Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Engineering Materials **Semester: VI**
Program: B.Tech APE-UP **Attempted Time : 24hrs.**
Course Code: CIVIL3001 **Max. Marks: 100**

Instructions:

(i) There are total of six questions in this question paper. One in Section A and five in Section B
(ii) Section A will be conducted online on BB Collaborate platform
(iii) Section B consist of long answer based questions and has the total weightage of 75%. The questions for section B shall also appear in BB Collaborate
(iv) The maximum time allocated to Section A is one Hrs.
(v) Section B to be submitted within 24 hrs from the scheduled time.
(vi) The section B should be attempted in blank white sheets (hand written) with all the details like programme, semester, course name, course code, name of the student, Sapid at the top (as in the format) and signature at the bottom (right hand side bottom corner

Section A

1. MCQ **25 Marks**

Q1. Automation is the technology by which a process or procedure is accomplished
(a) Machine
(b) Without Human assistance
(c) With Human assistance
(d) Not required

Q2. The basic elements of an automated system is a control system . The function of the control system is to actuate the

(a) sequence

(b) program

(c)instruction

(d) logic

Q3 Modern controllers used in automated system are based on

(a) actuator

(b) sensor

(c) analog computer

(d) digital computer

Q4. The failure diagnostics mode is invoked when a

(a) a sensor failure occurs

(b) malfunction occurs

(c)actuator failures occurs

(d)operation failure occurs I

Q5. The loss of power is a possible malfunctions coming under the error categories

(a) Machine and Process

(b) cutting tools

(c) part storage unit

(d) work holding fixture

Q6. The non powered types are often referred to as hand trucks because they are pushed or pulled by the human workers. Quantities of materials moved and distances are relatively

(a) simple

(b)complicated

(c)big

(d)low

Q7. "Walkie trucks , are battery powered vehicles equipped with wheeled forks for the insertion into pallet opening but with no provision for a worker "

(a) to pull one or more trailing carts over

(b) with high reach capacities

(c) to ride on the vehicles

(d) the worker to sit in and drive

Q8."An automated guided vehicle system (AGVS) is a material handling system that uses independently operated, self-propelled vehicles guided along pathways."

(a)undefined

(b)defined

(c)limited

(d)unknown

Q9.The conveyors have rolls or wheels on which the loads ride is called

(a)roller conveyor

(b)skate conveyor

(c)Belt Conveyors.

(d)Chain conveyors

Q10. "A gantry crane is distinguished from a bridge crane by the presence of one or two vertical leg, that support the"

(a) vertical bridge

(b)platform

(c) horizontal bridge

(d)Rail

Q11. The desirable features of the manufacturing system is

(a)flexibility

(b) static

(c)precise

(d)accuracy

Q12. In modern manufacturing engineering practice. even single model manufacturing systems arc being built with features that enable them to be changed over to new product styles when this becomes necessary. These kinds of features include

(a)Ease of mobility.

(b)Modular design of system components.

(c)All

(d) CNC workstations.

Q13. The classification of manufacturing scheme is defined by the parameter

(a) Cutting

(b)turning

(c)milling

(d) type of processing

Q14. The reasons for the popularity of the single model workstation include:

(a)unease

(b) adaptable

(c)complex

(d)cheaper

Q15. The powerful effect of the learning curve at different station signifies the

(a)explicit function

(b)progress function

(c)implicit function

(d)None

Q16. The philosophy in which similar parts are identified and grouped together to take advantage of their similarities in design and production.

(a)Batch Manufacturing

(b)Group Technology

(c)cellular manufacturing

(d)machine cells

Q17 .Group technology offers substantial benefits to companies that have the perseverance to implement .The benefits include:

(a) standardization of tooling

(b)Material handling is reduced

(c) Setup times are reduced

(d)All

Q18. The attributes which are concerned with part characteristics such as geometry, size, and material"

(a)design attributes

(b)manufacturing attributes

(c)machine cell design

(d)None

Q19. A designer faced with the task of developing a new part can use a design retrieval system to determine if a similar part already exists. Design retrieval is a part of

(a)color scheme

(b)coding scheme

(c)manufacturing scheme

(d)None

Q20."Hierarchical structure, also known as a "

(a)chain type

(b)mixed-mode structure

(c)mono code

(d)poly code

Q21 The method for identifying part families and associated machine groupings that uses the information contained on production route sheets rather than on part drawings.

