

## PROVISIONAL ANSWER KEY

Question 138/2024/OL

Paper Code:

Category 242/2023

Code:

Exam: Workshop Instructor/Instructor grade II/Demonstrator  
Tool and Die Engineering

Date of Test 31-12-2024

Department Technical Education

Question1:-Machinability index of a cutting tool is defined as

A:- Depth of metal cut for 20 minute tool life

Depth of cut for standard steel for 20 minute tool life

B:-Cutting speed of metal investigated for 20 minutes tool life

Cutting speed for standard steel for 20 minute tool life

C:-Quality of surface finish investigated for 20 minute tool life

Quality of surface finish in standard steel for 20 minute tool life

D:-Cost of cutting investigated for 20 minute tool life

Cost of cutting in standard steel for 20 minute tool life

Correct Answer:- Option-B

Question2:-In 18-4-1 high speed steel (T-series) the number 18 stands for

A:-% of chromium

B:-% of vanadium

C:-% of Tungsten

D:-% of carbon

Correct Answer:- Option-C

Question3:-If 'V' is the cutting speed and 'n' is the value which depends on tool and workpiece and 'T' is the tool life and 'C' being a constant, then the relation of cutting speed to the tool life is expressed as

A:- $TV^n = C$

B:- $n.T^V = C$

C:- $V.n^T = C$

D:- $V.T^n = C$

Correct Answer:- Option-D

Question4:-Which type of cutting method will have longer tool life?

A:-Orthogonal cutting

B:-Oblique cutting

C:-Combination of Orthogonal and Oblique cutting

D:-Usage of cutting tool with lesser back rake angle

Correct Answer:- Option-B

Question5:-Apron mechanism is used in

A:-Shaper machine

B:-Planer machine

C:-Milling machine

D:-Lathe machine

Correct Answer:- Option-D

Question6:-If 'D' is the larger diameter for taper turning and 'd' is the smaller diameter of taper over a length 'L', then the setover required for taper turning is given by

A:- $\frac{D-d}{L}$

B:- $\frac{D-2d}{L}$

C:- $\frac{D-d}{2L}$

D:- $\frac{2D-d}{L}$

Correct Answer:- Option-A

Question7:-Undercutting in welding is due to

A:-too high voltage

B:-too slow welding speed

C:-too high inclination of electrode position from the vertical

D:-too high current

Correct Answer:- Option-D

Question8:-In foundry operations draft allowance is given to pattern

A:-to compensate for shrinkage of metals as metals solidifies and cools

B:-to increase the surface finish of moulded metal

C:-ease of removal from the mould without injuring the edges of the mould

D:-increasing the machinability of moulded metal

Correct Answer:- Option-C

Question9:-Approximate temperature of heating steel for hand forging can be estimated by the heat colour. The white colour indicates the temperature of

A:-1200°C

B:-950°C

C:-500°C

D:-750°C

Correct Answer:- Option-A

Question10:-In the case for forging operations, swaging or drawing down is the process in which

A:-increasing the thickness of a bar at the expense of its length

B:-increasing the length of a bar at the expense of its width or thickness or both

C:-increasing the cross sectional area of some portions along its axis at the expense of its length

D:-increasing the diameter of cylindrical bar at the expense of its length

Correct Answer:- Option-B

Question11:-Which one of the following projection methods may be adopted in Engineering Drawing?

A:-Second and Fourth angle projection

B:-First and second angle projection

C:-Second and third angle projection

D:-First and third angle projection

Correct Answer:- Option-D

Question12:-A point is 30 mm below the horizontal plane and 50 mm behind the vertical plane. The point is situated in which quadrant?

A:-First quadrant

B:-Second quadrant

C:-Third quadrant

D:-Fourth quadrant

Correct Answer:- Option-C

Question13:-A line 60 mm long is parallel to vertical plane and inclined to horizontal plane at angle of  $30^\circ$ . Which one of the below statement is correct?

A:-Its front view measures the true length and top view measures the reduced length

B:-Its top view measures the true length and front view measures the reduced length

C:-Both front view and top view measures reduction in length

D:-Both front view and top view measures true length

Correct Answer:- Option-A

Question14:-Which one of the following conic section eccentricity less than one?

