School of Aeronautics (Neemrana)

Question Paper For Internal Assessment Examination (Theory) - Old Scheme i.e 2012 Syllabus

Instructions For Students / Faculty

Mid Term I (Total 40 Marks, 1 Hr. & 30 Min, Syllabus From Beginning of The Session)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from each part i.e. Part A and B. There is a choice of two questions out of four in each part. Part A will be theoretical or derivation type **(Not More Than 70 Words For Question).** Part B will be fully numerically oriented questions **(Not More Than 70 Words For Question)**, except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

Mid Term II (Total 50 Marks, 1 Hr. & 45 Min, Syllabus From Beginning of The Session)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and three questions from Part B. There is a choice of two questions out of four in part A and 3 questions out of 4 in Part B. Part A will be theoretical or derivation type **(Not More Than 70 Words For Question).** Part B will be fully numerically oriented questions **(Not More Than 70 Words For Question)**, except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

Mid Term III (Total 60 Marks, 2 Hrs, Syllabus From Beginning of The Session)

Total number of questions to be given are 10, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and 4 questions from Part B. There is a choice of two questions out of four in part A and 4 questions out of 6 in Part B. Part A will be theoretical or derivation type **(Not More Than 70 Words For Question).** Part B will be fully numerically oriented questions **(Not More Than 70 Words For Question)**, except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

*** LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: Aircraft Materials, Aircraft System, Aircraft Rules & Regulation-I, Mechanics of Composite Materials, Aircraft Design, Aircraft Rules & Regulation-II, Avionics-I, Helicopter Theory, Maintenance of Airframe and System Design, Avionics-II, Airlines and Airport Management, Maintenance of Power Plant & Systems

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'B' OF QUESTION PAPER

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION

Question Paper & Student Details

Mid Term*	Mid Term 1	**Date of Submission of QP**	04/09/2019
Name of Faculty*	RAHUL BAIRWAN	**Date of Examination***	10/09/2019
Subject*	7MH5 - Fuel Cell Hybrid Electric Eng. (Old)	**Course***	B.Tech (Mechatronics Engine...
Batch	Second (2)	**Semest...**	Semester : 7
Email Id of Faculty:*	rahulbairwan94@gmail.com	**Phone Number of Faculty***	945 634 1170

Student Name		**Student Reg No.**	

Part A

Question : 1*	Describe the differences between mechanization and automation. Give several specific examples for each.				
Lesson Plan*	1,2	**Topic***	Basic Principle of Mecha	**Source***	Manufacturing En
Question : 2*	Explain the term adaptive control.				
Lesson Plan*	3	**Topic***	Adaptive Control	**Source***	Manufacturing En

Question : 3*

Explain the evolution of automation.

Lesson Plan* 3 **Topic*** Automation **Source*** Manufacturing En

Question : 4*

Briefly explain Computer Aided Manufacturing.

Lesson Plan* 5 **Topic*** Computer Aided Manufa **Source*** Manufacturing En

Part B

Question : 1*

Explain the difference between hard and soft automation. Why are they so called?

Lesson Plan* 2 **Topic*** Automation **Source*** Manufacturing En

Question : 2*

Draw and explain the conventional manufacturing product cycle.

Lesson Plan* 4 **Topic*** Product Cycle **Source*** https://youtu.be/e

Question : 3*	Explain Hydraulic and Pneumatic actuating systems.				
Lesson Plan*	5	**Topic***	Actuating Systems	**Source***	http://www.thegre
Question : 4*	List the advantages and disadvantages of CAM.				
Lesson Plan*	5	**Topic***	Computer Aided Manufa	**Source***	https://getrevising
Question : 5					
Lesson Plan		**Topic**		**Source**	
Question : 6					
Lesson Plan		**Topic**		**Source**	

Upload Scanned Document In Case of Numerical or Diagram for any of the above question

Mention question number with relevant fig / numerical / equations. Max 150 KB

Choose files or drag here

I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.

