Question: Which of the following is a critical characteristic of a workpiece that influences process engineering decisions?

(a) The colour of the workpiece

(b) The machinability and hardness of the material

(c) The brand name of the raw material supplier

(d) The packaging method used for transportation

Answer: b

Question: Which instrument is commonly used to check parallelism in machine tool testing?

(a) Vernier caliper

(b) Micrometer

(c) Dial gauge and straightedge

(d) Hardness tester

Answer: c

Question: If a tire gauge reads 35 psi, what is the absolute pressure inside the tire, assuming atmospheric pressure is 14.7 psi?

(a) 14.7 psi

(b) 49.7 psi

(c) 35 psi

(d) 20.3 psi

Answer: b

Question: Additives that are normally used for mixing with oils to increase lubricating and cooling qualities of various oils are_____.

(a) Hydrogen and nitrogen

(b) Carbon and helium

(c) Sulphure and chlorine

(d) Sodium and potassium

Answer: c

Question: What does the number '22' in the refrigerant R-22 indicate?

(a) The molecular weight of the refrigerant

(b) The pressure required for refrigeration cycle operation

(c) The boiling point of the refrigerant in °C.

(d) A specific designation assigned based on chemical composition.

Answer: d

Question: A self-energizing brake is one in which____.

(a) The brake operates without friction.

(b) No external force is required to apply the brake

(c) The friction force is required to apply the brake

(d) The friction force helps applying

Answer: d

Question: Which of the following is a key objective of material management in an organization?

(a) To prioritise material procurement based solely on immediate production needs, without considering future demand fluctuations or long-term supplier relationships

(b) To maintain a high level of inventory to prevent any potential stock outs, even if it results in excessive storage costs

(c) To ensure the right quality and quantity of materials are available at the right time, the lowest cost, while minimizing waste and stock outs

(d) To procure materials at the lowest possible price, ignoring quality and supplier reliability to maximize short-term savings

Answer: c

Question: In a transverse fillet weld subjected to a tensile force, the primary mode of stress in the weld throat is:

(a) Tensile stress

(b) Shear stress

(c) Bending stress

(d) Compressive stress

Answer: a

Question: What is a block in CAD software?

(a) A feature that deletes duplicate objects.

(b) A pre-drawn object that can be reused multiple times

(c) A tool for creating 3D models.

(d) A setting that controls line thickness

Answer: b

Question: The load in a hydraulic dynamometer is controlled by____.

(a) Increasing the brake pedal force

(b) Varying the electrical resistance

(c) Changing the air pressure

(d) Adjusting the quantity of working fluid

Answer: d

Question: Which material is commonly used for strain gauge sensing elements?

(a) Copper

(b) Aluminium

(c) Silver

(d) Constantan

Answer: d

Question: Which of the following is a key characteristic of an open cycle gas turbine?

(a) The working fluid is exhausted to the atmosphere

(b) Operates only in a vacuum

(c) The working fluid is continuously recirculated

(d) Uses a heat exchanger to reuse heat

Answer: a

Question: Which of the following best describes the motion of the follower in a typical radial cam mechanism?

(a) Translational motion along the cam axis

(b) Rotational motion synchronized with the cam

(c) Reciprocating or oscillating motion perpendicular to cam rotation

(d) Circular motion

Answer: c

Question: The standard marking system of grinding wheels, as developed by the Indian standard marking system, gives the indication about:

(a) The hardness and grit size of the grinding wheel

(b) The time taken to complete the finishing of the workpiece

(c) Material removal rate

(d) The pressure between the grinding wheel and the workpiece

Answer: a

Question: In an eddy current dynamometer, eddy currents are produced in the_____.

(a) Cooling fins

(b) Bearings

(c) Rotating disc

(d) Stator coils

Answer: c

Question: When selecting plant and equipment for a manufacturing operation, which of the following factors will have the greatest impact on determining the break-even point (BEP)?

(a) The variability in the cost of raw materials used by the equipment

(b) The depreciation rate of the equipment over its useful life

(c) The initial capital investment required for the equipment

(d) The fixed operational costs associated with the equipment

Answer: d

Question: Which of the following statements regarding strain energy in the elastic region is true?

