a) counter sink tool   b) reamer tool   c) gun drill tool   d) counter bore tool

16. drill tool material used for high production and CNC machines

a) HSS   b) Carbide tipped drills   c) low carbon steel   d) all of them

17. A peripheral milling operation is performed on the top surface of arectangular workpart which is 400 mm long by 60 mm wide. T milling cutter, which is 80 mm in diameter and has five teeth, overhangs the width of the part on both sides. Cutting speed = 70 m/m chip load = 0.25 mm/tooth, and depth of cut = 5.0 mm. the feed rate is

a) 483 mm/min   b)843 mm/min   c) 348 mm/min   d) 438 mm/min

18. Built up edge can be reduced by

a) increase depth of cut   b) decrease the rake angle   c) Both a and b   d) use effective cutting fluid

19. As the lead angle increases the undeformed chip thickness

a) increases   b) don't affected c) decreases   d) none of them

20. In ...., the axis of cutter rotation is parallel to the workpiece surface.

a) slab milling   b) ball milling   c) end milling   d)face milling

21. In .... milling process, Max chip thickness is at the end of the cut

a) ball milling   b) down milling c) end milling   d) up milling

22. one of the following is not true for the upmilling process

a) cutting process is smooth   b) tooth engagement is a function of workpiece surface characteristics, and contamination or sc the surface affect tool life c)tendency for the tool to chatter   d)none of them

23. Because of the resulting high impact forces when the teeth engage the workpiece, this operation must have a rigid setup, and backlash must be eliminated in the table feed mechanism in .... milling process

a)up milling   b) end milling   c) down milling   d) ball milling

24. ....milling process can produce a variety of surfaces at any depth, such as curved, stepped, and pocketed.

a) end milling   b) down milling   c) up milling   d) referral milling

25. in milling process the problem of burr formation may be related to

a) incorrect entry and exit angles   b) dull cutting edges   c) feed and depth of cut too high   d) all of them

26. the component that supports the table and can move in the transverse direction is usually called

a) saddle   b) overarm   c) compound wrest   d) knee

27. one of the following is not true for the material removal processes compared to forming

a) waste of material   b) time consuming process   c) bad dimensional accuracy   d) straight edges and surfaces

28. Which of these statements are correct? built up edge may be reduced by:

1. decreasing depth of the cut   2. Increasing cutting velocity   3. increasing back rake angle

a) 1, 2 and 3   b) 1 and 2   c) 1 and 3   d) 2 and 3

*A turning operation is made with a rake angle of 10°, a feed of 0.010 in/rev and a depth of cut = 0.100 in. The shear strength of material is known to be 50,000 lb/in^2, and the chip thickness ratio is measured after the cut to be 0.40. **Answer questions 29, 30 32.**

29. The shear angle is

a) 29.2°   b) 22.9°   c) 92.2°   d)9.22°

30. The sheer force is

a) 812 lb b) 182 lb   c)821 lb   d) 128 lb

31. the cutting force is

a) 632 lb   b)326 lb   c) 623 lb   d) 236 lb

32. the thrust force is

a)922 lb   b)129 lb   c) 229lb   d) 22 lb

*Tool life tests in turning yield the following data: (1) when cutting speed is 100 m/min, tool life is 10 min; (2) when cutting speed is 75 m/min,tool life is 30 min. **Answer questions 33,34,and 35 using Taylor equation**

33. the value of the exponent n is

a) 0.1268   b) 0.2618   c) 0.6218   d) 0.8216

34. the value of the constant C is

a) 287.15   b) 182.75   c)157.82   d)578.12

*

16) b   17)   18) d   19) c   20) a   21). d
22) b   23) c   24) a   25) d   26) a   27) c
28) a   29) b   30) d   31) d   32) c   33) b
34) b