Answer Sheet Details	
Mid Term	Mid Term 1
Name of Faculty	RAHUL BAIRWAN
Subject	7MH5 - Fuel Cell Hybrid Electric Eng. (Old)
Date of Submission of QP	16/09/2019
Batch	Second (2)
Email Id of Faculty:	rahulbairwan94@gmail.com
Date of Examination	10/09/2019
Course	B.Tech (Mechatronics Engineering)
Semester	Semester : 7
Phone Number of Faculty	945-634-1170

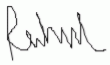
Part A	
Question : 1	Mechanization refers to the replacement of human power with mechanical power of some form. The use of hand power tools is not an example of mechanization. Automation and mechanization are often confused with each other; Mechanization saves the use of human muscles whereas automation saves the use of human judgement. Mechanization displaces physical labor, whereas Automation displaces mental labor as well. Mechanization affects one or two industries at a time. Automation is the replacement of human thinking with computers and machines. Automation create jobs for skilled workers at the cost of unskilled and semi skilled workers. It affects many industries at the same time. Mechanization is normally defined as the replacement of a human task with a machine. Automatic transplanters are an example of mechanization. But, true automation encompasses more than mechanization. Automation involves the entire process, including bringing material to and from the mechanized equipment. It normally involves integrating several operations and ensuring that the different pieces of equipment talk to one another to ensure smooth operation. Many times, true automation requires reevaluating and changing current processes rather than simply mechanizing them.

Question : 2	An adaptive control system is a control system containing a controller which can use the information it gathers online to change itself and improve its performance; in a sense it "adapts" to the feedback loop it is inside, and develops into a better controller over time. This is unlike the usual (non-adaptive) controller, the parameters of which are constant and which thus relies on the control design conducted prior to closed-loop operation. Adaptive control detects the changes in the characteristics of the process and adjusts the controller parameters automatically to compensate for the changing conditions of the process and in turn to optimize the loop response. An adaptive control system consists of a normal feedback loop and a parameter adjustment loop. The normal loop includes the controller and the process. The parameter adjustment loop consists of the parameter adjustment mechanism and a controller with adjustable parameters. The parameter adjustment loop is usually slower than the normal loop. The different types of adaptive control differ only by the mechanism it used for parameter adjustment. The adaptive control differs from all other control schemes. The adaptive control adjust the controller parameters whereas in other strategies a process variable is adjusted.
Question : 3	History of automation Manual control Pneumatic control Hard wired logic control Electronic control using logic gates (PLC) Programmable logic controller Manual Control process control actions are taken by the operators Drawbacks Likely human errors, it effects quality of final product Pneumatic Control Actions were controlled by a simple manipulation of pneumatic valves, which were controlled by relays and switches. Drawbacks Bulky and Complex System, Involves lot of rework to implement control logic, Longer project time Hard wired logic control The contactor and Relays together with hardware timers and counters were used in achieving the desired level of automation Drawbacks Bulky panels Complex wiring Difficult maintenance and troubleshooting Electronic Control using Logic Gates In 1960s with the advent of electronics, the logic gates started replacing the relays and auxiliary contactors in the control circuits. Drawbacks •Reduced space requirements •Less maintenance & greater reliability •Changes in control logic not possible •More project time Programmable Logic Controllers Use of microprocessors, sensors or say software. It can be effectively used in applications ranging from simple control like replacing small number of relays to complex automation problems Advantages of PLCs Reduced space, Energy saving, Ease of maintenance, Economical, reliability, flexibility, Shorter project time, Easier storage