(a) Strain energy is completely recoverable when the load is removed.

(b) Strain energy is entirely lost as heat during unloading.

(c) Strain energy is only partially recoverable after unloading

(d) Strain energy increases permanently with each load cycle.

Answer: a

Question: Which of the following is an advantage of using the Hole Basis System in manufacturing?

(a) Eliminates the need for tolerances

(b) Makes it difficult to achieve interchangeability

(c) Easier machining of holes with standard tools

(d) Requires less precision in manufacturing

Answer: d

Question: Which characteristic of Mixed Model Line Balancing allows flexibility in adjusting the output of different products?

(a) Each product should have entirely different operations to maximize variety.

(b) The production line must be stopped and reconfigured every time the product demand changes.

(c) Only identical products can be produced on the same assembly line.

(d) Products must have similar tasks and processing requirements to ensure smooth workflow.

Answer: d

Question: As per the Indian standard system, the point angle in a normal drill is:

(a) 90 degrees

(b) 118 degrees

(c) 75 degrees

(d) 100 degrees

Answer: b

Question: Why is it important to apply uniform pressure while mounting a strain gauge?

(a) To prevent the gauge from overheating

(b) To improve the flexibility of the gauge

(c) To avoid air gaps and ensure proper adhesion

(d) To increase the resistance of the strain gauge

Answer: c

Question: The power to weight ratio for external combustion engines as compared to internal combustion engines:

(a) Is high

(b) Is low

(c) Is equal

(d) Can be greater or lower, it depends on the situation

Answer: b

Question: Slip and creep are related to the operation of:

(a) Flat belt drive systems only

(b) V-belt drive systems only

(c) All types of belt drive systems

(d) Gear drive systems

Answer: c

Question: The symbol used to represent 'Inspection' in a flow process chart used in a work study is given by (a/an):

(a) Square

(b) Dee

(c) Arrow

(d) Triangle

Answer: a

Question: In oxyacetylene gas welding, the temperature at the inner cone of neutral flame is around:

(a) 2300°C

(b) 4000°C

(c) 3200°C

(d) 2600°C

Answer: c

Question: If the properties such as velocity, pressure etc. change at a point with respect to time, the flow is called_____ flow.

(a) Uniform

(b) Steady

(c) Non-uniform

(d) Unsteady

Answer: d

Question: Which of the following is NOT a characteristic of brittle fracture?

(a) Minimal plastic deformation before fracture

(b) Rapid crack propagation

(c) Ductile necking at the fracture site

(d) Occurs at low temperatures or high strain rates

Answer: c

Question: What is the function of coolant in a drilling operation?

(a) To clean the machine table

(b) To remove burrs from the hole

(c) To reduce heat and improve tool life

(d) To increase spindle speed

Answer: c

Question: The length of a belt in a belt drive system is calculated using the formula $L = 2C + \pi(D1 + D2) + (D1 - D2)2/4C$, where L is the total length of the belt, C is the centre distance, and $D1, D2$ are the diameters of the pulleys. What does the term $(D1 - D2)2/4C$ represent?

(a) The additional length due to the difference in pulley sizes

(b) The effect of belt tension

(c) The correction factor for friction

(d) The extra length due to pulley alignment

Answer: a

Question: What is gear backlash?

(a) The hardness of the gear material

(b) The thickness of a single gear tooth

(c) The total runout of a gear during rotation

(d) The clearance or play between meshing gear teeth

Answer: d

Question: In printing machines, cam and follower mechanisms are used to:

(a) Adjust the font size automatically

(b) Feed paper sheets at regular intervals

(c) Increase the pressure of printing rollers

(d) Transfer ink to the paper

Answer: b

Question: Which of the following factors DOES NOT affect the bending stress in a beam?