A:-Parabola

B:-Hyperbola

C:-Circle

D:-Ellipse

Correct Answer:- Option-B

Question15:-A non-truncated hollow cone having base radius 'R' and height 'h'. Its development of surface will have the shape of

- A:-Sector area of an ellipse
  - B:-Sector area of a hyperbola
  - C:-Sector area of a parabola
  - D:-Sector area of a circle
- Correct Answer:- Option-D

Question16:-In isometric projection the angle between any two isometric axes is

- A:-15°
- B:-120°
- C:-60°
- D:-30°

Correct Answer:- Option-B

Question17:-In the nomenclature of screw thread the term 'lead' is

- A:-The distance between the crest and root of a thread, measured perpendicular to the axis
- B:-It is the distance between corresponding points on the consecutive thread forms, measured parallel to the axis
- C:-It is the axial distance a screw thread advanced in one revolution
- D:-It is the radial distance by which the external thread, overlaps the internal thread of a making pair

Correct Answer:- Option-C

Question18:-If 'd' is the diameter of hexagonal bolt, then the empirical relation for thickness of bolt head in terms of diameter 'd' is

- A:-d
- B:-2 d
- C:-1.5 d
- D:-0.8 d

Correct Answer:- Option-D

Question19:-Normally the marginal distance taken for a rivetted joint in terms of rivet diameter 'd' is

- A:-2 d
- B:-1.5 d
- C:-3 d
- D:-0.8 d

Correct Answer:- Option-B

Question20:-Consider a fit designated by 30H8f7, the 'f7' refers to

- A:-Tolerance grade for shaft
- B:-Fundamental deviation for hole

C:-Tolerance grade for hole

D:-Fundamental deviation for shaft

Correct Answer:- Option-A

Question21:-The property of a material to absorb large amount of energy before fracture is known as

A:-Toughness

B:-Resilience

C:-Ductility

D:-Plasticity

Correct Answer:- Option-A

Question22:-The point of contraflexure occurs only in

A:-Simply supported beam

B:-Fixed beam

C:-Cantilever beam

D:-Overhanging beam

Correct Answer:- Option-D

Question23:-In a simply supported beam the shear force along a section is zero; where bending moment is

A:-Minimum

B:-Maximum

C:-Equal

D:-Zero

Correct Answer:- Option-B

Question24:-Which of the following is the hardest material?

A:-Boron Carbide

B:-Hardend steel

C:-Silicon Carbide

D:-Aluminium Oxide

Correct Answer:- Option-A

Question25:-The structure of eutectoid steel is

A:-Ferrite and Pearlite

B:-Cementite and Pearlite

C:-Pearlite Alone

D:-Ferrite and Cementite

Correct Answer:- Option-C

Question26:-The main objective of heat treatment of steel is to improve

A:-Chemical Composition

B:-Physical properties

C:-Mechanical properties

D:-Surface finish

Correct Answer:- Option-C

Question27:-An example of non destructive test is

A:-Impact test

B:-Tensile test

C:-Compression test

D:-Radiography test

Correct Answer:- Option-D

Question28:-In a thin walled cylinder, Hoop stress is

A:-Circumferential Tensile Stress

B:-Shear stress

C:-Compressive stress

D:-Longitudinal stress

Correct Answer:- Option-A

Question29:-The ratio of shear stress to shear strain is called

A:-Young's Modulus

B:-Bulk Modulus

C:-Modulus of elasticity

D:-Modulus of Rigidity

Correct Answer:- Option-D

Question30:-A column with maximum equivalent length has its

A:-Both Ends Fixed

B:-One End Fixed and Other End Free

C:-Both End Free

D:-Both End Hinged

Correct Answer:- Option-B

Question31:-The type of flow in which the density is constant for the fluid flows?

