

Set-2



IES - 2001

The spindle speed range in a general purpose lathe is divided into steps which approximately follow

- (a) Arithmetic progression
- (b) Geometric progression
- (c) Harmonic progression
- (d) Logarithmic progression

Ans. (b)

IES - 1992

Feed gear box for a screw cutting lathe is designed on the basis of

- (a) Geometric progression
- (b) Arithmetic progression
- (c) Harmonic progression
- (d) None

Ans. (a)

Example

How much machining time will be required to reduce the diameter of a cast iron rod from 120 mm to 116 mm over a length of 100 mm by turning using a carbide insert. Cutting velocity is 100 m/min and feed rate = 0.2 mm/rev.

IES 2010

In turning a solid round bar, if the travel of the cutting tool in the direction of feed motion is 1000 mm, rotational speed of the workpiece is 500 rpm, and rate of feed is 0.2 mm/revolution, then the machining time will be

- (a) 10 seconds
- (b) 100 seconds
- (c) 5 minutes
- (d) 10 minutes

Ans. (d)

IES - 2003

The time taken to face a workpiece of 72 mm diameter, if the spindle speed is 80 r.p.m. and cross-feed is 0.3 mm/rev, is

- (a) 1.5 minutes
- (b) 3.0 minutes
- (c) 5.4 minutes
- (d) 8.5 minutes

Ans. (a)

Set-2

IAS - 2002

A 150 mm long, 12 mm diameter 304 stainless steel rod is being reduced in diameter to 11.5 mm by turning on a lathe. The spindle rotates at $N = 400$ rpm and the tool is travelling at an axial speed of 200 mm/min. The time taken for cutting is given by

- (a) 30 s (b) 36 s
(c) 1 minute (d) 45 s

Ans. (d)

IES - 2004

A medium carbon steel workpiece is turned on a lathe at 50 m/min. cutting speed 0.8 mm/rev feed and 1.5 mm depth of cut. What is the rate of metal removal?

- (a) 1000 mm³/min
(b) 60,000 mm³/min
(c) 20,000 mm³/min
(d) Can not be calculated with the given data

Ans. (b)

IES - 2006

For taper turning on centre lathes, the method of swiveling the compound rest is preferred for:

- (a) Long jobs with small taper angles
(b) Long jobs with steep taper angles
(c) Short jobs with small taper angles
(d) Short jobs with steep taper angles

Ans. (d)

Example

Find the angle at which the compound rest should be set up to turn taper on the workpiece having a length of 200 mm, larger diameter 45 mm and the smaller 30 mm.

IES - 1992

Tail stock set over method of taper turning is preferred for

- (a) Internal tapers
(b) Small tapers
(c) Long slender tapers
(d) Steep tapers

Ans. (c)

IAS - 2002

The amount of offset of tail stock for turning taper on full length of a job 300 mm long which is to have its two diameters at 50 mm and 38 mm ultimately is

- (a) 6 mm (b) 12 mm
(c) 25 mm (d) 44 mm

Ans. (a)

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IES - 1998


A 400 mm long shaft has a 100 mm tapered step at the middle with 4° included angle. The tailstock offset required to produce this taper on a lathe would be

(a) $400 \sin 4^\circ$ (b) $400 \sin 2^\circ$
 (c) $100 \sin 4^\circ$ (d) $100 \sin 2^\circ$

Ans. (b)

IES 2010

The effect of centering error when the tool is set above the center line as shown in the figure results effectively in



1. Increase in rake angle.
2. Reduction in rake angle.
3. Increase in clearance angle.
4. Reduction in clearance angle.

Which of these statements is/are correct?

(a) 1 only (b) 1 and 4 only
 (c) 2 and 4 only (d) 1, 2, 3 and 4

Ans. (b)

GATE - 2002

A lead-screw with half nuts in a lathe, free to rotate in both directions has

(a) V-threads
 (b) Whitworth threads
 (c) Buttress threads
 (d) ACME threads

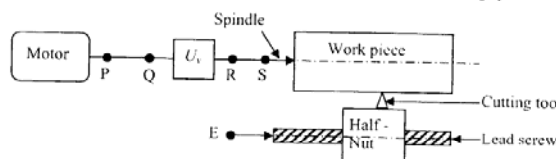
Ans. (d)

GATE - 2008

The figure shows an incomplete schematic of a conventional lathe to be used for cutting threads with different pitches. The speed gear box U_v is shown and the feed gear box U_s is to be placed. P, Q, R and S denote locations and have no other significance. Changes in U_v should NOT affect the pitch of the thread being cut and changes in U_s should NOT affect the cutting speed.

Contd.....

GATE - 2008 Contd....



The correct connections and the correct placement of U_s are given by

(a) Q and E are connected. U_s is placed between P and Q.
 (b) S and E are connected. U_s is placed between R and S.
 (c) Q and E are connected. U_s is placed between Q and E.
 (d) S and E are connected. U_s is placed between S and E.

GATE - 2003

Quality screw threads are produced by

(a) Thread milling
 (b) Thread chasing
 (c) Thread cutting with single point tool
 (d) Thread casting

Ans. (b)

Set-2

IES 2010

For producing both internal and external screw threads, the method used is

- (a) Thread chasing with multiple-rib chasers
- (b) Thread milling and multiple-thread cutters
- (c) Thread tapping with taps
- (d) Die threading with self-opening die heads

Ans. (b)

IES 2011

External threads can be produced by :

- 1. Rolling
- 2. Grinding
- 3. Milling
- (a) 1 and 3 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans. (d)

IES - 2004

Match List I (Cutting tools) with List II (Features) and select the correct answer using the codes given below the Lists:

List I			List II			Ans. (c)
A. Turning tool			1. Chisel edge			
B. Reamer			2. Flutes			
C. Milling cutter			3. Axial relief			
			4. Side relief			
Codes:	A	B	C	A	B	C
(a)	1	2	3	(b)	4	3
(c)	4	2	3	(d)	1	3

GATE-1994

To get good surface finish on a turned job, one should use a sharp tool with afeed and..... speed of rotation of the job.

