Reg. No.



## II SEMESTER M.TECH. (CAAD & MET) END SEMESTER EXAMINATION – APRIL/MAY 2017 SUBJECT: PROGRAM ELECTIVE - II (DESIGN FOR MANUFACTURING, MME 5264) REVISED CREDIT SYSTEM

## Time: 3 Hour

## Max. Marks: 50

- Note: (i) Answer all the questions
  - (ii) Missing data/detail, if any, may be appropriately assumed
  - (iii) Assumptions made must be clearly mentioned
- 1A Manufacturing is considered as an important factor influencing the design of 03 a component. Justify with two examples.
- 1B How DFM reduces product cost and at what stage of product development 03 process, it is implemented.
- 1C A steel shaft of diameter 45 mm and length 250 mm, has reduced diameter of 04 32 mm for a length of 16 mm, to facilitate bearing mounting, on both ends of the shaft. A rectangular key of 12 x 8 mm and 30 mm length is used to mount a gear at the midspan of shaft. Prepare the manufacturing drawing of the shaft and discuss DFM guidelines applied.
- 2A Mention and explain how capability attributes of manufacturing process 03 influence product design
- 2B Discuss the DFM guidelines w.r.t. wall thickness, ribs and holes in case of 03 components manufactured by injection moulding process.
- 2C L shaped bracket having a rib, is used to support a shaft end. The bracket is 04 mounted on a horizontal surface with the help of 4 screws. Prepare the machining drawing of bracket if the initial manufacturing process is casting and highlight DFM guidelines implemented.
- 3A Discuss with examples as how the design of ribs, corner/angle/T joints are 03 carried out f the part is manufactured by sand casting.

3B Explain with examples, DFM	1 guidelines for drilling operation.	03
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3C How DFM is applied for a gear if it is manufactured by04i) Powder metallurgy ii) Machining

- 4A Justify the following statements:
  - While machining a keyway in a shaft, keyway flat ends are avoided.
  - To achieve good flatness in surface grinding, component is to be properly supported and ground surface to be continuous.
  - After heat treatment, grinding operation is carried out.
- 4B Mention and justify the sequence of operations followed for the 07 manufacturing of machine tool spindle. How DFM guidelines are applicable in this case?
- 5A. Discuss the manufacturing of following sheet metal part, if alignment of holes 02 is important. Suggest alternate design to achieve good alignment of holes.



5B. Figure shows the assembly drawing of a drill jig, used to produce six holes, 08 spaced equally in a circular flange. The jig plate is so designed that the nut and latch washer are used to allow for quick loading and unloading of the work pieces. For unloading, the top nut is loosened, the latch washer swiveled out of zone and then the jig plate is lifted, to remove the work pieces from its seating.

i) Prepare the manufacturing drawing of a) Jig plate and b) Stem

ii) How stack up analysis is implemented?



Parts List

Part No.	Qty.	Name	Matl.	Part No.	Qty.	Name	Matl.
1	1	Nut		6	1	Stem	MS
2	6	Bush	MCS	7	3	Screw	MS
3	1	Jig plate	CI	8	1	Base	CI
4	1	Screw	MS	9	1	Latch washer	MS
5	1	Stud	MS			Eaton Habilo	