Question : 4	Computer Aided Manufacturing (CAM) is the use of software and computer-controlled machinery to automate a manufacturing process. Three components for a CAM system to function: Software that tells a machine how to make a product by generating toolpaths. Machinery that can turn raw material into a finished product. Post Processing that converts toolpaths into a language machines can understand. (CAM) is an application technology that uses computer software and machinery to facilitate and automate manufacturing processes. In addition to materials requirements, modern CAM systems include real-time controls and robotics. CAM reduces waste and energy for enhanced manufacturing and production efficiency via increased production speeds, raw material consistency and more precise tooling accuracy. CAM uses computer-driven manufacturing processes for additional automation of management, material tracking, planning and transportation. CAM also implements advanced productivity tools like simulation and optimization to leverage professional skills. Depending on enterprise solution and manufacturer, CAM may present inadequacies in the following areas: Manufacturing process and usage complexity Product Lifecycle Management (PLM) and modern enterprise integration Machine process automation CAM is often linked with CAD for more enhanced and streamlined manufacturing, efficient design and superior machinery automation.
Part B	
Question : 1	Automation of production systems: 1. Fixed automation (Hard Automation) 2. Programmable automation (Soft Automation) 1. Fixed automation (Hard automation): Fixed automation refers to the use of special purpose equipment to automate a fixed sequence of processing or assembly operations. Each of the operation in the sequence is usually simple, involving perhaps a plain linear or rotational motion or an uncomplicated combination of two. It is relatively difficult to accomodate changes in the product design. This is called hard automation. Advantages: 1. Low unit cost 2. Automated material handling 3. High production rate. Disadvantages: 1. High initial Investment 2. Relatively inflexible in accommodating product changes. 2. Programmable automation: In programmable automation, the production equipment is designed with the capability to change the sequence of operations to accomodate different product configurations. The operation sequence is controlled by a program, which is a set of instructions coded. So that they can be read and interpreted by the system. New programs can be prepared and entered into the equipment to produce new products. Advantages: 1. Flexible to deal with design variations. 2. Suitable for batch production. Disadvantages: 1. High investment in general purpose equipment 2. Lower production rate than fixed automation.
Question : 2	refer to fig 1 in attachment

Question : 3	Actuation systems are the elements of control systems which are responsible for transforming the output of a microcontrollers or microprocessor or control system into a controlling action on machine or device Pneumatic & hydraulic actuation systems • Pneumatic deals with air pressure • Hydraulic deals with fluid motion and Pressure refer fig 2 Typical Hydraulic Power System • The pressure relief valve is to release the pressure if it rises above a safe level, • The accumulator is to smooth out any short term fluctuations in the output oil pressure •The pump pumps oil from a sump through a non return valve and an accumulator to the system, from which it return to the sump. With a hydraulic system, pressurized oil (fluid) is provided by a pump driven by an electrical motor. refer figure 3 Hydraulic/Pneumatic linear actuators, Cylinders • Both hydraulic and pneumatic actuators have the same principles, differences being in size • The cylinder consists of a cylindrical tube along which a piston/ram can slide • They are of two types: • Single acting and double acting refer fig 4 and 5 Cylinders: Single acting • Single acting: the control pressure is applied to one side of the piston Cylinders: Double acting • Are used when control pressure are applied to both side of the piston. A different in pressure between the two sides results in motion of the piston (No spring).
Question : 4	CAM Advantages 1. Very efficient, produce items quicker. 2. less chance for product to malfunction (less chance for error) 3. Can create more complicated products- unique shapes--> all uniform and clean 4. more cost efficient over time 5. Labour costs are lover Disadvantages 1. Initial cost of purchasing CAM is high 2. Expensive and lengthy training on how to use CAM machinery 3May lead to rise in unemployment (less workers needed)
Question : 5	
Question : 6	
Upload Scanned Document In Case of Numerical or Diagram for any of the above question	http://www.123formbuilder.com/upload_dld.php?fileid=99a14db2c55fd8aabb9bacab640f06a2

I have scrutinized the answer sheet. There is no spelling mistake or any type of irrelevant answers.