- (a) Minimum, minimum
- (b) Minimum, maximum
- (c) Maximum, maximum
- (d) Maximum, minimum

Ans. (b)

IES - 1996

In turning of slender rods, it is necessary to keep the transverse force minimum mainly to

- (a) Improve the surface finish
- (b) Increase productivity
- (c) Improve cutting efficiency
- (d) Reduce vibrations and chatter.

Ans. (d)

IES - 2009

What is the number of jaws in self-centred chuck?

- (a) Eight
- (b) Six
- (c) Four
- (d) Three

Ans. (d)

Set-2

IES - 1999

Which one of the following sets of forces are encountered by a lathe parting tool while groove cutting?

- (a) Tangential, radial and axial
- (b) Tangential and radial
- (c) Tangential and axial
- (d) Radial and axial

Ans. (a)

IES - 2009

Which one of the following methods should be used for turning internal taper only?

- (a) Tailstock offset
- (b) Taper attachment
- (c) Form tool
- (d) Compound rest

Ans. (d)

IES - 1998

A single start thread of pitch 2 mm is to be produced on a lathe having a lead screw with a double start thread of pitch 4 mm. The ratio of speeds between the spindle and lead screw for this operation is

- (a) 1 : 2 (b) 2 : 1
- (c) 1 : 4 (d) 4 : 1

Ans. (d)

IES - 1993

It is required to cut screw threads of 2 mm pitch on a lathe. The lead screw has a pitch of 6 mm. If the spindle speed is 60 rpm, then the speed of the lead screw will be

- (a) 10 rpm (b) 20 rpm
- (c) 120 rpm (d) 180 rpm

Ans. (b)

IES - 1992

Which of the following statement is incorrect with reference of lathe cutting tools?

- (a) The flank of the tool is the surface below and adjacent to the cutting edges
- (b) The nose is the corner, or chamfer joining the side cutting and the end cutting edges
- (c) The heel is that part of the which is shaped to produce the cutting edges and face
- (d) The base is that surface of the shank which against the support and takes tangent

Ans. (c)

IES - 2006

It is required to cut screw threads with double start and 2 mm pitch on a lathe having lead screw pitch of 6 mm. What is the speed ratio between lathe spindle and lead screw?

- (a) 1 : 3 (b) 3 : 1
- (c) 2 : 3 (d) 3 : 2

Ans. (d)

Set-2

IES - 1997

Consider the following operations:

1. Under cutting
2. Plain turning
3. Taper turning
4. Thread cutting

The correct sequence of these operations in machining a product is

- (a) 2, 3, 4, 1 (b) 3, 2, 4, 1
(c) 2, 3, 1, 4 (d) 3, 2, 1, 4

Ans. (c)

IES - 2009

A capstan lathe is used to mass-produce, in batches of 200, a particular component. The direct material cost is Rs 4 per piece, the direct labour cost is Rs 3 per piece and the overhead costs are 400% of the labour costs. What is the production cost per piece?

- (a) Rs 19 (b) Rs 23
(c) Rs 16 (d) Rs 15

Ans. (a)

IES - 2007

Assertion (A): In a multi-spindle automatic lathe, the turret tool holder is indexed to engage the cutting tools one by one for successive machining operations.

Reason (R): Turret is a multiple tool holder so that for successive machining operation, the tools need not be changed.

- (a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is **not** the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans. (a)

IES - 1995

Consider the following characteristics:

1. Multiple operations can be performed
2. Operator's fatigue is greatly reduced.
3. Ideally suited for batch production
4. A break-down in one machine does not affect the flow of products.
5. Can accommodate modifications in design of components, within certain limits.

The characteristics which can be attributed to special purpose machines would include

- (a) 1, 3 and 4 (b) 1, 2 and 4
(c) 2, 3 and 5 (d) 1, 2 and 5

Ans. (c)

IES - 1996

Assertion (A): Special purpose machine tools and automatic machine tools are quite useful for job shops

Reason (R): Special purpose machine tools can do special types of machining work automatically

- (a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is **not** the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans. (d)

IES - 2003

Which one of the following mechanisms is employed for indexing of turret in an automatic lathe?

- (a) Whitworth (b) Rack and pinion
(c) Ratchet and pawl (d) Geneva wheel

Ans. (c)

Set-2

IES - 2009

For the manufacture of screw fasteners on a mass scale, which is the most suitable machine tool?

- (a) Capstan lathe
- (b) Single-spindle automatic lathe
- (c) CNC turning centre (lathe)
- (d) CNC machining centre

Ans. (b)

IES - 2001

The indexing of the turret in a single-spindle automatic lathe is done using

- (a) Geneva mechanism
- (b) Ratchet and Pawl mechanism
- (c) Rack and pinion mechanism
- (d) Whitworth mechanism

Ans. (b)

IES - 1995

Assertion (A): In a Swiss - type automatic lathe, the turret is given longitudinal feed for each tool in a specific order with suitable indexing.

Reason (R): A turret is a multiple tool holder to facilitate machining with each tool by indexing without the need to change the tools.

- (a) Both A and R are individually true and R is the correct explanation of A
- (b) Both A and R are individually true but R is **not** the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans. (d)

IES - 1992

Maximum production of small and slender parts is done by

- (a) Watch maker's lathe
- (b) Sliding head stock automatic lathe
- (c) Multi-spindle automatic lathe
- (d) Capstan lathe

Ans. (c)

IES - 2007

Screw threads are produced on solid rods by using which of the following?

- (a) Dies
- (b) Punch
- (c) Mandrel
- (d) Boring bar

Ans. (a)

IAS - 2007

Which one of the following is the characteristic for capstan lathe?

