1. Pre-heating of feed water is done in
   (1) Condenser
   (2) Regenerative heater
   (3) Electro static precipitator
   (4) Economiser

   Ans: 4 (using steam extracted from steam turbine)

2. Electrostatic precipitator is used to
   (1) precipitate dissolved salts in feed water
   (2) remove fly ash from flue gas
   (3) remove static electricity from the gases
   (4) clean the tube surfaces by removing ash

   Ans: 2 (used in coal based power plants, cement plants, etc.)

3. What is the nearest heating value of Indian Coal ?
   (1) 10,000 kcal/kg (2) 7,000 kcal/kg
   (3) 4,000 kcal/kg (4) 2,000 kcal/kg

   Ans: 3

4. Which of the following is an isothermal process ?
   (1) sensible heating of refrigerant
   (2) undercooling of refrigerant
   (3) expansion of refrigerant in capillary tube
   (4) vapourisation of refrigerant in the evaporator

   Ans: 4.

   (Option 1 – a sensible heating and hence temperature change
   Option 2 - undercooling is sensible process and hence temperature change
   Otion 3 – a temperature drop process
   Option 4 – a constant temperature process. condensation of refrigerant in the condenser is also isothermal process. Melting, freezing, condensation and vaporization are isothermal process)

5. Transducer used in load cell is
   (1) Thermistor (2) Strain gauge
   (3) Bi-metal strip (4) Bourdon gauge

Ans: 2

6. Which of the following instruments is used for precision linear measurements in shop floor

(1)Micrometer (2) Slip gauge (3) Clinometer (4) Comparator

Ans: 1

7. Geiger Muller tube/counter is used for detection/measurement of

(1) Nuclear Radiation (2) High vacuum
(3) Low temperatures (4) Photons

Ans: 1

8. Which of the following statements is FALSE ?

(1) For the same compression ratio Otto cycle is more efficient than Diesel cycle
(2) Detonation limits compression ratio in petrol engines
(3) Water cooled engine is more efficient than aircooled engines
(4) Two stroke petrol engine is less efficient than four stroke petrol engine

Ans: 4

9. Connecting rod is usually made of

(1) Aluminium (2) Medium carbon steel
(3) Cast iron (4) Low carbon steel

Ans: 2 (manufactured by drop forging)

10. Plain and butt welds may be used on materials upto

(1) 25 mm thickness (2) 50 mm thickness
(3) 70 mm thickness (4) 90 mm thickness

Ans: 1

11. The purpose of Jigs and Fixtures is to

(1) Increase production rate
(2) Increase machining accuracy
(3) Facilitate interchangeable manufacture
(4) All of the above

Ans: 4

12. Gears are best mass-produced by

(1) Milling (2) Shaping
(3) Hobbing (4) Casting

Ans: 3

13. The hardness of a grinding wheel is specified by

(1) BHN (2) VPN

(3) Letter of alphabet (4) Rockwell hardness number

Ans: 3

14. Time taken to drill a hole through a 25 mm thick plate at 300 rpm and at a feed rate of 0.25mm/rev will be

(1) 10 sec (2) 15 sec

(3) 20 sec (4) 25 sec

Ans:3. (t = 25mm. Time to drill, $T = \frac{t}{f.N} = \frac{25}{0.25x300} = \frac{1}{3} minute = 20\ second$)

15. ABC analysis deals with

(1) Analysis of process charts (2) Inventory control

(3) Flow of materials (4) Ordering schedule of jobs

Ans: 2

16. In a free cutting steel, the machinability is improved by the presence of

(1) Silicon and sulphur

(2) Phospherous, lead and sulphur

(3) Sulphur, graphite and aluminium

(4) Phospherous and aluminium

Ans: 2

Free machining steels are **carbon steels that have sulfur, lead, bismuth, selenium, tellurium, or phosphorus added**. Sulfur forms the compound manganese sulfide, which is soft and acts as a chip-breaking discontinuity. It also acts as a dry lubricant to prevent a built up edge on the cutting tool.
https://en.wikipedia.org/wiki/Free_machining_steel

17. Which of the following welding processes uses non-consumable electode ?

(1) LASER Beam welding (2) MIG welding

(2) Plasma arc welding (4) TIG welding

Ans: 4 (Other methods include carbon arc welding)

Gas Tungsten Arc Welding (GTAW), also known as tungsten inert gas (TIG) welding is a process that produces an electric arc maintained between a non-consumable tungsten electrode and the part to be welded.

