

Comprehensive

1.

The unit of thermal conductivity is ----- ***W/mK***

M₁L₁T₋₃Θ₋₁

2.

1. The prop reaction of a cantilever beam propped at free end and carrying udl over the whole span is

Ans- 3WL/8

3.

Fixed position layout is also known as

- A.** analytical layout
- B.** synthetic layout
- C.** static product layout
- D.** none of these

4.

In a flange coupling, the flanges are coupled together by means of

- [A]. bolts and nuts
- [B]. studs
- [C]. headless taper bolts
- [D]. none of these

5.

Critical speed of a shaft with a disc supported in between is equal to the natural frequency of the system in

- A.** transverse vibrations
- B.** torsional vibrations
- C.** longitudinal vibrations
- D.** all of these

6.

Holes of diameter $25.0^{+0.040}_{-0.020}$ mm are assembled interchangeably with the pins of diameter $25.0^{+0.005}_{-0.008}$ mm . The minimum clearance in the assembly will be

(A) 0.048 mm

(B) 0.015 mm

(C) 0.005 mm

(D) 0.008 mm

7.

For the given assembly: 25 H7/g8, match Group A with Group B

Group A	Group B
P. H	I. Shaft Type
Q. IT8	II. Hole Type
R. IT7	III. Hole Tolerance Grade
S. g	IV. Shaft Tolerance Grade

For the given assembly : 25 H7/g8, match Group A with Group B
[2014]

Group A	Group B
(P) H	(I) Shaft Type
(Q) IT8	(II) Hole Type
(R) IT7	(III) Hole Tolerance Grade
(S) g	(IV) Shaft Tolerance Grade

- (A) P-I, Q-III, R-IV, S-II
 (B) P-I, Q-IV, R-III, S-II
 (C) P-II, Q-III, R-IV, S-I
 (D) P-II, Q-IV, R-III, S-I

ANS:-D

8.

A beam is fixed at one end and simply supported at the other end. If a moment M is applied at the simply supported end, the moment induced at the fixed end is

Ans- $+M/2$

9.

A transmission shaft includes

[A]. counter shaft

- [B]. line shaft
- [C]. over head shaft
- [D]. all of these ✓

10.

The insulation ability of an insulator in the presence of moisture would

- A. increase
- B. decrease
- C. remain unaffected
- D. may increase/decrease depending on temperature and thickness of insulation
- E. none of the above.

11.

In inventory control theory, the economic order quantity is

- A. average level of inventory
- B. optimum lot size ✓
- C. capacity of a warehouse
- D. lot size corresponding to break-even analysis

12.

If the rotating mass of a rim type flywheel is distributed on another rim type flywheel whose mean radius is half the mean radius of the former, then energy stored in the later at the same speed will be

- a) Four times the first one
- b) Same as the first one
- c) One fourth of the first one
- d) One and half times the first one

13.

Slenderness ratio is the ratio of

- a) area of column to least radius of gyration.
- b) length of column to least radius of gyration.
- c) least radius of gyration to area of column.
- d) least radius of gyration to length of column.

14.

+0.040 +0.030
In an interchangeable assembly, shafts of size $25.000^{-0.010}\text{mm}$ mate with holes of size $25.000^{+0.020}\text{mm}$. The maximum interference (in microns) in the assembly is

- (A) 40 (B) 30 (C) 20 (D) 10

15.

A simply supported beam of span L carries a u.d.l. of w per unit length over the entire span.
The strain energy stored by the beam is given by

$$U_1 = \frac{w^2 l^5}{240 EI}$$

16.

The ratio of heat flow Q_1/Q_2 from two walls of same thickness having their thermal conductivities $K_1 = 2K_2$ will be -----.

- I
- 0.5
- 2
- 0.25
- 4.0

17.

Production cost refers to prime cost plus

- [A]. factory overheads
- [B]. factory and administration overheads
- [C]. factory, administration and sales overheads
- [D]. factory, administration, sales overheads and profit

18.

Metals are good conductors of heat because

- [A]. ***They contain free electrons***
- [B]. Their atoms are relatively far apart

- [C]. Their atoms collide frequently [D]. They have reflecting surfaces
- [E]. None of the above

19.

Which one of the following chart gives simultaneously information about the progress of work and machine loading?

- A. Process chart
- B. Machine load chart
- C. Man-machine chart 
- D. Gantt chart

20.

A hole is dimension $\phi 9^{+0}$ mm. The corresponding shaft is of dimension $\phi 9^{+0.001}$ mm. The resulting assembly has

ANS:-TRANSITION FIT

21.

What is the ratio of the bending moment at the centre of a simply supported beam to the bending moment at the centre of a fixed beam, when both are of same span and both are subjected to same u.d.l.

