

CHAPTER-10: Production Engineering (Answer Key)**1. Machining and Machining Tools**

1	2	3	4	5	6	7	8	9	10
d	a	b	d	b	d	d	d	a	a
11	12	13	14	15	16	17	18	19	20
a	a	d	c	d	b	c	a	d	a
21	22	23	24	25	26	27			
d	d	a	b	d	c	a			

2. Metal cutting

1	2	3	4	5	6	7	8	9	10
a	c	b	b	a	d	c	b	b	b
11	12	13	14	15	16	17	18		
b	a	c	a	d	a	a	d		

3. Engineering metrology and instrumentation

1	2	3
d	a	c

4. Metal forming

1	2	3	4	5	6	7	8	9	10
a	a	b	a	c	b	c	c	a	c
11	12								
b	b								

5. Casting

1	2	3	4	5	6	7	8	9	10
c	d	c	d	c	c	b	b	c	d
11	12	13	14	15	16	17	18	19	20
d	b	d	d	b	b	a	d	a	a
21	22	23	24	25	26	27	28	29	30
d	b	b	b	d	a	a,b	d	a	d
31	32	33	34	35	36	37	38	39	40
c	d	b	a	a	a	a	d	b	d
41	42	43	44	45	46	47	48	49	50
d	b	b	c	d	c	c	d	d	d
51	52	53	54						
b	c	d	a						

6. Welding

1	2	3	4	5	6	7	8	9	10
d	c	c	d	d	c	a	c	b	a
11	12	13	14	15	16	17	18	19	20
a	c	a	b	d	a,c	d	b	b	a
21	22	23	24	25	26	27	28	29	30
c	a	a	d	c	c	a	d	d	b
31	32	33	34	35	36	37	38	39	40
c	d	c	a	b	a	d	c	c	d
41	42	43	44	45	46	47	48	49	50
b	c	a	a	d	d	c	c	a	a
51	52	53	54	55					
b	a	c	b	d					

7. Material science

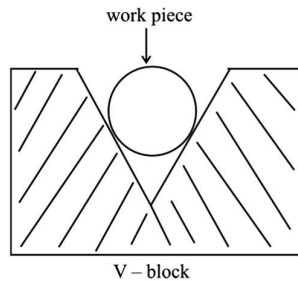
1	2	3	4	5	6	7	8	9	10
a	b	c	b	d	d	c	a	d	c
11	12	13	14	15	16	17	18	19	20
d	c	a	c	c	b	c	b	c	c
21	22	23	24	25	26				
a	a	b	c	a	d				

SOLUTIONS

1. Machining & Machining Tools

- (d)
Reaming is a operation of sizing and finishing a drilled hole.
Note : boring is used to enlarging a drilled hole
- (a)
Universal dividing head is used in plain or simple indexing. In this method a worm wheel mechanism is used having gear ratio 40 : 1.
- (b)
For grinding of hard material, a fine grain size and soft wheel is used. Because fine grain has small grinding capacity due to which it gives chance to a new particle easily.
- (d)
For turning a long shaft, there is a chance to bending the shaft.
Steady rest is a device which is used to avoid this phenomenon.
- (b)
When after a long operation, grinding wheel get dull due to which it does not perform it's function properly.
In dressing a tool (single point tool) is used to remove the blunt particles and give a place for new sharp particle.

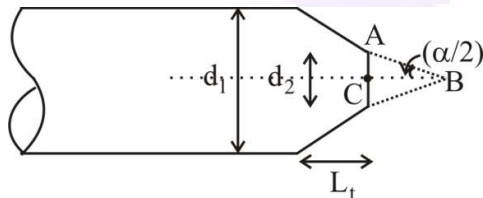
6. (d)
Thread cutting is done on the lathe machine with very low speed due to accuracy preference of thread profile.
7. (d)
For drilling operation, a cylindrical job is always hold on v – block.



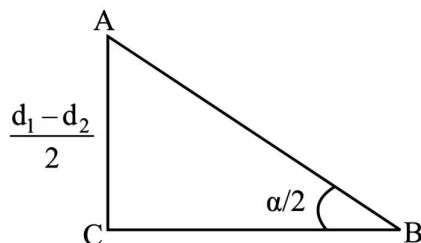
8. (d)
Quick return mechanism is used in shaper, planer and slotter. For getting a long cutting stroke and a short ideal stroke.
9. (a) Type of milling machine is classified by spindle or arbor position.
10. (a) Size of shaper is specified by length of the stroke.

$$\text{Length of stroke } (L) = \frac{2 \times \text{length of slotted lever} \times \text{length of crank}}{\text{length of connecting rod}}$$

11. (a)
Take $\alpha/2 = \text{half taper angle}$, $L_t = \text{taper length}$,



$$\therefore \text{ in triangle } \Delta ABC \rightarrow \tan\left(\frac{\alpha}{2}\right) = \frac{(d_1 - d_2)/2}{L_t}$$



$$\therefore \theta^\circ = 2 \cdot (\alpha/2) = 2 \cdot \tan^{-1} \left[\frac{(d_1 - d_2)}{2L_t} \right]$$

12. (a)
In a shaper, metal is removed during forward stroke and backward stroke is ideal.

13. (d)
Quick return mechanism is used in shaper, planer and slotter machine.
14. (c)
Speed range for grinding operation lies between 6000 – 8000 rpm. Which is highest compare to drilling, milling and lathe operations.
15. (d)
Maximum travel of cutting tool in shaper machine is also called stroke length by which size of shaper is specified.

