes. It is consist of the 4 main function.

There are plan, do, study, Act.

The PDSA is easy for construction and procedure.

The PDCA cycle is Continuous process improvement. This cycle is started with the identification of the solution for particular problem. Next analysis for the that particular procedure processes. This two phases are working planning process. Next step is developing the current solution and implementation for the solution. Then working in do process. Study of results and standardization for the results is working in study processes. Last one is evaluating solution and planning for the future problem solutions. This is the PDCA cycle of problem solving processes.

(B)

The cause and effect diagram in an industry is following below.

- To study for ^{Customer} Compliant.
- To take responsibility.
- Improving the quality product.
- To identify the customer requirement.
- To ^{study for} full detail of the Compliant.
- Give the feedback system.
- planning the problem solution processes.
- To clarify about the customers Compliant.

- The supervisor is given the rewards.
- Fulfill the customer requirement before the give the Complient.
- To creating for the teams.
- The histogram , Scatter diagram etc there are decrease
-ss the customer Complients.

35
50
8
30 12 21