Ans- 3/1

22.

Each screen point is referred to as

Ans- PIXEL

23.

Work sampling is applied for

- A. estimation of the percentage utilisation of machine tools
- B. estimating the percentage of the time consumed by various job activities
- C. finding out time standards, specially where the job is not repetitive and where time study by stop watch method is not possible
- D. all of the above 

24.

When a single load 'W' moves over a simply supported beam, the maximum B.M. at a section will occur when the load is placed.

Ans- At Center

25.

A shaft has a dimension, $\phi 35^{+0.009}_{-0.025}$. The respective values of fundamental deviation and tolerance are

ANS:--0.009,+0.016

26.

Which of the following line algorithms used integer only arithmetic to rasterize lines?

a) Bresenham's Line Algorithm

b) DDA Line Algorithm

c) FFTW Line Algorithm

d) Line clipping Algorithm

27.

The value of Prandtl number for air is approximately

[A]. 1000

[B]. 67

[C]. 9.7

[D]. 0.7

[E]. 0.065

Answer: Option D

28.

What are the upper and lower limits of the shaft represented by 60f8?

Use the following data

Diameter step is 50 - 80mm.

Fundamental tolerance unit $i = 0.45D^{(1/3)} + 0.001D$, where D is the representative size in mm, Tolerance value for IT8 = 25i,

Fundamental deviation for f shaft = $-5.5D^{0.41}$

ANS:- Lower limit = 59.924mm, Upper Limit = 59.970mm

29.

When a single load W moves over a simply supported beam, the curve for maximum shear force, + ve or - ve will be a

Ans- Linear

30.

Absorptivity of a body equals its emissivity

a) Under thermal equilibrium conditions

- b) For a polished surface
- c) At one particular temperature
- d) At shorter wavelengths

31.

A systematic job improvement sequence will consist of

- A.** motion study
- B.** time study
- C.** job enrichment
- D.** all of these ✓

32.

The purpose of refreshing a CRT is

- a)To avoid flickering
- b)To maintain steady picture
- c)To avoid fading of pixels
- d)All of the above

Ans: All of the above

33.

0.050

A hole is specified as $40^{0.000}$ mm. The mating shaft has a clearance fit with minimum clearance of 0.01 mm. The tolerance on the shaft is 0.04 mm. The maximum clearance in mm between the hole and the shaft is

- (a) 0.04
- (b) 0.05
- (c) 0.10
- (d) 0.11

- Answer

Option (c) is correct

34.

If temperature of a solid surface changes from 300 K to 900 K, then its emissive power changes in the ratio of

- 6
- 9
- 27
- 81.

ANSWER : : 81.

35.

If the speed of the engine varies between 390 and 410 rpm in a cycle of operation, the coefficient of fluctuation of speed will be

Variation in speed 20

Mean speed 400

COEFICIENT OF FLUCTUATION:- $20/400=0.05$

36.

A diagram showing the path followed by men and materials while performing a task is known as

- A.** string diagram
- B.** flow process chart
- C.** travel chart
- D.** flow diagram

37.

A simply supported beam and a fixed beam are of same span and same uniform flexural rigidity. If they are subjected to same u.d.l. over the entire span, the deflection at the centre in the case of fixed beam will be

Ans- $1/5^{\text{th}}$ of simply supported

38.

Which of the following is not an object-space hidden surface removal algorithm?

- a) Back-Face Culling
- b) Depth Buffer
- c) **Painter's Algorithm**
- d) FFTW Line Algorithm

39.

In time study, the rating factor is applied to determine

- A. standard time of a job
- B. merit rating of the worker
- C. fixation of incentive rate
- D. normal time of a worker

40.

In a pin jointed frame the members meeting at a joint must be so arranged that

- (a) **the axes of all the members are concurrent and coplanar**
- (b) **not more than two axes meet at a point**
- (c) **the axes must be parallel to each other**
- (d) **at least three axes meet at a common point.**

Ans- (A)

41.

The main function of CAD is

- a) Documentation
- b) Manufacturing

- c) curing
- d) marketing

42.

The zone of transition between laminar sublayer and turbulent core is called

ANS:-BUFFER LAYER

43.

In a flywheel, the safe stress is 25.2 MN/m² and the density is 7 g/cm³. Then what is the maximum peripheral velocity (in m/s)?

$$\text{(c)} \sigma_0 = \rho v^2$$
$$25.2 \times 10^6 = 7 \times 10^{-3} \times 10^6 \times v^2$$
$$v = 60 \text{ m/s}$$

44.

What does N, P and L mean in N.P.L. Gauge interferometer?

- a. Nikon pulsed laser
- b. Nuclear plasma laboratory
- c. National Physics Laboratory
- d. Nuclear physics laboratory

ANSWER: National Physics Laboratory

45.