(a) Moment of inertia

(b) Bending moment

(c) Distance from the neutral axis

(d) Length of the beam

Answer: d

Question: The compression ratio in case of diesel engines lies in the range of:

(a) 24-28

(b) 8-10

(c) 16-20

(d) 2-3

Answer:

Question: The glass transition temperature (Tg) of a polymer refers to:

(a) The temperature at which it becomes crystalline

(b) The temperature at which it melts

(c) The temperature at which it starts to burn

(d) The temperature at which it transitions from glassy to rubbery state

Answer: d

Question: Which of the following operations CANNOT be included between CNC machining centers?

(a) Milling

(b) Drilling

(c) Tapping

(d) Welding

Answer: d

Question: The wages of a welder fabricating a structure is an example of a/an_____.

(a) Indirect cost

(b) Direct cost

(c) Calculated cost

(d) Amplified cost

Answer: b

Question: Which of the following factors significantly affects the efficiency of a centrifugal compressor?

(a) The shape and speed of the impeller.

(b) The number of pistons used

(c) The use of intercooling between compression stages.

(d) The presence of a crankshaft for motion transmission

Answer: a

Question: Compute the value of 'Median' for the following data.

Item in data array 1 2 3 4 5 6 7

Time in minutes 4.2 4.3 4.7 4.8 5.1 5.4 5.8

(a) 4.9

(b) 5.1

(c) 4.8

(d) 4.7

Answer: c

Question: In a quasi-static process, irreversibilities are:

(a) Maximized

(b) Negligible

(c) Dominant

(d) Unpredictable

Answer: b

Question: Which feature of CAD software helps in creating precise, scalable designs?

(a) Image filter tools

(b) Freehand drawing tool

(c) Grid and snap settings

(d) 3D rendering

Answer: c

Question: What is the primary function of a strain gauge?

(a) To measure pressure variations

(b) To measure strain in a material

(c) To measure temperature changes

(d) To measure electrical resistance directly

Answer: b

Question: What is the primary function of a bevel protractor?

(a) To measure linear dimensions with high accuracy

(b) To measure the diameter of cylindrical objects

(c) To check the flatness of a surface

(d) To measure and set angles precisely

Answer: d

Question: A CAD object is rotated by 30° about the Z-axis. If the initial coordinates of a point are (4, 0), what will be the new coordinates after the rotation?

(a) (4, 1)

(b) (3.46, 2)

(c) (0, 4)

(d) (4, 2)

Answer: b

Question: A company produces a product with the following cost structure:

Fixed Costs = $500,000

Variable Cost per Unit = $25

Selling Price per Unit = $50

If the company wants to achieve a profit of $200,000, how many units must be sold?

(a) 35,000 units

(b) 20,000 units

(c) 14,000 units

(d) 28,000 units

Answer: d

Question: What is the function of the WBLOCK command in AutoCAD?

(a) To change the colour of a block

(b) To create wireframe models

(c) To write a block to an external file

(d) To delete a block from the library

Answer: c

Question: The Delphi method is best described as:

(a) A method that forecasts by collecting expert opinions in multiple rounds

(b) A method that uses historical data for trend analysis

(c) A time-series technique for projecting future values

(d) A quantitative method that applies moving averages for forecasting

Answer: a

Question: Reaming is primarily used for achieving:

(a) Lower MRR

(b) Improved position tolerance

(c) Improved dimension tolerance

(d) Higher MRR

Answer: c

Question: Which of the following represents the relationship between hoop strain (ε_h) and longitudinal strain (ε_l) in a thin cylinder?

(a) $\varepsilon_h = 1/2\ \varepsilon_l$

(b) $\varepsilon_h = 2\varepsilon_l$

(c) $\varepsilon_h = \varepsilon_l$

(d) $\varepsilon_h = 1/4\ \varepsilon_l$

Answer: b

Question: According to the ASHRAE numbering system, which of the following correctly represents the refrigerant R-134a?

(a) Carbon, 4 Hydrogen, 2 Fluorine atoms

(b) Carbon, 3 Hydrogen, 4 Fluorine atoms

(c) Carbon, 2 Hydrogen, 4 Fluorine atoms

(d) 1 Carbon, 2 Hydrogen, 3 Fluorine, 1 Chlorine atom

Answer: c

Question: Why does a multi-plate clutch transmit more torque than a single-plate clutch?

(a) It has less contact area.

(b) It has a stronger pressure plate.