A:-Laminar flow

B:-Incompressible flow

C:-Uniform flow

D:-Turbulent flow

Correct Answer:- Option-B

Question32:-A pipe has 200 mm and 400 mm diameters at sections 1-1 and 2-2

respectively. If the velocity of water flowing through the pipe at section 1-1 is 4 m/s, determine the velocity of water at section 2-2

A:-4 m/s

B:-16 m/s

C:-2 m/s

D:-1 m/s

Correct Answer:- Option-D

Question33:-The property of a fluid that resists the relative motion between its adjacent layers is known as

A:-Surface tension

B:-Specific Gravity

C:-Viscosity

D:-Capillarity

Correct Answer:- Option-C

Question34:-A surge tank is provided in the hydroelectric power plant to

A:-Strengthen penstocks

B:-Reduce frictional loss

C:-Increase net head

D:-Reduce water hammer pressure

Correct Answer:- Option-D

Question35:-Which of the following is NOT an assumptions of Bernoulli's equation?

A:-The fluid is viscous

B:-The flow is irrotational

C:-The flow is steady

D:-The fluid is incompressible

Correct Answer:- Option-A

Question36:-Which of the following is a characteristic of thermoplastic materials?

A:-They cannot be reshaped after cooling

B:-They soften when heated and can be remoulded

C:-They decompose when heated

D:-They exhibit high resistance to chemicals and acids

Correct Answer:- Option-B

Question37:-In which process is the plastic material heated and then forced through a die to form continuous shapes?

A:-Blow moulding

B:-Compression moulding

C:-Extrusion moulding

D:-Rotational moulding

Correct Answer:- Option-C

Question38:-What does the term "clamping force" refer to in injection moulding?

A:-The pressure required to inject molten plastic into the mould

B:-The force used to hold the mould shut during injection

C:-The force used to eject the part from the mould

D:-The amount of plastic injected into the mould

Correct Answer:- Option-B

Question39:-Which of the following is a type of ejection system used in injection moulding?

A:-Hydraulic ejectors

B:-Air-driven ejectors

C:-Mechanical ejectors

D:-All of the above

Correct Answer:- Option-D

Question40:-What is the primary purpose of the "runner system" in injection moulding?

A:-To guide the molten material into the mould cavity

B:-To provide cooling channels in the mould

C:-To eject the moulded part

D:-To remove excess material after moulding

Correct Answer:- Option-A

Question41:-Which moulding process involves heating a thermoplastic sheet and forming it over a mould by applying vacuum?

A:-Compression moulding

B:-Injection moulding

C:-Vacuum forming

D:-Rotational moulding

Correct Answer:- Option-C

Question42:-Which of the following materials is commonly used in die casting due to its low melting point and good fluidity?

A:-Cast iron

B:-Copper alloys

C:-Stainless steel

D:-Zinc alloys

Correct Answer:- Option-D

Question43:-What is the term for the process of producing parts from a preheated



mould and pressure during moulding in a closer cavity?

A:-Extrusion moulding

B:-Injection moulding

C:-Compression moulding

D:-All of the above

Correct Answer:- Option-C

Question44:-What is the most common application of blow moulding?

A:-Creating hollow plastic parts such as bottles

B:-Manufacturing of large and thick-walled parts

C:-Moulding small and intricate parts

D:-Moulding thermosetting materials

Correct Answer:- Option-A

Question45:-Which cooling system is most commonly used in injection moulding to reduce cycle time?

A:-Air cooling

B:-Oil cooling

C:-Water cooling through channels in the mould

D:-Evaporative cooling

Correct Answer:- Option-C

Question46:-Which moulding process is most suitable for producing large, thin-walled hollow objects?

A:-Injection moulding

B:-Blow moulding

C:-Compression moulding

D:-Rotational Moulding

Correct Answer:- Option-D

Question47:-In multi-colour injection moduling, what ensures that the right colour is injected into each part of the mould?

A:-Using different temperature zones in the mould

B:-Sequential injection using multiple injection units

C:-Mixing different colours into a single injection shot

D:-Using a single resin with multiple pigments

Correct Answer:- Option-B

Question48:-What is the primary difference between thermoplastic and thermosetting plastics?

A:-Thermoplastics can be remoulded multiple times, while thermosets cannot be reformed once set

B:-Thermosetting plastics are more flexible than thermoplastics

C:-Thermoplastics are heat resistant, while thermosetting plastics are not

D:-Thermosetting plastics are used in injection moulding, while thermoplastics are used in blow moulding

Correct Answer:- Option-A

Question49:-Which of the following is NOT a typical characteristic of die-casting alloys?