The chart which gives an estimate about the amount of materials handling between various work stations is known as

- A. flow chart
- B. process chart
- C. travel chart 
- D. operation chart

46.

The intercept between a given arch and a linear arch at a section is proportional to
ANS:-BENDING MOMENT OF THE SECTION

47.

A reciprocating engine, running at 80 rad/s, is supported on springs. The static deflection of the spring is 1mm. Take g=10m/s². When the engine runs what will be the frequency of vibration of the system?

(A) 80 rad/s (B) 100 rad/s (C) 90 rad/s (D) 160 rad/s

Frequency of vibration of system

$$w = \sqrt{\frac{g}{\delta}} = \sqrt{\frac{10}{1 \times 10^{-3}}} = 100 \text{ rad/sec}$$

(B) - - -

48.

CAD programs which incorporate parametric modeling utilize a system in which the dimensions control the _____.

- a) size and shape of the model features
- b) perspective of the model
- c) shading used to render the model
- d) colouring

49.

String diagram is used

- A. for checking the relative values of various layouts
- B. when a group of workers are working at a place
- C. where processes require the operator to be moved from one work place to another
- D. all of the above 

50.

Imperial standard yard is made of _____ simple bronze alloy

51.

The maximum tension in a cable occurs

ANS:- AT THE END POINTS

52.

The static deflection of a shaft under a flywheel is 4 mm. Take g=10m/s². What is the critical speed in rad/s?

(a) 50 (b) 20 (c) 10 (d) 5

53.

During the execution of a CNC part program block NO20 G02 X45.0 Y25.0 R5.0 the type of tool motion will be

- A) circular Interpolation — clockwise
- B) circular Interpolation — counterclockwise
- C) linear Interpolation
- D) rapid feed

Answer : (A)

54.

Friction power of the IC engine will _____ if the engine speed is increased.

- a) increases
- b) decreases
- c) no effect
- d) depends of other engine torque

55.

Hammer blow

a) is the maximum horizontal unbalanced force caused by the mass provided to balance the reciprocating masses.

b) is the maximum vertical unbalanced force caused by the mass added to balance the reciprocating masses

c) varies as the square root of the speed

56.

Analytical checking of gears includes checking of _____

- a. tooth profile
- b. vibrations
- c. noise level
- d. all of the above

ANSWER: tooth profile

57.

The maximum shear stress from a Mohr's circle is given by

Ans- radius of the circle

58.

The default position of the UCS icon is positioned at _____ on the AutoCAD grid.

- [A]. 0,0,0
- [B]. 10,10,10
- [C]. 20,20,20
- [D]. None of the above

59.

The determination of standard time in a complex job system is best done through

stop watch time study

analysis of micromotions

grouping timing technique

analysis of standard data system 

60.

In a turbojet engine, subsequent to heat addition to compressed air, to get the power output, the working substance is expanded in

- a) turbine blades, which is essentially an isochoric process.
- b) turbine blades, which is essentially an polytropic process.** 
- c) exit nozzle, which is essentially an isentropic process.
- d) exit nozzle, which is a constant volume process

61.

In A-B-C analysis, which class of items are generally large in number?

- A.** A
- B.** B
- C.** C 
- D.** none of these

62.

A nozzle is said to have choked flow when

- a) discharge is minimum. -→ **discharge is maximum**
- b) throat velocity is sonic.**
- c) nozzle exit pressure is more than the critical pressure.
- d) discharge is zero.

63.

Which formula is used to calculate diametral pitch?

Ans- T/D or N/PD

64.

CAD programs which incorporate parametric modeling utilize a system in which the dimensions control the _____.

- a) size and shape of the model features**
- b) perspective of the model
- c) shading used to render the model
- d) colouring

65.

If the poisson's ratio of a material is 0.25, the ratio of Modulus of rigidity to the young's modulus is

- (a) 3.75
- (b) 3
- (c) 2.5** 
- (d) 1.5

66.

The balancing weights are introduced in planes parallel to the plane of rotation of the disturbing mass. To obtain complete dynamic balance, the minimum number of balancing weights to be introduced in different planes is

- a) 1
- b) 2**
- c) 3
- d) 4

67.

Critical damping is a function of

- a) Mass and damping coefficient
- b) Mass and stiffness**
- c) Stiffness and natural frequency
- d) Natural frequency and damping coefficient

68.

The advantage of implementing CAD is to

- a) increase quality of design**
- b) expertise in the area of data base manufacturing management
- c) increase productivity
- d) improve communication

69.

According to Taylor's principle which type of gauge checks both size and geometric features?

- a. Go gauge**
- b. No go gauge**
- c. Both a. and b.
- d. None of the above

70.

