Unit 5 - Week 3

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

- Lecture 11 : Tool wear and Tool life
- Lecture 12: Wear and life of cutting tools - 2
- Lecture 13 : The lathe
- Lecture 14 : Calculations on mechanisms in machine tools
- Lecture 15 : Numerical problems on lathe
- Week 3 : Lecture Material
- Quiz : Assignment 3
- Week 3 Feedback Form

Week 4

DOWNLOAD VIDEOS

Assignment Detailed Solution

Live Interactive Session

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-18, 23:59 IST.

COMMON DATA QUESTIONS (QUESTION 1 to QUESTION 3)

India gets involved in a war with a country XX. In order to make war equipment, India is using single point turning tools obeying the Taylor's tool life equation as follows (V is the cutting velocity in m/min, T is the tool life in minutes)

$$V \times T^{0.5} = 350$$

Country XX employs single point turning tools obeying the Taylor's tool life equation as follows

$$V \times T^{0.3} = 200$$

1) If both the countries are running the tools at 65.38 m/min cutting speed, higher tool life would be obtained by 1 point

i. India
ii. Country XX
iii. Tool life would be same for both

- i.
- ii.
- iii.

No, the answer is incorrect.
Score: 0
Accepted Answers:
ii.

2) The countries will obtain the same tool life if both of them employ the same cutting speed nearest to (in m/min) 1 point

i. 65.38
ii. 86.39
iii. 94.68
iv. Not near any of these by ± 1 m/min

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0
Accepted Answers:
ii.

3) If level of war escalates and the tools have to be run at a speed of 105 m/min, tool life will be higher for the tool used by 1 point

i. India
ii. Country XX
iii. Both tools will have same life

- i.
- ii.
- iii.

No, the answer is incorrect.
Score: 0
Accepted Answers:
i.

4) In your final year, you take up a project to define cutting conditions for maximising net profit for a manufacturing company. The factory uses cutting tool A for turning MS round bars of diameter 150 mm with fixed depth of cut and feed s = 0.1 mm/rev in single pass and charges Rs 1000 per running metre of such turning jobs. Cutting tool inserts have 4 (main) cutting edges and cost Rs 1600/- per insert, which is the only expenditure to be considered. If the Taylor's tool life equation for the cutting tool (for each edge) is 1 point

$$V \times T^{0.6} = 600$$

The net profit for continuous work in an 8-hour shift would be maximized by adapting a cutting speed nearest to (in m/min)

a. 50
b. 60
c. 70
d. 40
e. Not near any of these by ± 1 m/min

- a.
- b.
- c.
- d.
- e.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

5) On the lathe, the lead screw is a machine element which is primarily used for 1 point

a. Turning round bars of metallic lead
b. Cutting cams of the automatic screw cutting lathe
c. Taper turning
d. None of these

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

6) The feed rod on the lathe is primarily used for 1 point

a. Cutting multiple threads
b. Automatic feed
c. Feeding rod through the hollow spindle in lathes with chucks
d. None of these

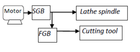
- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

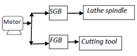
7) The correct kinematic diagram for a general purpose, operator-run centre lathe is (SGB is speed gear box, FGB is feed gear box) 1 point

a.

b.



c.



d. None of these

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

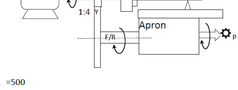
8) The main advantage of a Norton Tumbler drive is that 1 point

a. It has a conical shape – which is good for weight reduction
b. For a fixed centre distance – it provides a large number of output speeds
c. The large number of gears store energy by acting as a flywheel
d. None of these

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

9) Apron constant (=input rpm/Output rpm of Apron) of a centre lathe is found to be 60. Here, input rpm = rpm of Feed Rod (F/R) and output rpm = rpm of the pinion (small gear p)= 2 rpm. The gears X and Y have ratio of numbers of teeth = 1:4. In that case, the spindle rpm is nearest to 1 point

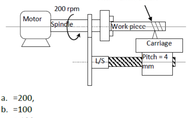


a. =500
b. >500
c. <500

- a.
- b.
- c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

10) On a conventional lathe, a 1 mm pitch, 2-start metric thread is cut on a cylindrical work piece rotating at 200 rpm. The pitch of the lead screw is 4mm. The lead screw (L/S) rpm is nearest to 1 point



a. =200,
b. =100
c. < 100
d. >200

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.