A:-High strength and durability

B:-Low fluidity for complex mould designs

C:-Excellent surface finish

D:-Suitable for high precision parts

Correct Answer:- Option-B

Question50:-In calendaring, the material is passed between which of the following?

A:-Two heated rollers

B:-Two hydraulic presses

C:-An extruder and a die

D:-A mould cavity and an ejector pin

Correct Answer:- Option-A

Question51:-A process that produces relatively shallow indentation or raised design with theoretically no change in metal thickness is called

A:-Coining

B:-Bulging

C:-Embossing

D:-Curling

Correct Answer:- Option-C

Question52:-Cutting and non cutting operations are performed by

A:-Progressive Die

B:-Compound Die

C:-Combination Die

D:-Fine Blanking Die

Correct Answer:- Option-C

Question53:-Find the cutting force for blanking a rectangular piece of Aluminum soft steel of size  $40 \times 20$  mm with 1 mm thickness. Shear Strength =  $110 \text{ N/mm}^2$

A:-13.2 kN

B:-88 kN

C:-6.6 kN

D:-44 kN

Correct Answer:- Option-A

Question54:-The Bending Force (F) required to bend a materials of thickness 't' mm, length of bend part 'l' mm, width between contact point of die 'w' mm, Ultimate tensile strength is 'S' N/mm<sup>2</sup> and die opening factor 'k' is given by

A:- $\frac{k l S t}{w}$

B:- $\frac{k w S t^2}{l}$

C:- $\frac{k l S t^2}{w}$

D:- $\frac{k t S w}{l}$

Correct Answer:- Option-C

Question55:-Which of the following are non-cutting operations?

- (i) Notching
- (ii) Coining
- (iii) Curling
- (iv) Bending

A:-All of the above

B:-Only (ii) and (iv)

C:-Only (i) and (iii)

D:-Only (ii), (iii) and (iv)

Correct Answer:- Option-D

Question56:-The operation in which the surface of the previously cut edge is finished smoothly to accurate dimensions?

A:-Trimming

B:-Notching

C:-Piercing

D:-Lancing

Correct Answer:- Option-A

Question57:-In a blanking operation, the clearance is provided on :

A:-The Punch

B:-Both punch and die equally

C:-The Die

D:-Neither the punch nor the die

Correct Answer:- Option-A

Question58:-In sheet metal blanking, shear is provided on punches and die so that

A:-Wrapping of sheet is minimized

B:-Press load is reduced

C:-Good cut edges is obtained

D:-Cut blanks are straight

Correct Answer:- Option-B

Question59:-Cutting force in blanking and piercing operation mainly depends upon

- A:-The yield strength of material
- B:-The Modulus of elasticity of material
- C:-The shear strength of material
- D:-The bulk modulus of material

Correct Answer:- Option-C

Question60:-The process of shearing strip in three sides of a rectangle and bending the strip about one of the sides not sheared is called

- A:-Bulging
- B:-Lancing
- C:-Swaging
- D:-Perforating

Correct Answer:- Option-B

Question61:-The press tool component used to locate the strip or the component accurately on the required position, prior to a cutting operation

- A:-Knockout
- B:-Shedder
- C:-Pilot
- D:-Finger stop

Correct Answer:- Option-C

Question62:-Which of the following are part(s) of a press tool die set:

- (i) Punch and Die
- (ii) Core and cavity plate
- (iii) Stripper
- (iv) Shank

- A:-All of the above
- B:-only i, iii, iv
- C:-Only i, ii, and iii
- D:-Only i, ii and iv

Correct Answer:- Option-B

Question63:-The stripping force is \_\_\_\_\_ (%) of the cutting force.