Q4: When the work material AISI 1100 is machined with the cutting speed of 300 m/min the tool life for mm wear is 180 minutes. Find out the tool life for the same wear if the cutting is increased to the maximum allowable value of 600 m/min. Use Taylor's model with exponent $n = 0.25$. **(3 Marks)**

$$\left(\frac{C}{V}\right)^{1/n} = T$$

$$\left(\frac{54}{600}\right)^{1/0.25} = T \rightarrow T = 6.561 \times 10^{-5} \text{ min}$$

$$T_{sx} = 300 \times 180 \times 10^{-3}$$
$$T = 54$$

Q5: The Shown sketch is for a single point cutting tool **(4 Marks)**

i) Symbol A refers to   side rack angle
ii) Symbol B refers to   end cutting tool edge
iii) Symbol C refers to   end relief angle
iv) Symbol D refers to   Flank
v) Symbol E refers to   nose radius
vi) Symbol F refers to   Face
vii) Symbol G refers to   Side relief angle
viii) Symbol H refers to   Side cutting tool angle

Axis

34) b

26) a   29) c

30) d   31) d   33) b

32) c   33) b

Q4) $300 \times 180^{(0.25)} = 600 \, T^{(0.25)}$

$\overline{T} = 11.25 \, min.$

a) 89.9   b) 99.8   c)109.9   d)59.9

36. Semicontinuous chips with large zones of low shear strain and small zones of high shear strain are called
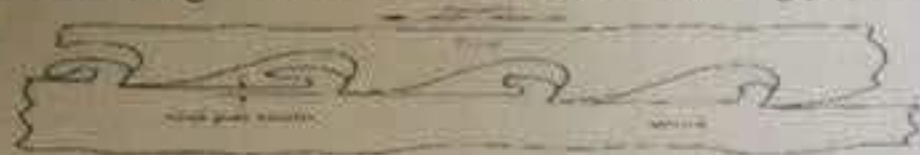
a) continuous chips   b) serrated chips   c) curl chips   d) discontinuous chips

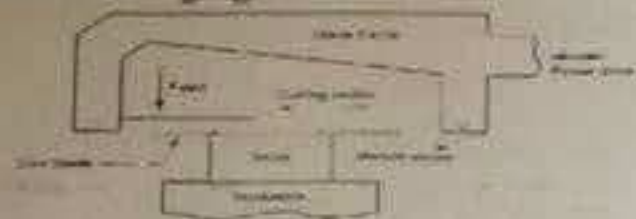37. the following figure refers to .... manufacturing process

a) end Milling   b) nose milling   c) face milling   d) Grinding

38. the following refers to .... manufacturing process
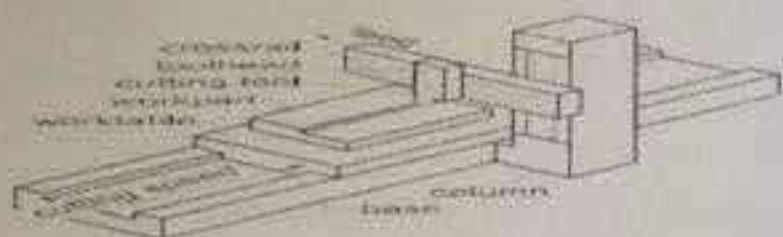

a) broaching   b) sawing   c)reaming   d) none of them

39. the following figure refers to .... manufacturing process

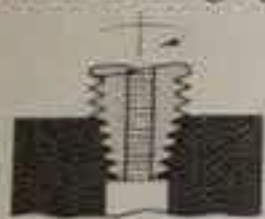a) blade sawing   b) Milling   c) reaming   d) hacksawing

40. the following figure refers to .... manufacturing process

a) Planning   b) turning   c) milling   d) shaping

41. the following figure refers to .... manufacturing process

a) shaping   b) turning   c) planning   d) tapping

42. Tools made up of carbides are extremely hard having Rockwell hardness varying from

a) 0—13 HRC   b) 90—93 HRC   c) 10—23 HRC   d) 590—993 HRC

43. The most common drill material is

a) High speed steel   b)Ceramic tipped   c) Diamond   d) carbide

44. Which of the following materials has the highest machienability index.

a) Steels   b) Copper   c) Magnesium   d) Aluminum

45. A cutting fluid should have

a) High conductivity   b) low toxicity   c) high thermal capacity   d) all of them

46. in abrasive jet machining the grit size is of an order of

a)15 micrometer   b)15 milimeter   c)15 centimeter   d) 15 meter

47. The nozzle part of the water jet machining is made of

a) tungestun carbid or sapphire   b) aluminum   c) steel   d) copper

48. which of the following is not true for the abrasive jet machining

a) Low capital cost   b) low vibration   c) high metal removal rate d) no heat is generated in work piece.