- (a) Rate of production is low
- (b) Labour cost is high
- (c) Used for handling jobs of varying shapes and sizes
- (d) Capstan head is mounted on a slide

Ans. (d)

Set-2

IAS - 2002

Consider the following statements related to Turret lathe:

1. Turret is mounted directly on the saddle.
2. Turret is mounted on an auxiliary slide.
3. Much heavier and larger jobs than Capstan lathe can be produced.

Which of the above statements is/are correct?

- (a) 1 and 3 (b) 2 and 3
(c) 1 only (d) 2 only

Ans. (a)

IAS - 1996

Apart from hexagonal turret, the elements (s) in a turret lathe include (s)

- (a) Cross-slide tool post
- (b) Cross-slide tool post and rear tool post
- (c) Cross-slide tool post and tail stock
- (d) Tool post and tail stock

Ans. (a)

IAS - 2004

Swiss type screw machines have

- (a) Turrets (b) Radial slides
(c) Spindle carriers (d) Tool posts

Ans. (c)

IAS - 2001

Consider the following operations and time required on a multi spindle automatic machine to produce a particular job

1. Turning ...1.2 minutes
2. Drilling ...1.6 minutes
3. Forming ...0.2 minute
4. Parting ...0.6 minute

The time required to make one piece (cycle time) will be

- (a) 0.6 minutes (b) 1.6 minutes
(c) 3.6 minutes (d) 0.9 minute Ans. (b)

IAS - 1995

Assertion (A): In a multi-spindle automat, the turret is indexed to engage each of the cutting tool mounted on it.

Reason(R): Turret is a multiple tool holder so that the machining can be continued with each tool without the need to change the tool.

- (a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans. (d)

IAS - 1994

A multi-spindle automat performs four operations with times 50, 60, 65 and 75 seconds at each of its work centers. The cycle time (time required to manufacture one work piece) in seconds will be

- (a) $50 + 60 + 65 + 75$
(b) $(50 + 60 + 65 + 75) / 4$
(c) $75/4$
(d) 75

Ans. (d)

Set-2

IAS - 1998

Assertion (A): For thread cutting, the spindle speed selected on a lathe, is very low.

Reason (R): The required feed rate is low in threading operation.

- (a) Both A and R are individually true and R is the correct explanation of A
 (b) Both A and R are individually true but R is **not** the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true **Ans. (c)**

IAS - 1998

Consider the following statements associated with the lathe accessories:

1. Steady rest is used for supporting a long job in between head stock and tail stock.
2. Mandrel is used for turning small cylindrical job.
3. Collects are used for turning disc-shaped job.

Of these statements:

- (a) 1 and 2 are correct (b) 2 and 3 are correct
 (c) 3 alone is correct (d) 1 alone is correct

Ans. (d)

IES 2011

In Norton type feed gearbox for cutting Whitworth standard threads with a standard TPI Leadscrew, power flows from:

- (a) Spindle to Tumbler gear to Norton cone to Meander drive to Leadscrew
 (b) Spindle to Norton cone to Tumbler gear to Meander drive to Leadscrew
 (c) Spindle to Tumbler gear to Meander drive to Norton cone to Leadscrew
 (d) Spindle to Norton cone to Meander drive to Tumbler gear to Leadscrew **Ans. (a)**

IAS - 2000

Consider the following features:

1. All spindles operate simultaneously,
2. One piece is completed each time the tools are withdrawn and the spindles are indexed
3. The tool slide indexes or revolves with the spindle carrier

Which of these features are characteristics of a multi-spindle automatic machine used for bar work?

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

Ans. (a)

Set-2



IES - 2004

Consider the following statements:

The helical flute in a twist drill provides the necessary

1. Clearance angle for the cutting edge
2. Rake angle for the cutting edge
3. Space for the chip to come out during drilling
4. Guidance for the drill to enter into the workpiece

Which of the statements given above are correct?

- (a) 1 and 2 (b) 2 and 3
(c) 3 and 4 (d) 1 and 4 **Ans. (b)**

IES - 2003

The purpose of helical grooves in a twist drill is to

1. Improve the stiffness
2. Save a tool material
3. Provide space for chip removal
4. Provide rake angle for the cutting edge

Select the correct answer using the codes given below:

Codes:

- (a) 1 and 2 (b) 2 and 3
(c) 3 and 4 (d) 1 and 4 **Ans. (c)**

GATE- 1996

The rake angle in a drill

- (a) Increases from centre to periphery
- (b) decreases from centre to periphery
- (c) Remains constant
- (d) Is irrelevant to the drilling operation

Ans. (a)

IES - 1997

The rake angle in a twist drill

- (a) Varies from minimum near the dead centre to a maximum value at the periphery
- (b) Is maximum at the dead centre and zero at the periphery
- (c) Is constant at every point of the cutting edge
- (d) Is a function of the size of the chisel edge.

Ans. (a)

IES - 1992

A drill for drilling deep holes in aluminum should have

- (a) High helix angle (b) Taper shank
- (c) Small point angle (d) No lip

Ans. (a)

Set-2

GATE- 1997

Helix angle of fast helix drill is normally

- (a) 35°
- (b) 60°
- (c) 90°
- (d) 5°

Ans. (a)

IES - 1992

Low helix angle drills are preferred for drilling holes in

- (a) Plastics
- (b) Copper
- (c) Cast steel
- (d) Carbon steel

Ans. (d)

Example

A hole with 40-mm diameter and 50-mm depth is to be drilled in mild steel component. The cutting speed can be taken as 65 m/min and the feed rate as 0.25 mm/rev. Calculate the machining time and the material removal rate.