- A:-25-30
- B:-50-75
- C:-5-20
- D:-30-50

Correct Answer:- Option-C

Question64:-The phenomenon in bending operation in which elastic stresses remaining in the bend area is released causing in slight decrease in the bend angle

is called

A:-Overbending

B:-Wrinkling

C:-Tearing

D:-Springback

Correct Answer:- Option-D

Question65:-The clearance equation between punch and die to material with thickness 't' mm, shear strength 'S' N/mm<sup>2</sup>, clearance 'C' mm/side s given by

A:- $C = 0.032t\sqrt{S}$

B:- $C = 0.016t\sqrt{S}$

C:- $C = 0.0064t\sqrt{S}$

D:- $C = 0.0032t\sqrt{S}$

Correct Answer:- Option-D

Question66:-Maximum utilization of a material in designing a die is done by

A:-Strip layout

B:-Die clearance

C:-Blank design

D:-Die design

Correct Answer:- Option-A

Question67:-Factors considered in calculating bend allowance of dies are

A:-Bend angle, inside radius of the bend only

B:-Bending force, metal thickness only

C:-Bending pressure only

D:-Bend angle, inside radius and metal thickness of the bend

Correct Answer:- Option-D

Question68:-Decrease in the actual bend angle after bending in dies is called

A:-Push back

B:-Spring back

C:-Elasticity

D:-Edge bending

Correct Answer:- Option-B

Question69:-Spring back can be compensated by

A:-Underbending

B:-Overbending

C:-Forming

D:-Curving

Correct Answer:- Option-B

Question70:-Number of draws in drawing operation is decided by the

A:-Ratio of height of cup to diameter of cup

B:-Ratio of diameter of cup to height of cup

C:-Ratio of cup thickness to height of the cup

D:-Ratio of cup thickness to diameter of the cup

Correct Answer:- Option-A

Question71:-Spring back during bending increases with

A:-tensile strength of the material bent only

B:-bend radius only

C:-bend angle only

D:-all of the above

Correct Answer:- Option-D

Question72:-Force required for drawing directly depends upon

A:-Yield strength of the material

B:-Density of the material

C:-Weight of the material

D:-Hardness of the material

Correct Answer:- Option-A

Question73:-The smallest measurement that can be made by an instrument is called

A:-Accuracy

B:-Range

C:-Least count

D:-Precision

Correct Answer:- Option-C

Question74:-Ability of a measuring instrument to give the same value everytime the measurement is repeated

A:-least count

B:-repeatability

C:-range

D:-sensivity

Correct Answer:- Option-B

Question75:-Closeness of a measuring instrument to the true value of the quantity to be measured is indicated by

A:-Accuracy

B:-Range

C:-Least count

D:-Hysteresis

Correct Answer:- Option-A

Question76:-Value of quantity is obtained directly by comparing the unknown with the standard in

A:-Direct measurement

B:-Angular measurement

C:-Calibration

D:-Threshold

Correct Answer:- Option-A

Question77:-Errors that are fluctuating and are not predictable are called

A:-Systematic errors

B:-Calibration errors

C:-Random errors

D:-Parallax error

Correct Answer:- Option-C

Question78:-Which of the following is an angle measuring instrument

A:-Vernier height gauge

B:-Limit gauge

C:-Plug gauge

D:-Autocollimator

Correct Answer:- Option-D

Question79:-Horizontal position of surfaces in inspected using

A:-Vernier depth gauge

B:-Spirit level

C:-Micrometer

D:-Vernier calliper

Correct Answer:- Option-B

Question80:-The internal diameter is checked by using

A:-Ring gauge

B:-Screwpitch gauge

C:-feeler gauge

D:-Plug gauge

Correct Answer:- Option-D

Question81:-Least count of a vernier calliper is usually

A:-0.05 mm

B:-2 mm

C:-0.02 mm

D:-5 mm

Correct Answer:- Option-C

Question82:-Joining of slip gauges together to create larger size is termed as

A:-Wringing

B:-Mixing

C:-Adding

D:-Sticking

Correct Answer:- Option-A

Question83:-Errors that are predictable and can be eliminated are called

A:-Random errors

B:-Systematic errors

C:-Scattered errors

D:-Calibration errors

Correct Answer:- Option-B

Question84:-Ability of an instrument to detect small differences in measurement

A:-Repeatability

B:-Sensitivity

C:-Hysteresis

D:-Accuracy

Correct Answer:- Option-B

Question85:-The lowest to highest values that can be measured using a particular instrument is called