18. Thermit welding is a form of

(1) Fusion welding (2) Gas welding
(3) Resistance welding (4) Forge welding

Ans: 1

19. Which of the following materials is best cut by oxy-acetylene cutting method?

(1) Brass (2) Copper
(3) Mild steel (4) Stainless steel

Ans: 3

20. Oxygen to acetylene ratio in the case of carburizing flame is

(1) 0.5 : 1 (2) 1 : 1
(3) 2 : 1 (4) 1 : 1.2

Ans: 2

21. The intensity of stress which causes unit strain is called

(1) Unit Stress (2) Modulus of Elasticity
(3) Bulk Modulus (4) Modulus of Rigidity

Ans: 1

Stress is the measure of an external **force** acting over the **cross sectional area** of an object. Stress has units of force per area: N/m^2 (SI) or lb/in^2 (US). The SI units are commonly referred to as Pascals, abbreviated **Pa**. Since the 1 Pa is inconveniently small compared to the stresses most structures experience,
10^3 Pa = 1 kPa (kilo Pascal), 10^6 Pa = a MPa (mega Pascal), or 10^9 Pa = GPa (giga Pascal).
There are two types of stress that a structure can experience:
1. Normal Stress **and**
2. Shear Stress**.**
When a force acts perpendicular (or "normal") to the surface of an object, it exerts a normal stress. When a force acts parallel to the surface of an object, it exerts a shear stress.

https://www.bu.edu/moss/mechanics-of-materials-stress/

22. To keep the noise to the minimum, following type of gear should be used

(1) Involute (2) Helical

(3) Cycloidal (4) Bevel

Ans: 2

23. Flexible coupling is used because

(1) It is easy to disassemble

(2) It is easy to engage and disengage

(3) It transmits shocks gradually

(4) It prevents shock transmission and eliminates stress reversal

Ans: 4

24. Piston rings are usually made of

(1) Cast iron (2) Aluminium

(3) Babbit (4) High carbon steel

Ans: 1

25. In sand moulding the bottom most part of flask is called

(1) Cope (2) Drag

(3) Flask bottom (4) Check

Ans: 2.

26. In sand moulding the top most part of flask is called

1. Cope (2) Drag

3. Flask bottom (4) Check

Ans: 1

27. Draft on pattern for casting is provided for

(1) Shrinkage allowance

(2) Taper to facilitate pattern withdrawal

(3) Machining allowance

(4) Increase in size of cavity due to shaking of pattern

Ans: 2

28. Negative rake is usually provided on

(1) HSS tool
(2) High carbon steel tool
(3) Cemented carbide tool
(4) None of the above

Ans: 3

29. Factor of safety is the ration of
(1) Yield stress / working stress
(2) Tensile stress / working stress
(3) Bearing stress / working stress
(4) Bearing stress / yield stress

Ans: 2

30. In the following, which one is the correct statement ?

(1) IHP = BHP + FHP
(2) IHP = BHP – FHP
(3) BHP = IHP + FHP
(4) FHP = BHP – IHP

Ans: 1

31. In ultrasonic machining the percentage of abrasives in the slurry maximum metal removal rate is-
(1) 15% (2) 30 % (3) 45% (4) 50%

Ans: 4

32. Limit gauges are used to-
(1) Limit the use of materials from stores
(2) Limit use of machines on the shop floor
(3) Inspect the component in order to accept/reject
(4) None of the above

Ans: 3

33. Melting point of iron is-
(1) 1539°C (2) 1601°C (3) 1429°C (4) 1712°C

Ans: 3

34. The binding material (Matrix) used in cemented carbide is-

(1) Graphite (2) Cobalt (3) Carbon (4) Boron

Ans: 2

35. For piercing operation where D is the diameter of the hole to be made, the punch size is equal to

1. D (2) Die size

3. D-2 times the clearance (4) D+2 times the clearance

Ans: 3

SIZES OF DIE AND PUNCH IN BLANKING AND PIERCING OPERATION

In **blanking** operation the die is a responsible member, so the size of die is equal to the size of given blank / component and the size of punch is calculated by subtracting the clearance all around from the size of die, i.e., the clearance is accommodated in punch.

