Uva Wellassa University, Sri Lanka
1st Semester Examination –March/April 2013
SCT 465-3 Manufacturing Technology & Repeat

Uva Wellassa University

Total **04** Questions
Time: Three (03) Hours
Answer **all** questions
Total mark allocation 400.

1.

a)

i. What is a **Gantt Chart**? Explain with an example.

(06 marks)

ii. What is the difference between a schedule and a sequence?

(06 marks)

iii. Give **four (4)** performance measures that can be used to evaluate a job schedule.

(08 marks)

b) Solve the following $10/1//n_T$ problem using the Moore's Algorithm.

Job	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Due Date	15	7	10	6	9	21	20	30	12	18
Processing Time	7	8	4	3	4	8	12	12	8	6

(20 marks)

c) Schedule the following $12/2/F/F_{max}$ problem using the Johnson's Algorithm.

Job	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Processing Time on M1	6	2	4	2	6	3	5	4	8	3	1	5
Processing Time on M2	3	4	6	2	4	7	6	8	5	3	2	1

(30 marks)

d) Solve the following $9/2/G/F_{max}$ problem using Johnson's Algorithm.

Job	Processing Time on Machine			
	First Machine		Second Machine	
1	M_1	6	M_2	2
2	M_1	5	M_2	4
3	M_1	9	M_2	6
4	M_1	4	M_2	7
5	M_2	8	M_1	5
6	M_2	7	M_1	3
7	M_1	9	-	
8	M_1	1	-	
9	M_2	5	-	

(30 marks)

2.

a) What are the main components of a Flexible Manufacturing System (FMS)?

(10 marks)

b) What are the functions of a computer controlled system in FMS?

(10 marks)

c) What are the different types of layouts we find in FMS?

(10 marks)

d) What are the methods that can be used to group jobs into Group Technology families?

(10 marks)

e) Seven machines constitute a GT cell. Determine the most logical sequence of machines for these data according to **to/from** ratios and construct a flow diagram. Where do parts enter into the system and leave the system. In what quantity?

The 'From-To' data for the machines is as follows.

To → / ↓From	1	2	3	4	5	6	7
1	0	5	0	10	45	50	0
2	10	0	0	0	30	5	0
3	0	20	0	0	0	0	30
4	0	0	50	20	0	0	0
5	20	30	0	0	0	0	0
6	0	0	25	10	0	0	5
7	50	0	0	0	0	10	20

(30 marks)

f)

i. What are the main components of a Kanban scheduling system?

(10 marks)

ii. Draw a model of a single-stage single-product Kanban system without backorders.

(10 marks)

iii. What are the steps in implementing a Kanban system for your production facility?

(10 marks)

3.

a) Name **four (4)** different types of casting processes. Give **two (2)** applications for each type.

(20 marks)

b) What is the most suitable manufacturing process that can be used to produce a water bottle? What is the material you would use for this process? What are the other applications of this material?

(20 marks)

c) What are the **two (2)** types of forging operations? What are the possible materials that can be used for this process?

(20 marks)

d) Name **five (5)** machining processes. Give the machine that you employ for each process and explain the shapes you can obtain from these processes.

(20 marks)

e) What are the advantages of having non-traditional methods of manufacturing? Give **five (5)** applications where they can be employed.

(20 marks)

4. Figure Q4 shows an engine governor used in steam engines. The governor controls the engine speed. As it rotates, weights swing outwards, pulling down a spindle that reduces fuel supply at high speed.

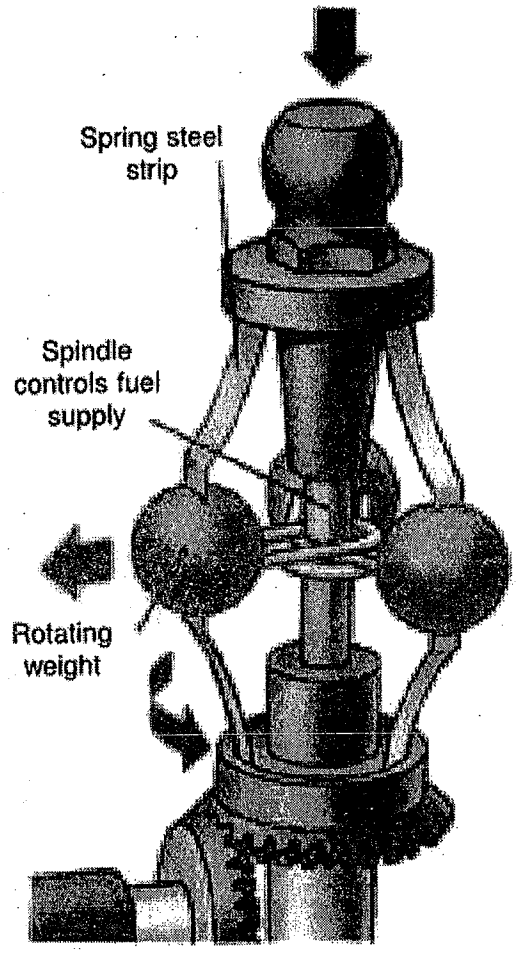

Figure Q4

a) Sketch any **five (5)** selected parts of the governor.

(20 marks)

b) Assign most suitable materials to fabricate the five parts in (a).

(40 marks)

c) Select the most suitable manufacturing process to fabricate the five parts in (a) and give reasons for your selection.

(40 marks)