49. which of the following material cannot be cut with water jet cutting

a) metals   b) glass   c) composites   d) plastics

50. the following figure refers to .... manufacturing process
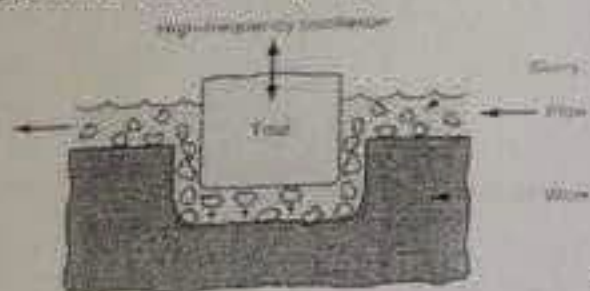
a) EDM   b) PLASMA arc   c) ultrasonic   d) abrasive jet

36) b   37) c   38) a   39) d   40) a   41) d   42) b

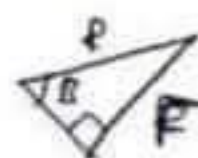43) a   44)   45) d   46) a   47) a   48) c   49) b

50) c

(2)

$$P_F = F \cdot V_c$$

$$\sin \beta = \frac{F}{R}$$

$$F = 6275.5$$

$$P_F = 627.5 \times \frac{40}{60} = 4183.6 \text{ lb} + \text{in}/\text{min}$$

(3)

$$P_s = F_s \cdot V_s = 1.67 \times 3199.13 = 5344.73 \text{ lb} \cdot \text{in}/\text{min}$$

$$\frac{V_c}{\sin\emptyset} = \frac{V_s}{\cos\alpha} \qquad \frac{7}{\sin 23} = \frac{V_s}{\cos(11.45)} \Rightarrow V_s = 1.67 \text{ in}/\text{min}$$

Q3: choose the correct answer and summarize your answer in the following table (10 marks)

1	2	3	4	5	6	7	8	9	10
b	d	a	d	a	b	a	d	a	d

+ 1. An example of Abrasive traditional machining processes where material removal by hard, abrasive particles
a) abrasive water jet b) polishing c) sand blasting d) Milling

2. An example of a chip removal process
a) reaming b) tapping c) skiving d) all of them

3. Material removal processes is generally belongs to — shaping induction;
a) primary industry b) secondary industry c) tertiary industry d) none of them

4. Factor influencing the chip formation process
a) machine tool and cutting tool b) chip control device and workpeice material c) tool geometry and the cutting fluid d) all of them

5. Defined as the speed at which the chips are removed from the surface of the workpiece.
a) Cutting speed b) chip speed c) shear speed d) feed speed

+ 6. one of the following is not true for the material removal processes compared to forming
a) waste of material b) time consuming process c) straight edges and surfaces d) bad dimensional accuracy

7. Which of these statements are correct? built up edge may be reduced by:
1. decreasing depth of the cut   2. Increasing cutting velocity   3. increasing back rake angle
a) 1, 2 and 3 b) 1 and 2 c) 2 and 3 d) 1 and 3

8. Semicontinuous chips with large zones of low shear strain and small zones of high shear strain are called
a) continuous chips b) discontinuous chips c) curl chips d) serrated chips

9. Tools made up of carbides are extremely hard having Rockwell hardness varying from
a) 90–93 HRC   b) 0–13 HRC   c) 10–23 HRC   d) 590–993 HRC

10. A cutting fluid should have
a) High conductivity b) low toxicity c) high thermal capacity d) all of them

More

1) a 2) d 3) b 4) d 5) a 6) d 7) a 8) d 9) a 9) d

4) a 4) a a) a 4) d 8a) c 4a) b

5a) c 4a) b a) b