# BIRLA INSTITUTE OF TECHNOLOGY
MESRA – 835215, RANCHI, INDIA

UG

Name: …… Roll No.: ……..

Branch: …… Signature of Invigilator: ……

Semester: VIth Date: 26/04/2022 (MORNING)

Subject with Code: PE313 TOOL DESIGN

| | Section A (30) | Section B (20) | Total Marks (50) |
|---|---|---|---|
| Marks Obtained | | | |

**INSTRUCTION TO CANDIDATE**

1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. **Candidates should write their roll no. in each page of the booklet.**
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to **submit the question paper cum answer sheets before leaving the examination hall**.

B

Birla Institute of Technology, Mesra: Ranchi

Class: B.Tech. Semester – 6th Branch – PIE

Session – SP / 2022 Time – 2 Hours Full Marks – 50

# Subject: PE 313 Tool Design

End Semester Examination

Instructions:

1. The total value of the questions is 50 marks.
2. Section A is of 30 marks (objective type) and Section B is of 20 Marks (short answer type)
3. The missing data if any may be assumed suitably.
4. Before attempting the question paper, be sure that you got the correct question paper.

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Section-A

(Total Marks= 30)

(30 question each of 1 marks)

1. Select the operation that does not require a jig.

   a. Drilling b. Turning

   c. Reaming d. Tapping

2. Which fixtures are used for machining parts which must have machined details evenly spaced?

   a. Duplex fixtures b. Profile fixtures

   c. Indexing fixtures d. None of the above

3. The use of fixtures mainly reduces

   a. only setting time b. only operation time

   c. tooling cost d. both setting and operation time

4. For holding thin-walled and deformable workpieces, the following power device is preferred

   a. Vacuum b. pneumatic

   c. hydraulic d. hydropneumatics

5. Which of the following clamp is a quick acting clamp

   a. Hinged clamp b. Cam operated clamp

   c. Edge clamp d. Bridge clamp

6. 3 - 2 -1 method of location in a jig or fixture would collectively restrict the work piece in n degrees of freedom, where the value of n is

   a. 9 b. 8

   c. 6 d. 3

7. For stable location of a flat surface, the number of rest buttons required is

a. 2 b. 3

c. 4 d. 5

8 Which of the following types of jigs is used for machining in more than one plane by single setting?

a. Open type jig b. Plate type jig

c. Box type jig d. Template type jig

9. In a fixture using dual-pin location, one of the pins is shaped as a diamond pin because

a. It has high wear resistance
b. It is easy to clamp
c. It is easy to restore for reuse after wear
d. It can accommodate variation of the distance between hole axes

10. Slip bush is used in jig where

a. The drill bit can slip on the work piece
b. Holes are too close
c. The bush is to be replaced every time
d. None of the above

11. Which one is not a shaping operation?

a. Bending b. Blanking

c. Forming d. Drawing

12. Variable that does not affect metal flow during drawing is

a. Radius on Punch b. Friction

c. Draw radius on die d. None

13. In blanking operation, the clearance is provided on

a. The die b. Punch

c. Both die and punch equally d. Neither the punch nor the die

14. Choose incorrect statement:

a. Embossing is a shallow forming operation.
b. Curling die rolls a raw edge of sheet metal into a roll.
c. Bulging is an internal forming operation used to expand portions of a drawn shell or tube,
d. During coining very close tolerance cannot be maintained.

15. Material is commonly used for making locating and clamping devices

a. Low carbon steel
b. High Carbon steel
c. High speed steel
d. Die steel

16. A conical locater has the advantage of

a. Easy location
b. Self-centring
c. Easy location and self-centring
d. Offers good grid

17. Blanking and drawing operations can be performed at one station of the press in every stroke of the ram in a

a. simple die
b. compound die
c. combination die
d. progressive die

18. In deep drawing of the sheets, the value of limiting drawing depends on

a. Percentage elongation of the sheet
b. Yield strength of the sheet
c. Type of press used
d. Thickness of sheet

19. Wrinkling is a common defect found in

a. Bent components
b. Deep drawing components
c. Embossed components
d. Blanked component

20. A 50 mm diameter disc required for the product is to be cut out from a carbon steel sheet 1.0 mm thick. The diameter of die should be (take clearance as 3 % of sheet thickness)

a. 49.925 mm
b. 50 mm
c. 50.075 mm
d. None of these

21. Wall thickness of drawn cup is controlled by

a. Deep drawing
b. Reverse drawing
c. redrawing
d. Ironing

22. Consider the following steps in forging a connecting rod from the bar stock

1. Blocking 2. trimming 3. finishing 4. Edging

Select the correct sequence of these operations using the codes given below

a. 1-2-3-4
b. 2-3-4-1
c. 3-4-1-2
d. 4-1-3-2

23. Flash and gutter are provided in drop forging dies at the following stage

a. Blocking
b. Edging (or Preforming)
c. Finishing
d. Fullering

24. which one is not a method of reducing cutting forces to prevent the overloading of press

a. Providing shear on die
b. Providing shear on punch
c. Increasing the clearance
d. Stepping punches

25. The angle between the face and the flank of the single point cutting tool is known as

a. lip angle
b. clearance angle
c. cutting angle
d. point angle

26. Cutting tools are provided with large positive rake angle mainly for

a. Increasing the strength of the cutting edge
b. Avoiding rubbing action with the finished surfaces
c. Reducing the magnitude of the cutting force
d. Better heat dissipation

27. In a machining process, the percentage of heat carried away by the chips is typically

a. 75%
b. 25%
c. 50%
d. 15%

28. A twist drill is specified by its shank, material and

a. length of the body
b. lip angle
c. Helix angle
d. diameter

29. Which tools have better strength and stiffness under compound bending stresses

a. Round
b. Square
c. rectangular
d. All of them

30. Plain milling cutters are mounted on

a. Arbor
b. Spindle
c. Chuck
d. Tool post

**Section B**

**(Total Marks 20)**

(Answer any Four question, all the questions carry the equal weightage)

1. a. Define the term clearance as it applies to blanking and piercing dies work. [3+2]
   b. What is the effect of excessive clearance or too small clearance given in the die?

2. a. How can the rough cast surfaces be located? [2+3]
   b. What error are caused by the improper orientation of a "V" locator?

3 What do you mean by Economics of tooling? The following data refers to two methods of production each involving the purchase of new machine tools and new equipment. Suggest the most economical method. [2+3]

| Sr. no. | Items | Method 'A' | Method 'B' |
|---|---|---|---|
| 1 | Number of working hours per year | 1800 | 1800 |
| 2 | Number of components per year | 2000 | 2000 |
| 3 | Time for each in minutes | 10 | 08 |
| 4 | Tool life in years | 2 | 2 |
| 5 | Machine rate per hour | Rs.10.00 | Rs. 12.00 |
| 6 | Cost of tooling | Rs.200.00 | Rs.400.00 |

4 a. Why the pressure pad or blank holders are required in drawing dies. [2+3]
   b. A shell diameter of 100mm diameter and 100 mm height with a corner radius of 0.4 mm is to be produced by cup drawing. Find the required blank diameter.

5 Define term parting line in forging. Write down the factors on which choice for parting line depends? [2+3]







