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Unit 5 - Week 4: 3-D Machining, Curved Surface Geometry and Cutter Path generation, Tutorial

Assignment-4

The due date for submitting this assignment has passed. **Due on 2018-03-17, 23:59 IST.**

Submitted assignment

1) 5 axis machining is considered better than 3 axis machining because *1 point*

- 2 more cutters can be simultaneously used with the main cutter in 5 axis m/cing , which can never be done in 3-axis machining
- There is provision for tilting the cutter to access re-entrant regions of folded surfaces
- 5-axis machines cost less compared to 3-axis machines as a rule
- None of the others

No, the answer is incorrect.
Score: 0

Accepted Answers:
There is provision for tilting the cutter to access re-entrant regions of folded surfaces

2) In 3-axis CNC milling of free form surface with a ball ended milling cutter, the roughness (due to scallops left behind) *1 point*

- Depends on the depth of cut
- Increases if cutter diameter is increased (side step remaining same)
- Increases if side step is increased (cutter remaining same)
- None of the others

No, the answer is incorrect.
Score: 0

Accepted Answers:
Increases if side step is increased (cutter remaining same)

3) The forward step in free form surface machining with ball ended milling cutter on CNC 3-axis milling machine with Zig-zag cutter paths, refers to *1 point*

- The movement of the cutter along a straight line to shift it from one cutter path sideways so that it can start another cutter path
- The straight line distance between the successive cutter location points when cutter is moving along a cutter path
- The straight line distance between the successive cutter contact points when the cutter is moving along a cutter path
- None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
The straight line distance between the successive cutter contact points when the cutter is moving along a cutter path

4) In the free form surface machining with a ball ended milling cutter with to-and-fro paths following the isoplanar strategy of cutter path generation ***1 point***

- The cutter location points are necessarily contained in a vertical plane
- The cutter contact points are necessarily contained in a vertical plane
- The scallop curve between two adjacent cutter paths is necessarily along a vertical plane
- None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
The cutter contact points are necessarily contained in a vertical plane

5) In fig shown, a Bezier surface *R(u,w)* is intersected by a vertical plane with unit normal **p**. At any point X on the curve of intersection, the unit normal to the Bezier surface is **n** and tangent to the dotted curve of intersection is **c**. ***1 point***

$\frac{\partial R}{\partial u}$ and $\frac{\partial R}{\partial w}$ are taken at x.

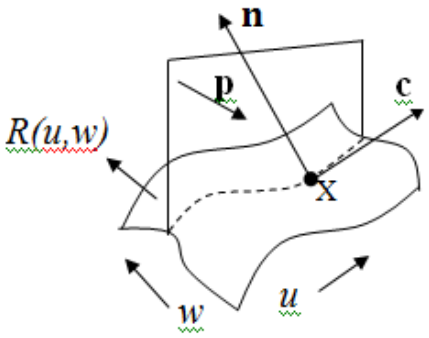

Fig.

The correct statement is

- n and p are necessarily normal to each other
- $\frac{\partial R}{\partial u}$ and **c** are necessarily parallel
- $\frac{\partial R}{\partial u}$ and n are necessarily normal to each other
- None of the others

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{\partial R}{\partial u}$ and n are necessarily normal to each other

6) Fig. shown, represents Bezier surfaces *R(u,w)* which can be drawn on the u-w plane as a square. In this representation, AB is a straight line parallel to the *u* axis. If AB represents a cutter contact path in zig-zag CNC machining of a Bezier surface in 3 axis ***1 point***

machining centre by ball end milling, AB

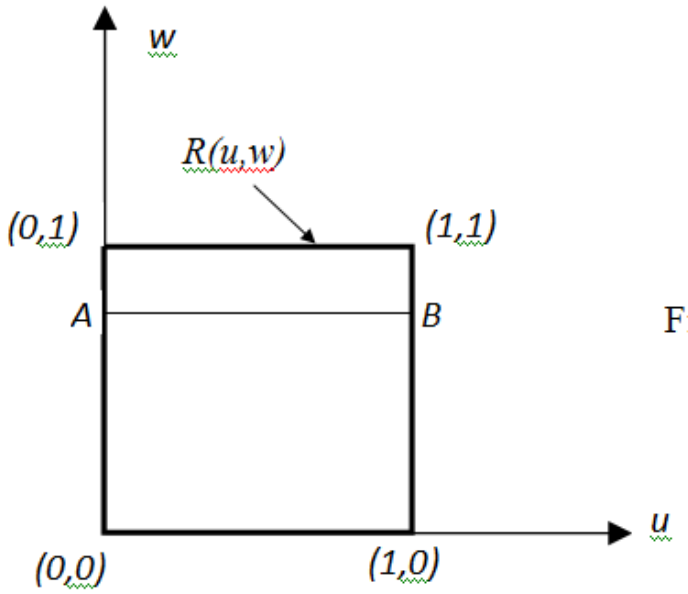

Fig. 4

- Can never be a planar curve
- Can never be an isoplanar cutter path with constant w
- Can never be an isoparametric cutter path with constant u
- Can never be an isoparametric cutter path with constant w

No, the answer is incorrect.
Score: 0

Accepted Answers:
Can never be an isoparametric cutter path with constant u

7) If, during the production of a free form surface from a part by zig-zag machining on a 3-axis CNC milling machine with a ball-end milling cutter, the cutter contact points of a cutter path are all in the X-Z plane, the cutter while traversing that path, ***1 point***

- May have Y axis movement
- Will definitely have Y axis movement
- Will definitely have no Y axis movement
- None of the others

No, the answer is incorrect.
Score: 0

Accepted Answers:
May have Y axis movement

8) Cutter location data (data-1) has been calculated for a cutter with ball nose radius if 8 mm (first cutter), for machining a free form surface. However, the cutter is broken and another cutter of same length is selected but with radius of ball nose equal to 5 mm. If this cutter is used to machine the surface with data-1, then in comparison to the case of machining with the first cutter ***1 point***

- Surface geometry will be alright but surface roughness will be more
- Surface geometry will be alright but surface roughness will be less
- Surface geometry will be incorrect and surface roughness will be more
- Surface geometry will be incorrect and surface roughness will be less

No, the answer is incorrect.
Score: 0

Accepted Answers:
Surface geometry will be incorrect and surface roughness will be more

9) The forward step depends on *1 point*

- surface curvature
- The feed of the cutter in mm/min
- The depth of cut
- None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
surface curvature

10) During free form surface machining by ball ended milling cutter, on the scallop surfaces, striations are visible, which necessarily occur due to *1 point*

- Vibration
- Interrupted cutting as in milling
- Built up edge formation
- None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
Interrupted cutting as in milling

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