(c) It has a larger diameter.

(d) It has more friction surfaces.

Answer: d

Question: Which type of feed is needed in facing operation?

(a) Perpendicular to the axis of rotation

(b) Parallel to the axis of rotation

(c) Both parallel and perpendicular to the axis of rotation

(d) Neither parallel nor perpendicular to the axis of rotation

Answer: a

Question: What is the full form of COMSOAL?

(a) Computer Method for Sequencing Operations for Assembly Lines

(b) Computerized Solution of Assembly Line Balancing

(c) Computerized Simulation of Assembly Line

(d) Computerized Simulation and Optimization of Assembly

Answer: a

Question: Which of the following metals is commonly alloyed with iron to produce tool steels?

(a) Tungsten

(b) Lead

(c) Copper

(d) Zinc

Answer: a

Question: In a combined cycle power plant, which of the following is used to generate additional power after the gas turbine?

(a) Hydraulic turbine

(b) Steam turbine

(c) Wind turbine

(d) Nuclear reactor

Answer: b

Question: How does throttle governing affect the efficiency of a steam turbine?

(a) Does not affect efficiency

(b) Reduces efficiency due to throttling losses

(c) Increases efficiency by improving heat recovery

(d) Increases efficiency by reducing steam pressure drop

Answer: b

Question: The 'soap' present in soluble oil (a type of cutting fluid) acts as a/an:

(a) Lubricating, cooling as well as emulsifying agent

(b) Cooling agent only

(c) Lubricating agent only

(d) Emulsifying agent only

Answer: d

Question: In oxyacetylene welding, if acetylene is observed to be in excess, the flame is called as:

(a) Oxidizing flame

(b) Reducing flame

(c) Neutral flame

(d) Originating flame

Answer: b

Question: Which of the following is the primary function of a helical compression spring?

(a) To resist bending stresses

(b) To convert rotational motion into linear motion

(c) To prevent axial displacement

(d) To store and release energy

Answer: d

Question: Man machine chart is a special type of:

(a) String diagram

(b) Multiple activity chart

(c) Chronocycle graph

(d) Flow process chart

Answer: b

Question: For a simply supported beam subjected to a uniformly distributed load (UDL) of intensity w (force per unit length) over its entire length L, what is the reaction force at each support?

(a) wL.

(b) (wL)/4.

(c) (wL)/2.

(d) (wL)/8.

Answer: c

Question: When a bolted joint is subjected to eccentric loading, which stress is primarily induced in the bolt in addition to shear stress?

(a) Impact stress

(b) Bending stress

(c) Torsional stress

(d) Bearing stress

Answer: b

Question: An ideal fluid is one which has:

(a) Linear behaviour between shear stress and velocity gradient

(b) Quadratic relation between shear stress and velocity gradient

(c) No resistance to shear stress

(d) No velocity gradient

Answer: c

Question: Observed time for a worker is 0.7 minutes and his performance rating is 80%. Calculate the normal time taken by the worker.

(a) 0.7 minutes

(b) 0.56 minutes

(c) 0.95 minutes

(d) 0.875 minutes

Answer: b

Question: Which of the following units is used for specific gravity?

(a) g/cm^2

(b) m^3/kg

(c) No units

(d) kg/m^3

Answer: c

Question: What is the main purpose of limits, fits, and tolerances in manufacturing?

(a) To increase the weight of the components

(b) To eliminate the need for machining

(c) To reduce the production cost only

(d) To ensure proper assembly and interchangeability

Answer: d

Question: Which of the following processes is always quasi-static?

(a) Reversible isothermal process

(b) Sudden compression of a piston

(c) Free expansion of a gas

(d) Combustion in an engine

Answer: a

Question: In order to move the cross slide, the feed screw is turned by rotating the:

(a) Square threaded screw

(b) Setover screw

(c) Handwheel

(d) Barrel

Answer: c

Question: In a four-stroke cycle petrol engine, during suction stroke:

(a) Only petrol is sucked in

(b) Mixture of petrol and air is sucked in

(c) Only air is sucked in

(d) Suction stroke is intermittent, thus cannot be judged precisely

Answer: b

Question: Which of the following is not a function of material management?