In break even analysis, total cost consists of

- [A]. fixed cost + sales revenue
- [B]. variable cost + sales revenue
- [C]. fixed cost + variable cost 
- [D]. fixed cost + variable cost + profit

71.

In a gas turbine cycle, the turbine output is 600 kJ/kg, the compressor work is 400 kJ/kg and the heat supplied is 1000 kJ/kg. The thermal efficiency of this cycle is :

- a) 60%
- b) 40% 
- c) 20% 
- d) 80%

72.

A simply supported beam is subjected to a central concentrated load. The slope at the two ends is given by

$$(a) \frac{WL^2}{6EI}$$

(b) $\frac{WL^3}{48EI}$

$$(c) \frac{WL^2}{48EI}$$

(d) $\frac{WL^2}{16EI}$.

Ans- (D)

73.

What effect does pitch error have on nut and bolt?

- a. Major diameter of nut decreases and effective diameter of bolt increases
- b. Effective diameter of nut decreases and effective diameter of bolt increases
- c. Effective diameter of nut increases and effective diameter of bolt decreases
- d. None of the above

ANSWER: Effective diameter of nut decreases and effective diameter of bolt increases

74.

Whirling speed of the shaft is the speed at which

- a. Shaft tends to vibrate in longitudinal direction
- b. Torsional vibrations occur
- c. shaft tends to vibrate vigorously in transverse direction 

d. combination of transverse and longitudinal vibration occurs

(Ans:c)

75.

Direct expenses include

Ans-Raw material, labour etc

76.

A simply supported beam is subjected to a uniformly varying load with zero intensity at the two ends increasing to w/m at the centre. The maximum shear force is

Ans- $WL/4$

77.

In a CNC machine tool, encoder is used to sense and control

a) spindle position

b) table velocity

c) spindle speed

78.

Which of the following type of layout is suitable for automobile manufacturing concern?

A. product layout 

B. process layout

C. fixed position layout

D. combination layout

79.

What is ten point height method?

It is the average sum of ten highest points measured within sampling length

b. It is the average difference of five highest points and five deepest valleys measured within sampling length

c. It is the sum of ten highest points divided by sum of ten deepest valleys measured within sampling length

d. It is the average sum of five highest points and five deepest valleys measured within sampling length

ANSWER: It is the average difference of five highest points and five deepest valleys measured within sampling length

80.

The minimum quantity of cement content needed in one m³ of a reinforced concrete which is exposed to sea weather conditions (in kg)

- (a) 350
- (b) 200
- (c) 250**
- (d) 300 Ans.(c)

81.

In a system subjected to damped forced vibrations, the ratio of maximum displacement to the static deflection is known as

- a. Critical damping ratio
- b. Damping factor
- c. Logarithmic decrement
- d. Magnification factor**

(Ans:d)

82.

Interpolation in the controller refers to control of which one of the following in a CNC machine?

- a) Loading/unloading of jobs on machine
- b) Loading/unloading of tools from the tool changer
- c) Axes of machine for contouring**
- d) Coolant and miscellaneous functions on machine

83.

. In an internal combustion engine, during the compression stroke the heat rejected to the cooling water is 50 kJ/kg and the work input is 100 kJ/kg. The change in internal energy of the working fluid is

- a) 0
- b) 50 kJ/kg, gain**
- c) 50 kJ/kg, loss
- d) 100 kJ/kg, loss

84.

Which of the following statements is true?

85.

Feed drives in CNC milling machines are provided by

- a) synchronous motors
- b) induction motors

- c) stepper motors
- d) servo-motors

86.

The permissible bearing stress on full area of concrete shall be taken as

For working stress method of design, the permissible bearing stress on full area of concrete shall be taken as $0.25 f_{ck}$; for limit state method of design the permissible bearing stress shall be $0.45 f_{ck}$.

87.

Rankine cycle efficiency of well maintained steam power plant is in the range of

- a) less than 10%
- b) 10% to 20%
- c) 35% to 45%
- d) 50% to 60%

88.

Work study involves

- A. only method study
- B. only work measurement
- C. method study and work measurement
- D. only motion study

89.

Dispatching

- [A]. prescribes the sequence of operations to be followed
- [B]. determines the programme for the operations
- [C]. is concerned with the starting of processes
- [D]. regulates the progress of job through various processes

Answer: Option C

90.

During the execution of a CNC part program block NO20 G02 X45.0 Y25.0 R5.0 the type of tool motion will be

- A) circular Interpolation — clockwise
- B) circular Interpolation — counterclockwise
- C) linear Interpolation

D) rapid feed

Answer : (A)

91.

For steady state forced vibrations, the phase lag at resonance is

- a) 0°
- b) 45°
- c) 90°
- d) 180°

92.

