

22338

23124

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answer with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (8) Preferably, write the answers in sequential order.

**Marks**

1. Attempt any FIVE of the following: 10
- a) Define grooving operation on lathe machine.
  - b) State four methods of taper turning.
  - c) Define counter sinking operation.
  - d) List four different milling machines.
  - e) State four types of grinding machine.
  - f) Define simple indexing.
  - g) State four types of horizontal boring machine.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) A plain surface of 50 mm wide and 200 mm long is to be milled on horizontal milling machine with cutter diameter 60 mm and cutting speed 50 m/min. Take feed per tooth 0.1 mm and no. of teeth on cutter as 16. Calculate machining time.
  - b) Write selection criteria for grinding wheel.
  - c) i) Find the indexing movement needed for milling the sides of hexagonal nut using direct indexing.  
ii) Find indexing movement required for gear having 14 teeth.
  - d) Calculate the time required for drilling a 18 mm hole in a work piece of thickness 50 mm. Take cutting speed 12 m/min. and feed 0.2 mm/revolution. Neglect length of approach.
- 3. Attempt any THREE of the following:** **12**
- a) Describe counter boring operation with sketch.
  - b) Explain grinding wheel dressing with neat sketch.
  - c) Describe gear hobbing with neat sketch.
  - d) Index an angle of  $35^\circ$  by angular indexing.
- 4. Attempt any THREE of the following:** **12**
- a) Explain spot facing operation and write purpose of it.
  - b) Set the dividing head to mill 30 teeth on spur gear blank.
  - c) Explain with neat sketches two different shapes of broaching operations done on the job.
  - d) With the help of neat sketch, describe following elements of broach –
    - i) Front pilot
    - ii) Roughing teeth
    - iii) Semi finishing teeth
    - iv) Finishing teeth.
  - e) Explain the applications of lathe machine in manufacturing.

**5. Attempt any TWO of the following:****12**

- a) Find the time required for one complete cut on a piece of work 300 mm long and 50 mm diameter. The cutting speed is 30 m/min. and the feed is 0.8 mm/rev.
- b) Describe with neat sketch functions of following parts of column and knee type milling machine –
  - i) Knee
  - ii) Elevating screw
  - iii) Table
- c) Recommend grinding wheels for grinding –
  - i) High speed steel
  - ii) Cast iron
  - iii) Hard and brittle materials

**6. Attempt any TWO of the following:****12**

- a) Explain with neat sketch functions of compound rest and tailstock in lathe.
  - b) Following shapes of certain lengths are to be machined on milling machine. Suggest suitable milling cutters, milling machine and process –
    - i) Half round slot
    - ii) Key-way of width 8 mm.
  - c) Suggest and describe typical grinding process for –
    - i) Shafts
    - ii) Pins of diameter 8 mm and length 40 mm with quantity 500 nos.
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