U.S.N ☐☐☐☐☐☐☐☐☐☐

P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Sixth Semester, B.E. - Industrial and Production Engineering
Semester End Examination; June/July – 2015
Quality Assurance and Reliability

Time: 3 hrs   *Max. Marks: 100*

*Note: Answer any **FIVE** full questions, selecting at least **TWO** full questions from **each part**.*

PART - A

1 a	What is quality cost? Explain any two types of quality cost in detail.	12
b	Write a note on:	8
	i) sporadic and chronic quality problems　　ii) Quality function deployment.	
2.a	Write a note on quality Audit and mention the purpose of audits.	8
b	Explain the planning and performing audit activities in detail.	12
3 a	Explain chance and assignable causes with an example.	8
b	What are the seven Q.C. tools? Explain any three of them briefly.	12
4 a	Mention the various types of control charts for variables and explain any one of them briefly.	8

b The mean weight of 4 samples of 1 m length each of a certain size of rolled steel section measured at approval inspection stage and the range over 20 sub groups is as follows.

Sub group No.	Mean weight (gms)	Ranks
1	452	3
2	456	6
3	452	5
4	453	6
5	455	4
6	454	4
7	458	1
8	456	5
9	455	0
10	455	7
11	452	4
12	453	0
13	456	4
14	457	5
15	457	2
16	453	7
17	452	5
18	461	9
19	456	3
20	454	0

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i) Construct $\bar{x}$ - R chart for the data

ii) Do you think the steel rolling activity is operating under assignable cause? If so what is the influence assignable cause is having on the weight of the rolled section?

PART - B

5 a Explain P chart with a neat sketch. 7

b A set of chairs are subjected for inspection. A set consists of 5 chairs and there are 20 sub groups. The inspection data obtained is as follows,

Group No.:	1	2	3	4	5	6	7	8	9	10	11
No. of defects:	77	64	75	93	45	61	49	65	45	77	59

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Group No.	12	13	14	15	16	17	18	19	20
No. of defects:	54	41	87	40	22	92	89	55	25

i) Construct the appropriate chart.

ii) Is the process under control? If not determine further control limits.

6 a Explain OC curve with a figure. 6

b Draw the OC for the following single sampling plan and also determine producer risk and consumer risk when AQL = 1%   GLTPD = 4%   respectively 14
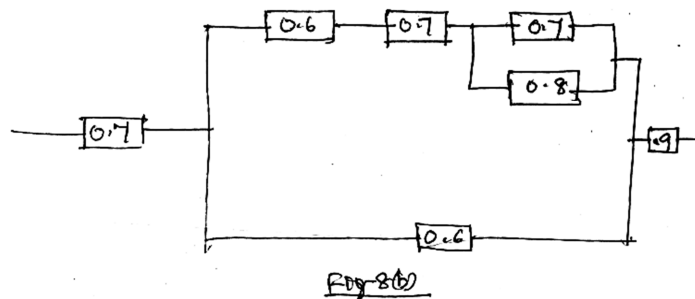
N = 10,000   n = 150   c = 2

7 a Write a note on the following :

i) AOQ with a neat sketch. 6

ii) Application of statistical theory of tolerance. 7

iii) Failure models of components 7

8 a Explain the following terms :

i) Reliability

ii) Failure rate 6

iii) MTBF

b. Determine the reliability of the system shown below.

Fig 8(b)

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