Which type of surface in a fringe pattern exhibits the movement of fringes towards the centre?

- a. concave surface**
- b. convex surface**

93.

If the permissible compressive and tensile stresses in a singly reinforced beam are 5 N/mm^2 and 140 N/mm^2 respectively and the modular ratio is 18.67, the percentage area of the steel required is

- [A]. 0.496%
- [B]. 0.596%
- [C]. 0.696% 
Or .714
- [D]. 0.796%
- [E]. none of these.

94.

The efficiency of standard Diesel cycle depends on

- a) cut-off ratio in the cycle
- b) compression ratio in the cycle
- c) cut-off ratio and compression ratio**
- d) mean effective pressure

95.

At which angle does a glass plate reflector set in N.P.L. interferometer?

- a. 30°
- b. 45°**
- c. 60°
- d. 90°

ans:45 degree

96.

In order to avoid excessive multiplication of facilities, the layout preferred is

- A.** product layout
- B.** process layout
- C.** group layout
- D.** static layout

97.

The minimum amount of negative moment reinforcement in R.C.C. beams that should extend beyond the point of inflection is

A minimum of one-third of the required negative-moment reinforcement at the face of the support should extend beyond the point of inflection

98.

The basic transformations include

- a) Translation
- b) Rotation
- c) Scaling
- d) All of the above

Ans: All of the above

99.

Which process is included in air standard Diesel cycle?

- a) Polytropic compression
- b) Isochoric heat addition
- c) Isobaric heat addition
- d) Isochoric and isobaric heat addition

100.

Which type of deviation is observed while calculating hole dimensions?

- a. Positive
- b. Negative
- c. Zero
- d. All of the above

ANSWER: All of the above

101.

The transformation in which an object is moved in a minimum distance path from one position to another is called

- a) Rotation
- b) Replacement
- c) Translation
- d) Scaling

102.

In reciprocating engines primary forces

- a) are completely balanced
- b) are partially balanced
- c) are balanced by secondary forces
- d) cannot be balanced

103.

Process layout is also known as

Ans :- Functional Layout

104.

The maximum horizontal distance between the parallel main reinforcement bars in solid slabs is

5. Spacing of bars. The horizontal distance between parallel main reinforcement bars shall not be more than three times the effective depth of a solid slab or 450 mm, whichever is smaller. The horizontal distance between parallel reinforcement bars provided against shrinkage

105.

Which one of the following is part of air standard Brayton cycle?

- a) Polytropic compression
- b) Isochoric heat addition
- c) Isobaric heat addition
- d) Isochoric and isobaric heat addition

106.

The snap gauge having go dimension corresponds to _____

- a. maximum metal condition
- b. minimum metal condition
- c. minimum material condition
- d. none of the above

107.

For handling materials during manufacture of cement, a _____ is widely used

- A. belt conveyor
- B. bucket conveyor

C. fork lift truck

D. overhead crane

Answer: Option **B**

108.

A governor is said to be isochronous when the equilibrium speed for all radii of rotation of the balls within the working range

- a) is not constant
- b) is constant**
- c) varies uniformly
- d) has uniform acceleration

109.

Forming products of transformation matrices is often referred as

- a) Concatenation
- b) Composition
- c) both a&b**
- d) only a

110.

The surface width of cracks shall not generally exceed

- (a) 0.1 mm**
- (c) 0.3 mm**

- (b) 0.2 mm**
- (d) 0.4 mm.**

Ans- (C)

111.

The mean effective pressure of an engine is defined as

- a) work done/stroke volume
- b) work done per cycle/cylinder volume
- c) work done per cycle/stroke volume**
- d) work done per kg/stroke volume

112.

When the sleeve of a Porter governor moves upwards, the governor speed

- a) increases**
- b) first increases and then decreases
- c) decreases
- d) remains unaffected

113.

In product layout

114.

The combines the volumes occupied by overlapping 3D objects using set operations

- a) Beam penetration
- b) CSG Method
- c) Sweep representation
- d) All the answer

115.

The type of cement preferred in the construction of massive concrete dam is

Low heat Cement

116.

An Otto cycle operates with volumes of 40 cm³ and 400 cm³ at Top Dead Centre and Bottom Dead Center respectively. If the power output is 100 kW, what is the heat input in kJ/s?

- a) 166
- b) 145
- c) 110
- d) 93

117.

Fill up the blank

$$Accuracy = \sqrt{(Repeatability)^2 + (\underline{\hspace{2cm}})^2}$$

$$Accuracy = \sqrt{(Repeatability)^2 + (Systematic\ error)^2}$$

Ans- Systematic error

118.

A low wet bulb temperature indicates very _____ humidity.