GATE- 2002

The time taken to drill a hole through a 25 mm thick plate with the drill rotating at 300 r.p.m. and moving at a feed rate of 0.25 mm/revolution is

- (a) 10 sec
- (b) 20 sec
- (c) 60 sec
- (d) 100 sec

Ans. (b)

GATE- 2004

Through holes of 10 mm diameter are to be drilled in a steel plate of 20 mm thickness. Drill spindle speed is 300 rpm, feed 0.2 mm/ rev and drill point angle is 120° . Assuming drill over travel of 2 mm, the time for producing a hole will be

- (a) 4 seconds
- (b) 25 seconds
- (c) 100 seconds
- (d) 110 seconds

Ans. (b)

IES - 2002

The arm of a radial drilling machine is being raised at a speed of 3.9 m/min by single start square threads of 6 mm pitch and 30 mm diameter. The speed of the screw

- (a) Is 650 rpm
- (b) Is 180 rpm
- (c) Is 130 rpm
- (d) Cannot be determined as the data is insufficient

Ans. (a)

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IES - 1994

The ratio between two consecutive spindle speeds for a six-speed drilling machine using drills of diameter 6.25 to 25 mm size and at a cutting velocity of 18 m/min is

(a) 1.02 (b) 1.32
(c) 1.62 (d) 1.82

Ans. (b)

IES - 2009

What is the drilling time for producing a hole in an MS sheet of 25 mm thickness using an HSS drill of 20 mm diameter? The cutting speed and feed for drill are 20 m/min and 0.25 mm/revolution respectively, Neglect time taken for setting up, approaching and travelling of tools.

(a) 0.314 min (b) 0.236 min
(c) 0.438 min (d) 0.443 min

Ans. (a)

IES - 2002

A 31.8 mm H.S.S. drill is used to drill a hole in a cast iron block 100 mm thick at a cutting speed 20 m/min and feed 0.3 mm/rev. If the over travel of drill is 4 mm and approach 9 mm, the time required to drill the hole is

(a) 1 min 40 s (b) 1 min 44 s
(c) 1 min 49 s (d) 1 min 53 s

Ans. (d)

IAS - 1999

To drill a 10 mm diameter hole through a 20 mm thick M.S. plate with a drill bit running at 300 rpm and a feed of 0.25 mm per revolution, time taken will be

(a) 8 s (b) 16 s
(c) 24 s (d) 32 s

Ans. (b)

IAS - 1994

The time (in minutes) for drilling a hole is given by

$$t = \frac{\text{Depth of the hole} + h}{\text{Feed} \times \text{RPM}}$$

where 'h' is the

(a) Length of the drill
(b) Drill diameter
(c) Flute length of the drill
(d) Cone height of the drill.

Ans. (d)

IES - 1999

Match List-I (Drill bits) with List-II (Applications) and select the correct answer using the codes given below the Lists:

<p>List-I</p> <p>A. Core drill</p> <p>B. Reamer</p> <p>C. Counter bore drill</p> <p>D. Tap drill</p>	<p>List-II</p> <p>1. To enlarge a hole to a certain depth so as to accommodate the bolt head of a screw</p> <p>2. To drill and enlarge an already existing hole in a casting</p> <p>3. To drill a hole before making internal thread</p> <p>4. To improve the surface finish and dimensional accuracy of the already drilled hole</p>
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Code:	A	B	C	D	A	B	C	D
(a)	1	3	2	4	(b)	2	3	1
(c)	2	4	1	3	(d)	3	2	4

Ans. (c)



IES - 1999

Which one of the following processes results in the best accuracy of the hole made?

(a) Drilling (b) Reaming
(c) Broaching (d) Boring

Ans. (b)

IES - 1999

Consider the following statements regarding reaming process:

1. Reaming generally produces a hole larger than its own diameter
2. Generally rake angles are not provided on reamers.
3. Even numbers of teeth are preferred in reamer design.

Which of these statements are correct?

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

Ans. (b)

IES - 1998

Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I	List-II
A. Reaming	1. Smoothing and squaring surface around the hole for proper seating
B. Counter-boring	2. Sizing and finishing the hole
C. Counter-sinking	3. Enlarging the end of the hole
D. Spot facing	4. Making a conical enlargement at the end of the hole

Ans. (d)

Code: A	B	C	D	A	B	C	D
(a) 3	2	4	1	(b) 2	3	1	4
(c) 3	2	1	4	(d) 2	3	4	1

IES - 1994

In reaming process

(a) Metal removal rate is high
(b) High surface finish is obtained.
(c) High form accuracy is obtained
(d) High dimensional accuracy is obtained.

Ans. (d)

IES - 1993

A hole of 30 mm diameter is to be produced by reaming. The minimum diameter permissible is 30.00 mm while the maximum diameter permissible is 30.05 mm. In this regard, consider the following statements about the reamer size:

1. The minimum diameter of the reamer can be less than 30 mm.
2. The minimum diameter of the reamer cannot be less than 30 mm.
3. The maximum diameter of the reamer can be more than 30.05 mm.
4. The maximum diameter of the reamer must be less than 30.05 mm.

Of these statements

Ans. (d)

(a) 1 and 4 are correct (b) 1 and 3 are correct
(c) 2 and 3 are correct (d) 2 and 4 are correct

Set-2

IES - 1998

A component requires a hole which must be within the two limits of 25.03 and 25.04 mm diameter. Which of the following statements about the reamer size are correct?

1. Reamer size cannot be below 25.03 mm.
2. Reamer size cannot be above 25.04 mm.
3. Reamer size can be 25.04 mm.
4. Reamer size can be 25.03 mm.