A:-Error

B:-Calibration

C:-Metrology

D:-Range

Correct Answer:- Option-D

Question86:-'Fool proofing' in fixtures refers to

- i. arresting all degrees of motion of workpiece with the help of fixture
- ii. arresting all rotations of workpiece along the three axis.
- iii. locating system that does not permit to load the workpiece incorrectly on a fixture

A:-Only i

B:-Only ii

C:-Only iii



D:-Both i and ii

Correct Answer:- Option-C

Question87:-For locating a workpiece with two drilled holes using a base plate but having dimensional variation between centre to centre distance of holes

A:-two round pins can be used

B:-a round pin and a diamond pin can be used

C:-a round pin and a jack pin can be used

D:-spherical locating pins can be used

Correct Answer:- Option-B

Question88:-Which of the following statements are incorrect about a clamp? A clamp should

i. be a six point locator

ii. hold the workpiece firmly but should not damaged it

iii. be quick acting

iv. be of weak material so that it should fail first in case of shocks, vibration and chatter and protect the workpiece

A:-i and iv

B:-ii and iii

C:-i, ii and iii

D:-iv only

Correct Answer:- Option-A

Question89:-Which of the following is not a type of clamp?

A:-Sledge clamp

B:-Strap clamp

C:-C-clamp

D:-Lever clamp

Correct Answer:- Option-A

Question90:-A \_\_\_\_\_ clamp is used in spring type milling fixture for holding workpiece in position.

A:-Eccentric clamp

B:-Lever clamp

C:-Strap clamp

D:-Screw clamp

Correct Answer:- Option-D

Question91:-Which of the following is a desirable property of tool material used in EDM?

A:-Low electrical conductivity

B:-High thermal conductivity

C:-Low melting temperature

D:-Para-magnetic

Correct Answer:- Option-B

Question92:-Which of the following is not a property of dielectric used in EDM?

A:-It should have high electrical conductivity

B:-It should deionize rapidly after the spark discharge has taken place

C:-It should have low viscosity

D:-It should have a good wetting capacity

Correct Answer:- Option-A

Question93:-The most commonly used electrolyte in ECM is

A:-Tri ethylene glycol with water 40% by volume

B:-Distilled water

C:-Solution of sodium chloride

D:-Tap water

Correct Answer:- Option-C

Question94:-Define the term 'wear ratio' associated with ultrasonic machining process

A:-Weight of material removed from work / Exposed area of material to tool

B:-Volume of material removed from work / Volume of material eroded from tool

C:-Weight of material removed from work/ Weight of material eroded from tool

D:-Weight of material removed from work / Material removal capacity of tool in  $m^3/min$

Correct Answer:- Option-B

Question95:- $CO_2$  laser system used in LBM does not use one of the gases given in the options below. Identify it.

A:-Carbon dioxide

B:-Helium

C:-Nitrogen

D:-Hydrogen

Correct Answer:- Option-D

Question96:-Type of motor used in NC open-loop positioning system

A:-Synchronous motor

B:-Stepper motor

C:-Separately excited DC motor

D:-Servo motor

Correct Answer:- Option-B

Question97:-In manual part programming S-word represents

A:-Sequence number

B:-Selection of tool

C:-Spindle speed

D:-Selection command

Correct Answer:- Option-C

Question98:-In CNC, ATP represents

A:-Automatic tool changer

B:-Automated tooling and control

C:-Automatic tool control

D:-Automatic traction control

Correct Answer:- Option-A

Question99:-Which of the following statements is incorrect about FMS?

A:-An FMS is capable of processing a variety of different part styles simultaneously

B:-An FMS relies on the principle of Group Technology

C:-FMS is capable of producing only a single part family or limited range or part families

D:-In an FMS, the mix of part styles and quantities of production cannot be adjusted in response to changing demand patterns

Correct Answer:- Option-D

Question100:-Mastercam is a

A:-Master technician in Cam

B:-Software package for CNC part programming

C:-Package for operating FMS

D:-Part of machine control unit that sends signals to the servo motors in NC machines

Correct Answer:- Option-B