- a) low
- b) high
- c) low or high depends on other properties
- d) None of the options

119.

When the speed of the engine fluctuates continuously above and below the mean speed, the governor is said to be

- a) hunt
- b) unstable
- c) isochronous
- d) stable

120.

A moist sand occupies a depth of 150 mm and when fully saturated it occupies 120 mm. Then the bulking of the moist sand is

Ans. $(150-120)/120 = 25\%$

121.

Find the missing term in the equation which represents the standard tolerance unit.

$$i = 0.45\sqrt[3]{D} + \underline{\hspace{2cm}}$$

ANS- 0.001D

122.

..... is created by revolution of a circle about an axis lying in its plane.

- a) Sphere
- b) Ellipsoid
- c) Torus**
- d) Cylinder

123.

Process layout is employed

- A.** where low volume of production is required
- B.** where similar jobs are manufactured on similar machines
- C.** where machines are arranged on functional basis
- D.** all of the above

124.

The stresses caused by different loads can be superimposed in

- (a) working stress design**
- (b) ultimate strength design**
- (c) limit state design**
- (d) plastic design.**

Ans- (A)

125.

As the size of a part to be manufactured increases, the tolerance limits within which the part can be manufactured _____

As the size increases, the tolerance within which a part can be manufactured also increases

126.

Which one of the following techniques is used for determining allowances in time study?

- A.** Acceptance sampling

B. Linear regression

C. Performance rating

D. Work sampling 

127.

In a four stroke I.C. engine, the turning moment during the compression stroke is

- a) negative during major portion of the stroke
- b) negative throughout**
- c) positive throughout
- d) positive during major portion of the stroke

128.

Cooling with adiabatic humidification Process is known as

- a) Evaporative cooling**
- b) Adiabatic chemical dehumidification
- c) cooling and dehumidification
- d) heating and humidification

129.

The point about which an object is rotated is called

- a) Fixed point
- b) Central point
- c) Pivot point**
- d) None

Ans: Pivot point

130.

The volumetric efficiency of compressor with increase in compression ratio will

- a) increase
- b) decrease**
- c) remain same
- d) none of the options

131.

The engine of an aeroplane rotates in clockwise direction when seen from the tail end and the aeroplane takes a turn to the left. The effect of the gyroscopic couple on the aeroplane will be

- a) to raise the nose and dip the tail**

- b) to dip the nose and raise the tail
- c) to raise the nose and tail
- d) to dip the nose and tail

132.

What description of fit suits the vacant box?

Shafts	Grades	Description of fit	Application
f	6, 7, 8		Lubricated bearings (with oil or grease), pumps and smaller motors, gear boxes

Clearance Fits (Hole Basis System):

Shafts	Grades	Description of fit	Application
a, b, c	11	Very large clearance	Generally not used
d	8, 9, 10	Loose running	Loose pulleys
e	7, 8, 9	Loose clearance	Electric motor bearings, heavily loaded bearing
f	6, 7, 8	Normal running	Lubricated bearings (with oil or grease), pumps and smaller motors, gear boxes
g	5, 6	Precision running	Lightly loaded shafts, sliding spools, accurate bearings
h	5 to 11	Extreme clearance (preferably for non-running parts)	Sockets and spigots of joints

133.

A parabolic tendon in prestressed beam causes an equivalent balancing

(a) concentrated shear force

(b) constant moment

(c) distributed force

(d) uniformly distributed force.

Ans- (d)

134.

In process layout

135.

A surface of revolution is generated by a of a 2D curve.

- a) Translational sweep

b) Rotational sweep

c) union

d) intersection

136.

A two stage compressor takes in air at 1.1. bar and discharges at 20 bar. for minimum compression work, the intermediate pressure is

a) 10.55 bar

b) 7.33 bar

c) 5.5 bar

d) 4.7 bar

137.

Identify line clipping algorithms from the following

a) Cohen- Sutherland algorithm

b) Liang-Barsky clipping

c) Nicholl-Lee-Nicholl clipping

d) All the answer

138.

Which of the following charts are used for plant layout design?

A. Operation process chart

B. Man machine chart

C. Travel chart

D. all of these ✓

139.

Describe the fit in relation to the following data

Shafts	Grades	Description of fit	Application
k	5, 6, 7		Precision joints likely to be subjected to vibrations

k	5, 6, 7	No clearance to little clearance	Precision joints likely to be subjected to vibrations
---	---------	----------------------------------	---

140.

The approximate loss of prestress due to creep in steel in prestressed concrete is about

(a) 1%

(c) 6%

(b) 3%

(d) 10%.

Ans- (B)

141.