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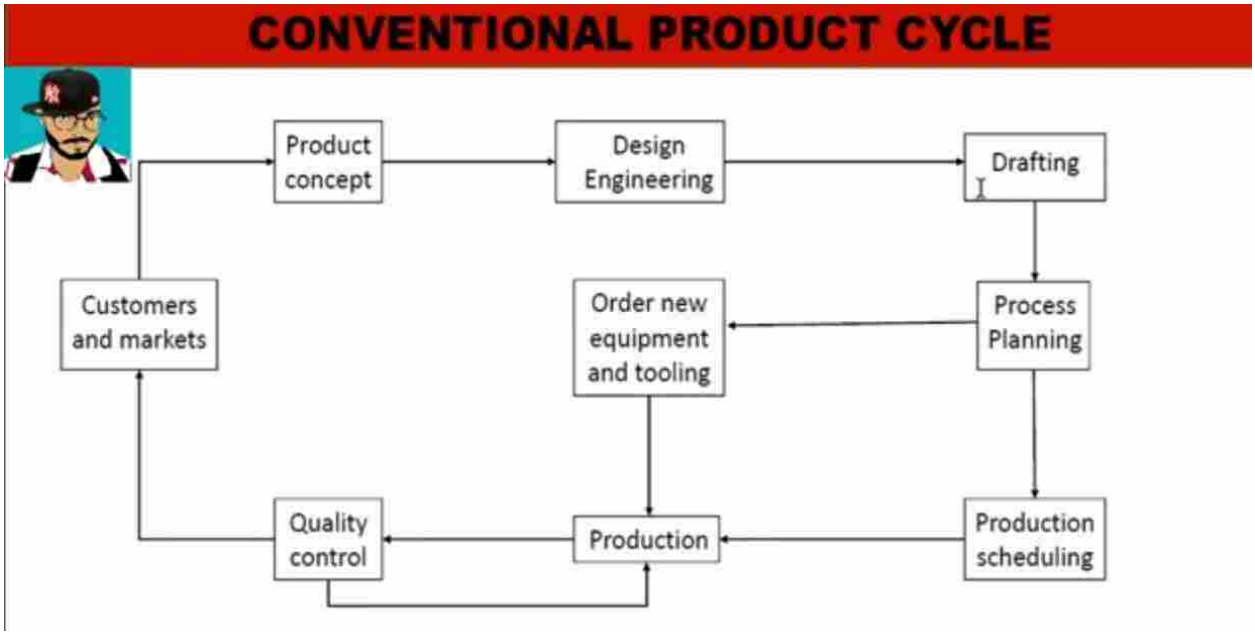