Select the correct answer using the codes given below:

(a) 1 and 3 (b) 1 and 2 **Ans. (b)**
 (c) 3 and 4 (d) 2 and 4

IAS - 1999

For reaming operation of blind hole, the type of reamer required is

- (a) Straight flute reamer
- (b) Right hand spiral fluted reamer
- (c) Left hand spiral fluted reamer
- (d) None of the above

Ans. (b)

IAS - 2003

Match List I (Operation) with List II (Application) and select the correct answer using the codes given below the lists:

List-I	List-II	Ans. (c)
(Operation)	(Application)	
(A) Reaming	1. Used for enlarging the end of a hole to give it a conical shape for a short distance	
(B) Boring	2. Used for enlarging only a limited portion of the hole	
(C) Counter boring	3. Used for finishing a hole	
(D) Counter sinking	4. Used for enlarging a hole	

Codes: A B C D A B C D

(a) 3 2 4 1 (b) 1 4 2 3
 (c) 3 4 2 1 (d) 1 2 4 3

IES - 1992

Shell reamers are mounted on

- (a) Tool holders
- (b) Armour plates
- (c) Arbor
- (d) Shanks

Ans. (c)

IES - 1993

The main purpose of boring operation, as compared to drilling is to:

- (a) Drill a hole
- (b) Finish the drilled hole
- (c) Correct the hole
- (d) Enlarge the existing hole

Ans. (d)

IES - 1994

Enlarging an existing circular hole with a rotating single point tool is called

- (a) Boring
- (b) Drilling
- (c) Reaming
- (d) Internal turning.

Ans. (a)

Set-2

IES - 1992

Which of the machine tools can be used for boring

1. Lathe
 2. Drilling machine
 3. Vertical milling machine
 4. Horizontal milling machine
- (a) 1, 2, 3 (b) 1, 3, 4
(c) 2 and 4 (d) 1, 2, 3, 4

Ans. (a)

IES - 2000

Which one of the following sets of tools or tools and processes are normally employed for making large diameter holes?

- (a) Boring tool
- (b) BTA tools (Boring and trepanning association) and gun drill
- (c) Gun drill and boring tool
- (d) Boring tools and trepanning

Ans. (d)

IES - 1996

Which of the following statements are correct?

1. A boring machine is suitable for a job shop.
 2. A jig boring machine is designed specially for doing more accurate work when compared to a vertical milling machine.
 3. A vertical precision boring machine is suitable for boring holes in cylinder blocks and liners.
- (a) 1, 2 and 3 (b) 1 and 2
(c) 2 and 3 (d) 1 and 3

Ans. (a)

IES - 1995

The effects of setting a boring tool above centre height leads to a/an.

- (a) Increase in the effective rake angle and a decrease in the effective clearance angle.
- (b) Increase in both effective rake angle and effective clearance angle.
- (c) Decrease in the effective rake angle and an increase in the effective clearance angle.
- (d) Decrease in both effective rake angle and effective clearance angle.

Ans. (c)

JWM 2010

Consider the following operations regarding boring machines :

1. Counterboring
2. Countersinking
3. Trepanning

Which of the above operations is/are correct ?

- (a) 1, 2 and 3 (b) 1 and 2 only
(c) 2 and 3 only (d) 1 only

Ans. (a)

IES - 2007

Among the following machining processes, which can be used for machining flat surfaces?

1. Shaping 2. Milling 3. Broaching

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

Ans. (d)

Set-2

IES - 1993

Assertion (A): Soluble oils are employed with broaching machine.
Reason (R): Soluble oils have excellent cooling effect.

(a) Both A and R are individually true and R is the correct explanation of A
 (b) Both A and R are individually true but R is **not** the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true **Ans. (a)**

IES – 1993, 2001

Assertion (A): No separate feed motion is required during broaching.
Reason (R): The broaching machines are generally hydraulically operated.

(a) Both A and R are individually true and R is the correct explanation of A
 (b) Both A and R are individually true but R is **not** the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true **Ans. (b)**

IES - 2001

The screw and nut in a broaching machine are changed from square thread to ACME thread. The power requirement of the machine at the same r.p.m. will

(a) Remain same
 (b) Decrease
 (c) Increase
 (d) Depend on the operator

Ans. (c)

IAS - 2004

Which one of the following is true for the last few teeth of a broach which are meant for fine finishing?

(a) They have equal diameter
 (b) They have increasing diameter
 (c) They have decreasing diameter
 (d) They have alternately increasing and decreasing diameter.

Ans. (a)

IES - 2005

Match List I (Tool) with List II (Element of Tool) and select the correct answer using the code given below the Lists: **Ans. (c)**

<p>List I</p> <p>A. Broach B. Reamer C. Drill D. Carbide insert face mill</p>	<p>List II</p> <p>1. Tang 2. Pilot 3. Front taper 4. Bond 5. Sweeper tooth</p>
---	---

Codes:	A	B	C	D	A	B	C	D	
(a)	2	5	1	3	(b)	1	3	4	5
(c)	2	3	1	5	(d)	1	5	4	3

IES - 2002

Match List I with List II and select the correct answer:

<p>List I (Machine tool)</p> <p>A. Lathe B. Drilling machine C. Shaper D. Broaching machine</p>	<p>List II (Features)</p> <p>1. Push or pull tool 2. Ratchet and pawl mechanism 3. Dividing head 4. Hollow tapered spindle 5. Face plate</p>
---	---

Ans. (d)

Codes:	A	B	C	D	A	B	C	D	
(a)	2	4	5	1	(b)	5	3	2	4
(c)	2	3	5	4	(d)	5	4	2	1

Set-2



Example

A C50 steel flat surface of dimensions 100 mm × 250 mm is to be produced on a horizontal axis milling machine. An HSS slab mill with a 100 mm diameter and 150 mm width is to be used for the purpose. The milling cutter has 8 teeth.

Calculate the machining time assuming that entire stock can be removed in one depth of 2 mm.

Given,

Feed, $f = 0.13$ mm/tooth,

Cutting speed, $V = 20$ m/min.