A motor car moving at a certain speed takes a left turn in a curved path. If the engine rotates in the same direction as that of wheels, then due to the centrifugal forces

a) the reaction on the inner wheels increases and on the outer wheels decreases

b) the reaction on the outer wheels increases and on the inner wheels decreases

c) the reaction on the front wheels increases and on the rear wheels decreases

d) the reaction on the rear wheels increases and on the front wheels decreases

[View Answer](#)

Answer: b

142.

What type of fit does the following description represent?

Shafts	Grades	Description of fit	Application
s	5, 6, 7	Semi permanent/ permanent fit	Valve seating, collars on shafts

Ans- [Interference Fits \(Hole Basis System\)](#)

143.

In a single stage air-compressor, the clearance volume is 1/19th of the swept volume. It delivers 7.6 m³ of free air per minute from 100 kpa to 900 kpa. Assume the index of compression and expansion as 1.2. Find the volumetric efficiency of compressor

a) 72.4 %

b) 82.4 %

c) 62.4 %

d) 90.4 %

144.

A rigid body, under the action of external forces, can be replaced by two masses placed at a fixed distance apart. The two masses form an equivalent dynamical system, if

[A]. the sum of the two masses is equal to the total mass of body

[B]. the centre of gravity of the two masses coincides with that of the body

- [C]. the sum of mass moment of inertia of the masses about their centre of gravity is equal to the mass moment of inertia of the body
- [D]. all of the above

145.

The amount of slip from friction wedges holding the wires may be taken on an average as

- (a) 1 mm (b) 2.5 mm
 (c) 5 mm (d) 10 mm.

Ans- (B)

146.

A-B-C analysis

147.

The transformation in which the dimension of an object are changed relative to a specified fixed point is called

- a) Rotation
b) Reflection
c) Translation
d) Scaling

148.

With incremental tool positioning, ____.

- a) each tool movement is made with reference to the last tool position
b) all tool movement is measured from a fixed point or origin
c) all tool movement is measured from a zero point
d) No tool Movement

149.

The maximum fluctuation of energy is the

- a) sum of maximum and minimum energies
b) difference between the maximum and minimum energies
c) ratio of the maximum energy and minimum energy
d) ratio of the mean resisting torque to the work done per cycle

150.

What is the value of the fundamental tolerance unit "i" for the shaft and hole pair designated by

6 H7/g6

Solution: The size 6 mm lies in the diametral step of 3-6, therefore, D is given by –

$$D = \sqrt{3 \times 6} = 4.24\text{mm}$$

The value of fundamental tolerance unit is given by –

$$i = 0.45\sqrt[3]{D} + 0.001D$$

$$i = 0.45\sqrt[3]{4.24} + 0.001 \times 4.24$$

$$i = 0.7327\mu\text{m}$$

151.

Spalling stresses are produced because of

(a) bursting force

(b) inadequate anchor block

(c) insufficient bond length

(d) high concentrated tendon force.

Ans- (d)

152.

Routing

153.

A 20 m³ of air per minute is compressed from 1 bar and 20 degree Celsius to 10.24 bar. Calculate the minimum power required to drive the compressor with 2-stage compression. Assume the index of compression is 1.3

a) 68.2 kW

b) 88.9 kW

- c) 78.8 kW
d) 58.8 kW

155.

The size of the anchor plate in post-tensioned prestressed concrete structures depends upon

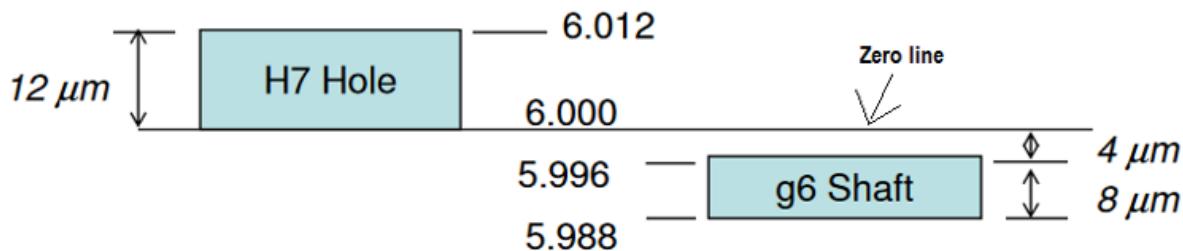
156.

The work input to air compressor is minimum if the compression law followed is

- a) $PV^{1.35} = C$
b) $PV = C$
c) $PV\gamma = C$
d) None of the answers

157.

The figure given below represents the disposition of tolerance zone around the zero line



Find the

Min. Clearance and Max. Clearance

Fit

Maximum clearance = Maximum size of hole - Minimum size of shaft

$$= 6.012 - 5.988 = 0.024 \text{ mm} = 24 \mu\text{m}$$

Minimum clearance = Minimum size of hole - Maximum size of shaft

$$= 6.000 - 5.996 = 0.004 \text{ mm} = 4 \mu\text{m}$$

158.

