


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2022			
Course: Manufacturing Technology Program: B.Tech Mechanical Course Code: MEPD 3012		Semester : VI Time : 03 hrs. Max. Marks: 100	
Instructions:			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Explain the effect of clay and water on the green and dry strength of the mold.	4	CO1
Q-2	Enlist the design considerations for good clamping system design.	4	CO1
Q-3	Differentiate between accuracy and precision. Also show a model tolerance diagram for basic hole and basic shaft system.	2+2	CO2
Q-4	Enlist advantages and disadvantages of interchangeable assembly	4	CO3
Q-5	Show the mathematical formulation of transportation problem	4	CO4
SECTION B (4Qx10M= 40 Marks)			
Q-6	a) Describe 3-2-1 principle of jigs and fixture design. b) Explain the toughening mechanism of cutting tool made of zirconia-toughened alumina and silver toughened alumina.	10	CO1
Q-7	a) Four end bars of basic length 100 mm are to be calibrated using a standard bar of 400 mm whose actual length is 399.9992 mm. It was also found that lengths of bars B,C & D in comparison with A are +0.0002 mm, +0.0004 mm and -0.0001 mm respectively and the length of all the four bars put together in comparison with the standard bar is +0.0003 mm longer. Determine the actual lengths of each end bars. b) A shaft is manufactured within the specified limits of 30.02 and 29.98 mm. Find the high and low limits of the bush to give a maximum clearance of 0.10 mm and minimum clearance of 0.02 mm. show the fit on the tolerance diagram with proper nomenclature.	10	CO2
Q-8	Compare make to suit, interchangeable and selective assembly.	10	CO3
Q-9	A paint company produces both exterior and interior paint. Basic raw	10	CO4

material A and B are used to manufacture the paint. The maximum availability of A is 6 tonne/day and that of B is 8 tonne/day. The requirement of raw material per tonne of interior and exterior paint is given below

Raw material	Exterior paint	Interior paint
A	1	2
B	2	1

The survey shows that the maximum demand for interior paint is limited to 2 tonne/ day. Selling price per tonne is Rs. 3000 for exterior and Rs. 2000 for interior paint. How much interior and exterior paint the company should produce to maximize its revenue. Formulate the problem and solve it by graphical method.

OR

A company has five tasks that has to be assigned to the five persons. Time taken by them is given in the table. Find the optimum assignment to minimize the time. Also find the value of minimum time.

Task	I	II	III	IV	V
Person					
A	6	7	5	9	4
B	7	5	10	9	6
C	5	4	3	6	5
D	8	3	5	6	4
E	4	7	5	6	6

SECTION-C
(2Qx20M=40 Marks)

Q-10	<p>a) Describe working principle, construction feature and applications of micrometer and dial indicator</p> <p>b) Describe the procedure of process planning. Critically analyse and prepare a process plan for making metallic gears in small-scale industries.</p>	10+10	CO2,CO 3
Q-11	<p>A factory manufactures two products A and B on three machines X, Y, and Z. Product A requires 10 hours of machine X and 5 hours of machine Y a one hour of machine Z. The requirement of product B is 6 hours, 10 hours and 2 hours of machine X, Y and Z respectively. The profit contribution of products A and B are Rs. 23/- per unit and Rs. 32 /- per unit respectively. In the coming planning period the available capacity of machines X, Y and Z are 2500 hours, 2000 hours and 500 hours respectively. Formulate the problem for finding the optimum quantity of production, which can maximize the profit. Solve the same problem using simplex method.</p> <p>OR</p>	20	CO4

Obtain the optimum solution of below mentioned transportation problem to minimize the total transportation cost. Find the initial solution by Vogel's approximation method.

		Destination				Supply available
		D1	D2	D3	D4	
Origin	S1	42	48	38	37	16
	S2	40	49	52	51	15
	S3	39	38	40	43	19
Demand		8	9	11	16	