Ans. 4.11 min

GATE - 1995

List-I (Manufacturing Processes)	List-II (Condition)
(A) Finish turning	1. Backlash eliminator
(B) Forming	2. Zero rake
(C) Thread cutting	3. Nose radius
(D) Down milling	4. Low speed

Codes: A B C D A B C D

(a) 2 3 4 1 (b) 3 4 1 2

(c) 1 2 3 4 (d) 4 1 2 3

Ans. (a)

GATE - 1993

A milling cutter having 8 teeth is rotating at 150 rpm. If the feed per tooth is 0.1, the table speed in mm per minute is

- (a) 120 (b) 187
(c) 125 (d) 70

Ans. (a)

IES - 2003

In milling machine, the cutting tool is held in position by

- (a) Chuck (b) Spindle
(c) Arbor (d) Tool holder

Ans. (c)

IES - 2009

The arbor of a milling machine is used to hold which one of the following?

- (a) Spindle (b) Over-arm
(c) Cutting tool (d) Mandrel

Ans. (c)

Set-2

IES - 1994

Consider the following operations:

1. Cutting key ways on shafts
2. Cutting external screw threads.
3. Cutting teeth of spur gears
4. Cutting external splines.

Those which can be performed with milling cutters would include

- (a) 1 and 2 (b) 2,3 and 4
(c) 1 and 3 (d) 1,2,3 and 4 .

Ans. (d)

IES - 1992

A set of eight form relieved milling cutters for each module is provided to enable cutting of gears of different

- (a) Materials
(b) Types e.g. spur, helical, etc.
(c) Number of teeth
(d) Width of gears

Ans. (c)

IES - 2007

What is the process of removing metal by a milling cutter which is rotated against the direction of travel of the work piece, called?

- (a) Down milling (b) Up milling
(c) End milling (d) Face milling

Ans. (b)

GATE - 1992

In horizontal milling process..... (up/down) milling provides better surface finish and..... (up-down) milling provides longer tool life.

Ans. down, down

IES - 1997

Consider the following statements:

In Up milling process,

1. The cutter starts the cut from the machined surface and proceeds upwards.
2. The cutter starts the cut from the top surface and proceeds downwards.
3. The job is fed in a direction opposite to that of cutter rotation.
4. The job is fed in the same direction as that of cutter rotation.

Of these statements correct are:

- (a) 1 and 3 (b) 1 and 4
(c) 2 and 3 (d) 2 and 4

Ans. (a)

IES - 1995

Assertion (A): Up milling or climb milling is commonly used for machining castings and forgings.

Reason (R): Up milling can be done on universal milling machines.

- (a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is **not** the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans. (d)

Set-2

IES - 2005

Which one of the following statements is correct?

In up-milling operation, the undeformed chip thickness,

- a) Is zero at the start of the cut and increases to a maximum value just before the tooth disengages the workpiece.
- b) Increases to the maximum value at the centre of the travel and decreases towards the end of tooth engagement.
- c) Has a maximum value just after the cut is started and drops to zero at the end of the cut.
- d) Remains unchanged.

Ans. (a)

IES - 1993

Climb milling is chosen while machining because

- (a) The chip thickness increases gradually
- (b) It enables the cutter to dig in and depth of cut
- (c) The specific power consumption is reduced
- (d) Better surface finish can be obtained

Ans. (d)

IES 2010

Assertion (A): Climb or down milling operation ensures smoother operation of the machine tool and longer tool life as compared to the conventional up milling operation.

Reason (R): In climb or down milling operation, the rotational motion of the cutter as well as the feed motion of the work-piece are in the same direction, and the depth of cut is maximum at the entry point as the cutter engages the workpiece.

- (a) Both A and R are individually true and R is the correct explanation of A
- (b) Both A and R are individually true but R is NOT the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans. (b)

IES - 2002

Assertion (A): Virtually all modern milling machines are capable of doing down-milling.

Reason (R): In down-milling the cutter tends to push the work along and lift it upward from the table. This action tends to eliminate any effect in looseness in the feed screw and nut of the milling machine table and results in smooth cut.

- (a) Both A and R are individually true and R is the correct explanation of A
- (b) Both A and R are individually true but R is **not** the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans. (c)

IES - 2004

The cutting speed of a milling cutter while cutting brass is:

- (a) 45 to 60 m/min
- (b) 30 to 40 m/min
- (c) 25 to 35 m/min
- (d) 15 to 20 m/min

Ans. (a)

IES - 2006

Gang milling is a

- (a) Milling process for generating hexagonal surfaces
- (b) Process of cutting gears
- (c) Process in which two or more cutters are used simultaneously
- (d) Milling operation combined with turning

Ans. (c)

Set-2

IES - 2009

For machining, which one of the following gang milling operations is employed?

- (a) Threads
- (b) Bores
- (c) Grooves
- (d) Steps on prismatic parts

Ans. (d)

IES - 1995

In a milling operation two side milling cutters are mounted with a desired distance between them so that both sides of a work piece can be milled simultaneously. This set up is called.

- (a) Gang milling
- (b) Straddle milling
- (c) String milling
- (d) Side milling.

Ans. (b)

IES - 2004

One brand of milling machine has the following two index plates supplied along with the indexing head:

Plate 1: 15, 16, 17, 18, 19, 20 hole circles

Plate 2: 21, 23, 27, 29, 31, 33 hole circles

It is proposed to mill a spur gear of 28 teeth using simple indexing method. Which one of the following combinations of index plate and number of revolutions is correct?