(a) group cell flow analysis

(b)assembly flow analysis

(c)line flow analysis

(d)Production flow analysis

Q22. "The application of group technology in which dissimilar machines or processes have been aggregated into cells, each of which is dedicated to the production of a pair or product family or a limited group of families. "

(a) Cellular manufacturing

(b)flexible manufacturing

(c)fixed manufacturing

(d)None

Q23. "The move, in which the part moves from the current machine in the backward direction to another machine is called."

(a)in-sequence move

(b)backtracking move

(c) " by-passing move, "

(d)repeat operation

Q24. The bottleneck model assumes that the bottleneck station is utilized 100% and that there are delays in the system due to queues.

(a)small

(b)high

(c) no

(d)low

Q25. The expected number of times a given operation in the process routing is performed for each work unit is called

(a) time

(b) frequency

(c)cycle

(d)operation frequency

Section B

Attempt all the questions.

Q1.(a) Discuss the level of automation. 7 Marks

(b).Explain the function of the basic elements of an automated system. 8 Marks

Q2.A planned fleet of forklift trucks has an average travel distance per delivery = 500ft loaded and an average empty travel distance = 300 ft. The fleet must make a total of 60 del/hr Load and unload times are each 0.5min and the speed of the vehicles = 300ft/min, The traffic factor for the system = 0.85.Availability is expected to be 0.95 and worker efficiency is, assumed to be 0.90. Determine: (a) ideal cycle time per delivery. (b) the resulting average number of deliveries per hour that a forklift truck can make. and (c) how many trucks are required to accomplish the 60 del/hr. 15 Marks

OR

Discuss different types of automated guided vehicle and its applications.

Q3. The learning curve phenomenon is one of the important reasons why an assembly line with ***n*** stations is capable of out producing ***n*** single workstations, where each single station does the entire work content of the job. Consider these of a product whose theoretical work content time for the first unit is 20min. The effect of an 84% learning rate is to be compared for two cases: 10 single station manual cells, each doing the entire assembly task and one perfectly balanced 10-station manually assembly line, where each station does 2.0 min of the total work content. For the 1000^{th} unit produced, determine the rate of production of:(a) the 10 single workstations and (b) the 10-station assembly line.

15 Marks

OR

Describe the component of a manufacturing system.

Q4. Apply the rank order clustering technique to the part-machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters, and machines are identified numerically.

	Parts								
Machines	A	B	C	D	E	F	G	H	I
1			1	1	1				
2	1	1					1	1	1
3						1	1	1	
4	1	1		1					
5			1		1				
6		1						1	1
7	1		1	1					
8		1				1		1	1

15 Marks

OR

Explain the machine cell design.

Q5. The following table lists the weekly quantities and routings of ten parts that are being considered for cellular manufacturing in a machine shop. Parts are identified by letters, and machines are identified numerically. For the data given, (a) develop the part-machine incidence matrix .and (b) apply the rank order clustering technique 10the part-machine incidence matrix to identify logical part families and machine groups. 15 Marks

Part	*Weekly Quantity*	*Machine Routing*
A	50	3 → 2 → 7
B	20	6 → 1
C	75	6 → 5
D	10	6 → 5 → 1
E	12	3 → 2 → 7 → 4

Part	*Weekly Quantity*	*Machine Routing*
F	60	5 → 1
G	5	3 → 2 → 4
H	100	3 → 2 → 4 → 7
I	40	2 → 4 → 7
J	15	5 → 6 → 1

OR

Discuss the applications consideration in group technology.