fig 1 Product Cycle

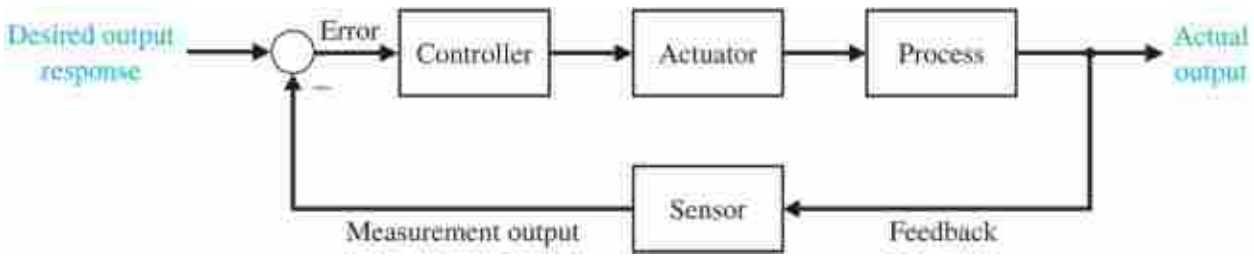

fig 2 Pneumatic & hydraulic actuation systems

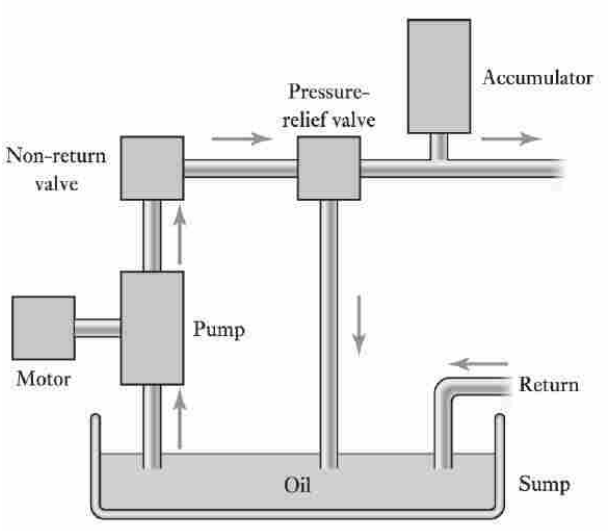

fig 3 **Typical Hydraulic Power System**

Typical Hydraulic Power System

- The Accumulator Work
- Accumulator is a container in which the oil is held under pressure against an external force, which involves gas within a bladder in the chamber containing the hydraulic fluid
- If the oil pressure rises then the bladder contracts increase the volume the oil can occupy and so reduces the pressure.
- If the oil pressure falls the bladder expands to reduce the volume occupied by the oil and so increases its pressure.

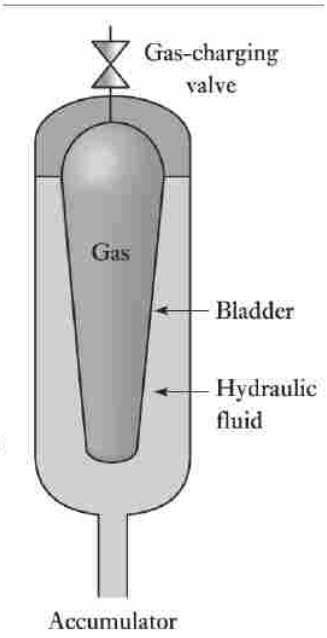

Fig 4

Typical Pneumatic Power System

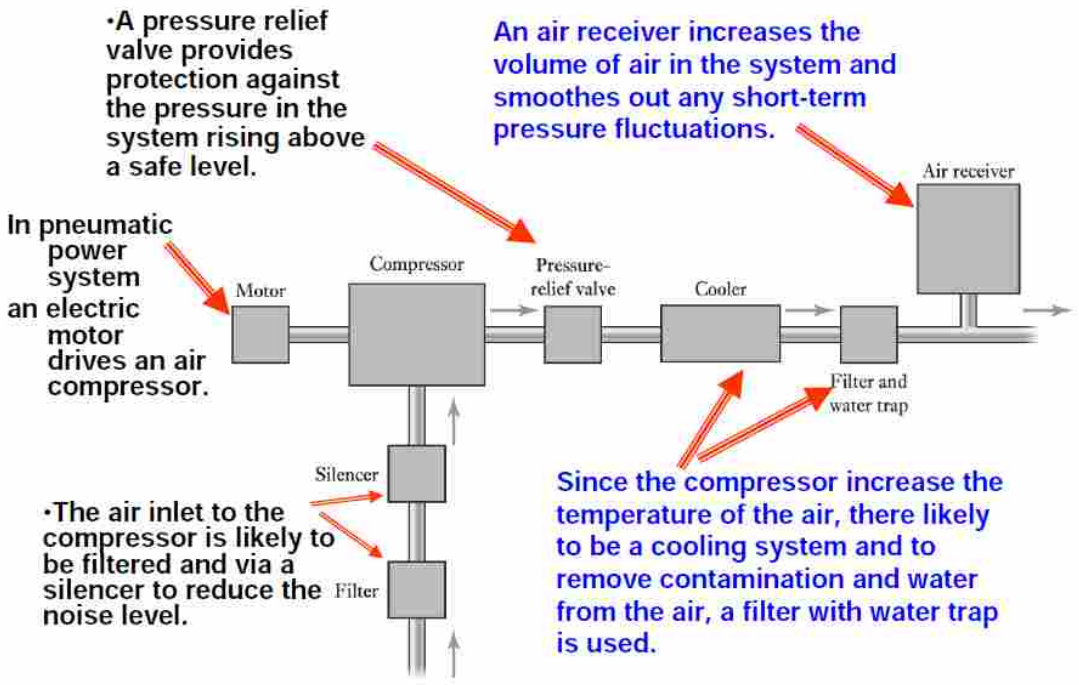

Fig 5