- (a) Plate 1: 1 revolution and 9 holes in 18 hole circles
- (b) Plate 2: 1 revolution and 9 holes in 21 hole circles
- (c) Plate 2: 1 revolution and 9 holes in 33 hole circles
- (d) Plate 1: 1 revolution and 9 holes in 15 hole circles

Ans. (b)

IES - 2000

One of the index plates of a milling machine dividing head has the following hole circles: 15; 16; 17; 18; 19; 20

A gear wheel of 34 teeth has to be milled by simple indexing method. To machine each tooth, the index crank has to be rotated through

- (a) 17 holes in the 20-hole circle
- (b) 18 holes in the 20-hole circle
- (c) 1 revolution and 3 holes in 17-hole circle
- (d) 1 revolution and 2 holes in 18-hole circle

Ans. (c)

IES - 1999

A straight teeth slab milling cutter of 100 mm diameter and 10 teeth rotating at 200 r.p.m. is used to remove a layer of 3 mm thickness from a steel bar. If the table feed is 400 mm/minute, the feed per tooth in this operation will be

- (a) 0.2 mm
- (b) 0.4 mm
- (c) 0.5 mm
- (d) 0.6 mm

Ans. (a)

IES - 2002

A side and face cutter 125 mm diameter has 10 teeth. It operates at a cutting speed of 14 m/min with a table traverse 100 mm/min. The feed per tooth of the cutter is

- (a) 10 mm
- (b) 2.86 mm
- (c) 0.286 mm
- (d) 0.8 mm

Ans. (c)

Set-2

IES - 2004

Match List I (Milling problem) with List II (Probable causes) and select the correct answer using the codes given below the Lists:

List I		List II		Ans. (b)
A. Chatter	1.	Too high feed		
B. Poor surface finish	2.	Lack of rigidity in machine fixtures, bar or workpiece		
C. Loss of accuracy	3.	High cutting load		
D. Cutter burrs	4.	Radial relief too great		
	5.	Not enough lubricant		

Codes:	A	B	C	D	A	B	C	D
(a)	2	1	5	3	(b)	2	1	3
(c)	4	5	2	3	(d)	4	2	3

IAS - 2001

Which one of the following statements are correct in respect of up-milling and down-milling?

- In up-milling the cutter rotates in a direction opposite to that of workpiece travel whereas in down-milling the cutter rotates in a direction similar to that of workpiece travel.
- In down-milling chip will be thin at the beginning and increase to a maximum at the end of the cut and reverse will be the case for a chip formed by up-milling.
- Down-milling is desirable with milling cutters having a high radial rake angle when compared to up-milling.
- Down-milling forces the work-piece against the milling table to exert more pressure while up-milling tends to lift the workpiece from the table.

Select the correct answer using the codes given below:

Codes:

- | | | | |
|-----|------------|-----|------------|
| (a) | 1, 2 and 3 | (b) | 1, 2 and 4 |
| (c) | 3 and 4 | (d) | 1, 3 and 4 |

Ans. (d)

IAS - 1998

Which of the following statements are true of face milling?

- Face milling cutter is held on an arbor.
- It has two rake angles- axial rake and radial rake.
- The maximum chip thickness equals the feed per tooth.
- The chip thickness varies from a minimum at the start of cut to a maximum at the end of cut.

Select the correct answer using the codes given below:

Codes :

- | | | | |
|-----|---------|-----|---------|
| (a) | 1 and 2 | (b) | 2 and 3 |
| (c) | 2 and 4 | (d) | 3 and 4 |

Ans. (b)

IAS - 2001

Which of the following mechanisms are suitable for indexing the table of rotary transfer line?

- | | |
|--------------------|---------------------|
| 1. Rack and pinion | 2. Ratchet and pawl |
| 3. Lead screw | 4. Geneva mechanism |

Select the correct answer by using the codes given below:

Codes:

- | | | | |
|-----|------------|-----|------------|
| (a) | 1, 2 and 3 | (b) | 2, 3 and 4 |
| (c) | 1, 3 and 4 | (d) | 1, 2 and 4 |

Ans. (d)

IAS - 2000

Consider the following mechanisms:

- Geneva gearing
- Rack and pinion
- Ratchet and pawl

Which of these mechanisms are used to index the work table on a transfer machine?

- | | | | |
|-----|---------|-----|------------|
| (a) | 1 and 2 | (b) | 2 and 3 |
| (c) | 1 and 3 | (d) | 1, 2 and 3 |

Ans. (d)

IAS - 1994

A standard dividing head is equipped with the following index plates

- Plate with 12, 16, 17, 18, 19, 20 holes circles
- Plate with 21, 23, 27, 29, 31, 33 holes circles
- Plate with 37, 39, 41, 43, 47, 49 holes circles

For obtaining 24 divisions on a work piece by simple indexing

- | | |
|-----|---------------------------------|
| (a) | Hole plate 2 alone can be used |
| (b) | Hole plates 1 and 2 can be used |
| (c) | Hole plates 1 and 3 can be used |

Ans. (d)

- | | |
|-----|--|
| (d) | Any of the three hole plates can be used |
|-----|--|

Set-2

IAS - 2003

A milling cutter of 70 mm diameter with 12 teeth is operating at a cutting speed of 22 m/min and a feed of 0.05 mm/tooth. The feed per minute is

(a) 110 m/min (b) 35 mm/min
(c) 6 mm/min (d) 60 mm/min

Ans (d)

IES-1994

Which one of the following operations is carried out at the minimum cutting velocity if the machines are equally rigid and the tool work materials are the same?

(a) Turning
(b) Grinding
(c) Boring
(d) Milling

Ans (d)

IES 2011

Match List -I with List -II and select the correct answer using the code given below the lists : **Ans (b)**

List -I				List -II			
A. Lathe				1. Flute			
B. Shaper				2. Universal indexing			
C. Drilling machine				3. Leadscrew			
D. Milling machine				4. Rocker arm			
A	B	C	D	A	B	C	D
(a) 2	4	1	3	(b) 3	4	1	2
(c) 2	1	4	3	(d) 3	1	4	2

