



يسمح باستخدام الطاباق المحمول ويسلم مع كراسة الاجابة اسطوانة مدمجة

Answer the following questions

Question One

(70Marks)

1- Analyze the data shown in Table 1.

(b1-1)(b1-2)(20+10Marks)

Table 1

Exp. No.	Input Parameters				Response RS,MPa
	Tool overhang, Coded value	Speed, coded value	Feed, Coded value	Depth of cut, Coded value	
1	1	1	1	1	130
2	1	2	2	2	170
3	1	3	3	3	160
4	1	4	4	4	140
5	1	5	5	5	110
6	2	1	2	3	150
7	2	2	3	4	170
8	2	3	4	5	150
9	2	4	5	1	50
10	2	5	1	2	135
11	3	1	3	5	150
12	3	2	4	1	100
13	3	3	5	2	110
14	3	4	1	3	125
15	3	5	2	4	120
16	4	1	4	2	130
17	4	2	5	3	160
18	4	3	1	4	140
19	4	4	2	5	165
20	4	5	3	1	90
21	5	1	5	4	200
22	5	2	1	5	170
23	5	3	2	1	140
24	5	4	3	2	145
25	5	5	4	3	140

2- Consider the data shown in Table 2. Deduce the mathematical model that relates the different input parameters to surface hardness. Perform the statistical analysis. (c3-1)(30Marks)

Differentiate between the conclusions of both 3D curves and contour plots (c4-1)(10Marks)

Table 2

Exp. No.	Input Parameters				Response
	speed, Coded value	feed, coded value	force, Coded value	Depth of penetration, Coded value	Surface Hardness, Hv
1	-1	-1	-1	-1	253
2	1	-1	-1	-1	257
3	-1	1	-1	-1	312
4	1	1	-1	-1	343
5	-1	-1	1	-1	301
6	1	-1	1	-1	241
7	-1	1	1	-1	335
8	1	1	1	-1	302
9	-1	-1	-1	1	306
10	1	-1	-1	1	336
11	-1	1	-1	1	349
12	1	1	-1	1	383
13	-1	-1	1	1	330
14	1	-1	1	1	318
15	-1	1	1	1	312
16	1	1	1	1	366
17	-2	0	0	0	280
18	2	0	0	0	313
19	0	-2	0	0	270
20	0	2	0	0	336
21	0	0	-2	0	325
22	0	0	2	0	290
23	0	0	0	-2	337
24	0	0	0	2	411
25	0	0	0	0	330
26	0	0	0	0	318
27	0	0	0	0	306
28	0	0	0	0	324
29	0	0	0	0	336
30	0	0	0	0	333
31	0	0	0	0	339

Question Two

(30Marks)

- 1- What is the difference between Taguchi and RSM methods? Which one is best for engineering optimization? (a1-1)(a2-1)(15Marks)
- 2- What is the signal-to-noise ratio in a Taguchi design? - Minitab (a5-1)(5Marks)
- 3- Construct the experimental design tables in the case of both Taguchi and response surface methodology techniques using three input parameters and five levels of each one. (b4-1)(10Marks)

With our best wishes

This exam measures the following ILOs										
Question Number	Q2-1	Q2-1	Q2-2	Q1-1	Q1-1	Q2-3	Q	Q	Q1-2	Q1-2
Skills	a1-1	a2-1	a5-1	b1-1	b1-2	b4-1	b5-1	c2-1	c3-1	c4-1
	Knowledge & Understanding Skills			Intellectual Skills				Professional Skills		