(a) Warehousing

(b) Marketing strategy

(c) Procurement

(d) Inventory control

Answer: b

Question: Which of the following CANNONT be considered as a part of a simple carburetor?

(a) Idling system

(b) Float chamber

(c) Throttle valve

(d) Nozzle with metering orifice

Answer: a

Question: A heavier flywheel is required in which of the following?

(a) Both two and four stroke require same type of flywheel

(b) Flywheel is not required in operation of two and four stroke engines

(c) Four stroke engines relative to two stroke engines

(d) Two stroke engines relative to four stroke engines

Answer: c

Question: What is the expression for the slope θ(x) of the deflection curve of a beam?

(a) $\theta(x) = \int y\,(x)dx.$

(b) $\theta(x) = d^2y/dx^2.$

(c) $\theta(x) = dy/dx.$

(d) $\theta(x) = y(x).$

Answer: c

Question: The maximum deflection (δ_{max}) of a cantilever beam of length L subjected to a point load P at its free end is given by:

(a) $PL^3(8EI)$

(b) $PL^3/(3EI)$

(c) $PL^3/(6EI)$

(d) $PL^3/(48EI)$

Answer: b

Question: For a cantilever beam subjected to a point load W at its free end, what is the slope at the free end?

(a) $\theta = (WL)/EI$

(b) $\theta = (WL^2)/EI$

(c) $\theta = (WL^2)/2EI$

(d) $\theta = (WL^2)/3EI$

Answer: c

Question: Which process is used to increase the strength of aluminum alloys through controlled heating and cooling?

(a) Annealing

(b) Quenching

(c) Normalizing

(d) Precipitation hardening

Answer: d

Question: Which command is used to change the appearance of dimensions in AutoCAD?

(a) DSETTINGS

(b) DIMSTYLE

(c) DSTYLE

(d) DIMEDIT

Answer: b

Question: How does the COP of a refrigeration system change with an increase in evaporator temperature?

(a) COP increases

(b) COP remains constant

(c) COP decreases

(d) COP becomes zero

Answer: a

Question: Two masses of 3 kg and 6 kg are attached at 0.2 m and 0.1 m radius in the same plane. What should be the mass of a third counter mass at 0.15 m to balance the system?

(a) 3 kg

(b) 2 kg

(c) 1 kg

(d) 8 kg

Answer: d

Question: Which of the following factors does NOT affect surface tension?

(a) Temperature

(b) Presence of surfactants

(c) Surface area of the liquid

(d) Nature of the liquid

Answer: c

Question: Which of the following factors does NOT affect fluid pressure?

(a) Area of the surface

(b) Gravitational acceleration

(c) Density of the fluid

(d) Depth of the fluid

Answer: a

Question: Which of the following statements is NOT correct for 'Product Layout'?

(a) More process inventory

(b) Smooth and continuous workflow

(c) Less space requirement for same volume of production

(d) Better co-ordination and simple production planning and control

Answer: a

Question: What happens when the diameter of the shank of a bolt is made smaller than the core diameter of the thread (Dc)?

(a) The shank absorbs more energy, making the bolt stronger and better at absorbing shock

(b) The bolt becomes weaker and more likely to fail.

(c) The thread bears most of the load, and the shank is unaffected

(d) The bolt becomes heavier and less efficient.

Answer: a

Question: What is the primary safety advantage of the protected type flange coupling?

(a) It protects the workman from injuries due to protruding bolts and nuts.

(b) It provides automatic lubrication to the shaft.

(c) It minimizes friction between the shaft and the coupling.

(d) It enhances the torsional rigidity of the system.

Answer: a

Question: Two-stroke engines in comparison to four-stroke engines have:

(a) Low power output and greater mechanical simplicity

(b) Better power output and low mechanical simplicity

(c) Better power output and greater mechanical simplicity

(d) Low power output and low mechanical simplicity

Answer: c

Question: The atoms in a simple cubic unit cell touch along:

(a) The corner

(b) The face diagonal

(c) The body diagonal

(d) The edge

Answer: d