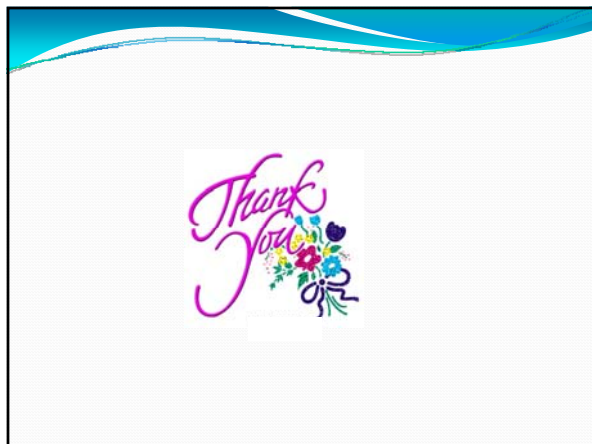
IES- 2002

Match List I with List II and select the correct answer:

List I (Machine tools)	List II (Machine tool parts)
A. Lathe	1. Lead screw
B. Milling machine	2. Rocker arm
C. Shaper	3. Universal indexing
D. Drilling machine	4. Flute

Ans (d)

Codes:	A	B	C	D	A	B	C	D
(a)	4	2	3	1	(b)	1	3	2
(c)	4	3	2	1	(d)	1	2	3



Ch-7: Milling

Q No	Option	Q. No	Option
1	B	7	D
2	B	8	D
3	D	9	A
4	A	10	D
5	C	11	C
6	D	12	D

Set-2



GATE - 2005

A 600 mm x 30 mm flat surface of a plate is to be finish machined on a shaper. The plate has been fixed with the 600 mm side along the tool travel direction. If the tool over-travel at each end of the plate is 20 mm, average cutting speed is 8 m/min, feed rate is 0.3 mm/stroke and the ratio of return time to cutting time of the tool is 1:2, the time required for machining will be

- (a) 8 minutes (b) 12 minutes
(c) 16 minutes (d) 20 minutes

Ans. (b)

IES - 2004

Consider the following alignment tests on machine tools

1. Straightness 2. Flatness
3. Run out 4. Parallelism

Which of the above alignment tests on machine tools are common to both lathe and shaper?

- (a) 1 and 2 (b) 2 and 3
(c) 3 and 4 (d) 1 and 4

Ans. (d)

IES - 2001

In a shaper machine, the mechanism for tool feed is

- (a) Geneva mechanism
(b) Whitworth mechanism
(c) Ratchet and Pawl mechanism
(d) Ward- Leonard system

Ans. (c)

IES 2010

Assertion (A): Longitudinal cutting motion of the tool and cross-wise feed motion of the job generates flat surfaces in planning process.

Reason (R): Jobs used in planning machines are generally long and heavy compared to shaping.

- (a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans. (d)

IES - 1997

Which of the following are the advantages of a hydraulic shaper over a mechanically driven shaper?

1. More strokes per minute can be obtained at a given cutting speed.
2. The cutting stroke has a definite stopping point.
3. It is simpler in construction.
4. Cutting speed is constant throughout most of the cutting stroke.

Select the correct answer using the codes given below:

- (a) 1 and 2 (b) 1 and 4
(c) 2 and 4 (d) 1, 3 and 4

Ans. (b)

Set-2

IES - 1995

In a mechanical shaper, the length of stroke is increased by

- (a) Increasing the centre distance of bull gear and crank pin
- (b) Decreasing the centre distance of bull gear and crank pin
- (c) Increasing the length of the ram
- (d) Decreasing the length of the slot in the slotted lever

Ans. (a)

IES - 1994

Given that, average cutting speed = 9 m/min, the return time to cutting time ratio is = 1 : 2, the feed rate = 0.3 mm/stroke, the clearance at each end of cut = 25 mm and that the plate is fixed with 700 mm side along the direction of tool travel, the time required for finishing one flat surface of a plate of size 700 x 30 mm in a shaper, will be

- (a) 10 min (b) 12.5 min Ans. (b)
- (c) 15 min (d) 20 min

IAS - 1995

Size of a shaper is given by

- (a) Stroke length (b) Motor power
- (c) Weight of the machine (d) Table size

Ans. (a)

IAS - 1994

Stroke of a shaping machine is 250 mm. It makes 30 double strokes per minute. Overall average speed of operation is

- (a) 3.75 m/min (b) 5.0 m/min
- (c) 7.5 m/min (d) 15 m/min

Ans. (d)



IES - 1999

Consider the following processes for the manufacture of gears:

1. Casting
2. Powder metallurgy
3. Machining from bar stock
4. Closed die forging

The correct sequence in increasing order of bending strength of gear teeth is

(a) 1, 2, 3, 4 (b) 1, 2, 4, 3
 (c) 2, 1, 4, 3 (d) 2, 1, 3, 4 **Ans. (a)**

IES - 2006

Which of the following is/are used for cutting internal gears?

1. Gear hobber 2. Gear shaper
3. Rack cutter 4. Jig borer

Select the correct answer using the codes given below:

(a) Only 1 and 2 (b) Only 2 and 3
 (c) Only 1 and 4 (d) Only 2

Ans. (d)

IES - 2005

In helical milling, the ratio of the circumference of the gear blank to the lead of the helix determines the:

- (a) Proper speed to use
- (b) Proper feed and depth of cut required
- (c) Angle setting of the machine table
- (d) Gear ratio for table screw and dividing head

Ans. (c)

IES 2010

Match List I with List II and select the correct answer using the code given below the lists: **Ans. (d)**

List I (Type of work)	List II (Manufacturing)
A. High rate production of worm Gears and worm wheel	1. Gear shaving
B. Generating internal gears and Cluster gears	2. Gear milling
C. Finishing of gear tooth profiles	3. Gear hobbing
D. Repair and piece production of gears	4. Gear shaping

	A	B	C	D		A	B	C	D
(a)	2	1	4	3	(b)	3	1	4	2
(c)	2	4	1	3	(d)	3	4	1	2

IES - 1996

Gear cutting on a milling machine using an involute profile cutter is a

- (a) Gear forming process
- (b) Gear generating process.
- (c) Gear shaping process
- (d) Highly accurate gear producing process.

Ans. (a)