Size of die = Size of blank

Size of punch, D_p = Size of die, D_b - cutting clearance all around

$= D_b - 2c$

In **piercing** operation the punch is a responsible member, so the size of punch is equal to the size of hole and the size of die is calculated by adding the clearance all around in the size of punch, i.e., the clearance is accommodated in the die.

Size of punch, D_p = Size of hole

Size of die = Size of punch, D_p + clearance all around

$= D_p + 2c.$

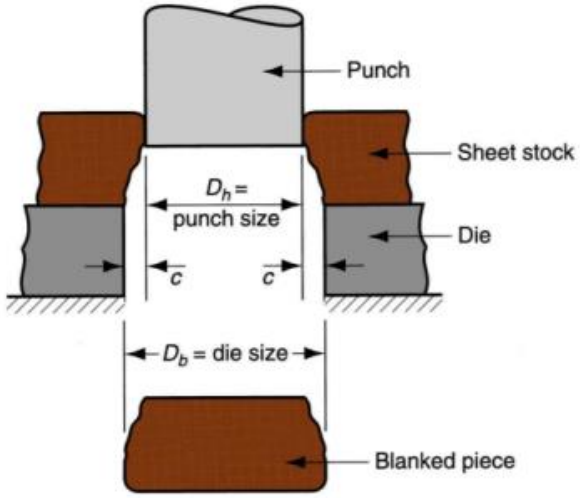
https://www.kdtooldesign.com/2020/06/cutting-clearance-calculation-formula.html

36. For blanking operation where D is the diameter of the component to produced, the punch size is equal to-

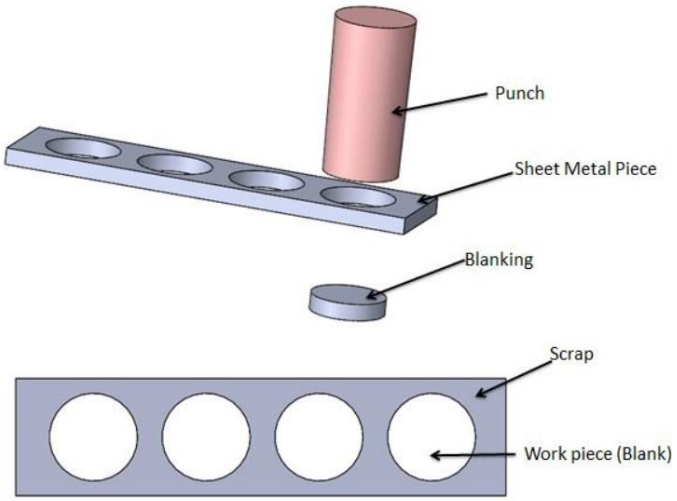
(1) D (2) Die size

(3) D-2 times the clearance (4) D+2 times the clearance

Ans: 3

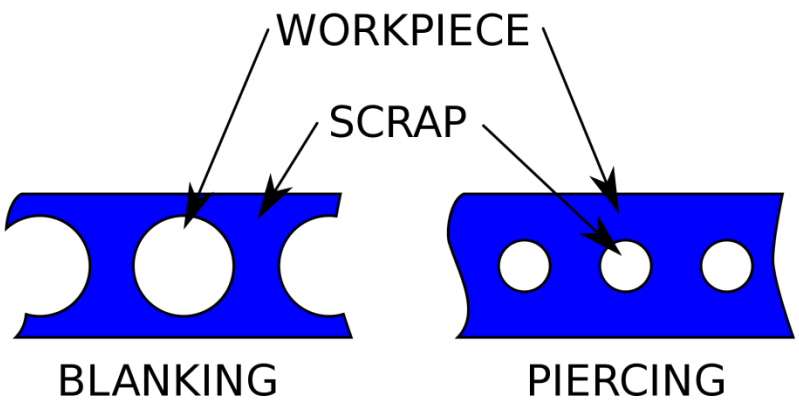


http://staff.fit.ac.cy/eng.os/AMEM201_LEC5_PROBLEMS.pdf



https://www.smlease.com/entries/sheet-metal-design/difference-between-blanking-punching-piercing/

Blanking vs Piercing



By Wizard191 - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=8970924 https://en.wikipedia.org/wiki/Blanking_and_piercing#/media/File:Blanking_vs_piercing.svg

37. Indicated Horse Power of a 4-stroke -single cylinder engine is equal to-

(1) PLAN (2) 2 PLAN (3) 4 PLAN (4) $\frac{PLAN}{2}$

where

P = Mean effective pressure,
L = Stroke length,
A = Area of piston,
N = RPM of the engine crank shaft.

Ans: 4

Indicated Power IC Engine Testing It is the power developed in the cylinder and thus, forms the basis of evaluation of combustion efficiency or the heat release in the cylinder.

38. Indicated Horse Power of a 2-stroke single cylinder engine is equal to-

1. PLAN (2) 2 PLAN (3) 4 PLAN (4) None

where

P = Mean effective pressure,
L = Stroke length,
A = Area of piston,
N = RPM of the engine crank shaft.

Ans: 4

39. N.C. machines are best suited for –

(1) Mass production
(2) Batch production
(3) Simple components manufacturing
(4) None of the above

Ans: 2

40. Ignition quality of petrol is expressed by-

(1) Octane number (2) Cetane number
(3) Calorific value (4) All of the above

Ans: 1

41. Ignition quality of diesel is expressed by-

1. Octane number (2) Cetane number

3.Calorific value (4) All of the above

Ans: 2

42. The compression ratio in motor car petrol engines is approximately-

(1) 5 (2) 7-10 (3) 12 (4) 15

Ans: 2

43. The compression ratio in motor car diesel engines is approximately-

1. 5 (2) 7 (3) 10 (4) 14-24

Ans: 4

44. The constant pressure gas turbine works on-

(1) Bell Coleman cycle (2) Carnot cycle
(3) Dual cycle (4) Brayton cycle

Ans: 3

45. The efficiency of I.C. engines is normally of the order of-

(1) 15 to 20% (2) 20 to 25%
(3) 25 to 30% (4) 30 to 35%

Ans: 4

46. Water hammer in a pipe occurs due to-

(1) Someone hitting the pipe with a hammer

(2) Heavy pressurization of water

(3) Sudden reduction in the velocity of any flowing fluid, i.e., closing of valve

(4) None of the above

Ans: 3

47. A bucket of water weighing 10 Kg is pulled up from a well 20 m deep by rope weighing 1 Kg/m length, then the work done is

(1) 200 Kg.m (2) 400 Kg.m (3) 600 Kg.m (4) 800 Kg.m

Ans: 4

48. Acceptance sampling is widely used in-

(1) Batch production (2) Job production

(3) Mass production (4) All of the above

Ans: 3.

Acceptance Sampling is a quality control method used in the industry for quality control of products or services. This method uses statistical sampling to inspect or test a random sample for determining whether the quality of a batch of product or service is acceptable or not,(i.e., when the cost of 100% inspection or test is too high or time-consuming). It involves first, determining the size of a product lot to be tested, then the number of products to be sampled, and finally the number of defects acceptable within the sample batch.

49. Method study is

1. the process of subjecting work to systematic, critical scrutiny to make it more effective and efficient.
2. Machine setting time
3. Time taken by workers to do a job

4.Method of fixing time for workers

Ans:1

Scope of Method study

There are different areas where you can apply Method study for better results. You can use method study for:

1. Improving work methods and procedures
2. Smoothening workflow
3. Determining the best sequence of working
4. Reducing monotonous work
5. Eliminating unproductive operations

https://leverageedu.com/blog/method-study/

Method study involves the following sequence of steps:

Identify the work to be studied.

Identify the relevant facts for the work as it is currently performed.

Critically review these facts, answering such questions as why specific tasks are being done, what else could be done instead, can the work be done elsewhere, can it be done at a different time, could someone else do the work, and whether there are alternative ways to complete the work.

Develop the most practical and effective alternative.

Install the alternative method and periodically review it.

tps://www.accountingtools.com/articles/2020/2/17/method-study

50. Hooke's law holds good up to:

(1) yield point (2) limit of proportionality

(3) breaking point (4) elastic limit

Ans:4