By using CIM to control all phases of manufacturing, firms hope to reap what benefits?

- a) Increased productivity
b) Improved quality
c) Enhanced flexibility
d) All of the answer

159.

The primary unbalanced force is maximum when the angle of inclination of the crank with the line of stroke is

- A. 0° and 90°

B. 0° and 180°

C. 90° and 180°

D. 180° and 360°

160.

Which type of model is likely to be created with a rapid prototyping system?

a) Mathematical model

b) Wireframe model

c) Surface model

d) Scale model

161.

Find the volumetric efficiency of the compressor if air is compressed from 1 bar to 7 bar. The expansion and compression are isentropic ($n=1.3$) and the clearance volume is 3% of stroke volume.

a) 76.2%

b) 85.1%

c) 89.6 %

d) 91.5%

162.

The partial balancing means

A. balancing partially revolving masses

B. balancing partially reciprocating masses

C. best balancing of engines

D. all of these

163.

Performance rating is equal to

[A]. observed performance + normal performance

[B]. observed performance - normal performance

[C]. observed performance x normal performance

[D]. none of the above

$$\text{Rating Factor} = \frac{\text{Observed Performance}}{\text{Normal Performance}}$$

164.

Internal diameter of any workpiece can be measured using _____

Ans- Inside Calliper

165.

The minimum cover in any post-tensioned prestressed concrete member protected from direct weather is the greater of the cable or

- (a) 15 mm
 (c) 25 mm

- (b) 20 mm
 (d) 30 mm.

-

Ans- (D)

166.

A flywheel of moment of inertia 9.8 kgm^2 fluctuates by 30 rpm for a fluctuation in energy of 1936 Joules. The mean speed of the flywheel is (in rpm)

- a) 600
b) 900
c) 968
d) 2940

167.

Which of the following process technologies is associated with low volume and high variety?

- a) Flexible manufacturing systems
b) Dedicated systems
c) Flexible transfer lines
 d) Computer numerically controlled machines

168.

Which among the following is measured using four ball method?

- a. Diameter
 b. Length
 c. Angle
 d. All of the above

ANSWER: Diameter

169.

In jobbing production

Ans- Every Job is different

170.

A mono-atomic ideal gas ($\gamma = 1.67$, molecular weight = 40) is compressed adiabatically from 0.1 MPa, 300 K to 0.2 MPa. The universal gas constant is 8.314 kJ/molK. The work of compression of the gas (in kJ/kg) is

- a) 29.7
- b) 19.9
- c) 13.3
- d) zero

171.

The minimum cover in any post-tensioned prestressed concrete member protected from direct weather is the greater of the cable or

- (a) 15 mm
- (c) 25 mm

- (b) 20 mm
- (d) 30 mm.

Ans- (d)

172.

What is the name of a system which brings together several technologies into a coherent system?

- a) Focused integration systems
- b) Portable manufacturing systems
- c) Flexible manufacturing systems
- d) Automated integration systems

173.

In a locomotive, the ratio of the connecting rod length to the crank radius is kept very large in order to

- a) minimise the effect of primary forces
- b) minimise the effect of secondary forces
- c) have perfect balancing
- d) start the locomotive quickly

174.

A gas expands in a frictionless piston-cylinder arrangement. The expansion process is very slow and is resisted by an ambient pressure of the 100 kPa. During the expansion process, the pressure of the system (gas) remains constant at 300 kPa. The change in volume of the gas is 0.01 m³. The maximum amount of work that could be utilized from the above process is

- a) zero
- b) 1 kJ
- c) 2 kJ
- d) 3 kJ

175.

Abbreviated work factor data is applied for

- A. material handling operation

- B. maintenance operation
- C. packing and shipping operation
- D. all of these 

176.

Match the following Group 1 items (Type of error) with Group 2 items (characteristics) and select the correct option

1. Gross error -----A. Magnitude and direction vary
2. Systematic error -----B. Caused by electrostatic fields
3. Random error -----C. Human fault
4. Environmental error -----D. Magnitude and direction are definite
- a. 1-B, 2-A, 3-D, 4-C
b. 1-A, 2-C, 3-D, 4-B
c. 1-C, 2-D, 3-A, 4-B
d. 1-D, 2-A, 3-B, 4-C

ANSWER: 1-C, 2-D, 3-A, 4-B

177.

The grouting of ducts in post-tensioned prestressed concrete works should be done under a pressure of about (in MPa)

- (a) 0.5 (b) 0.7
(c) 1.2 (d) 1.5.

Ans- (b)

178.

A reversible thermodynamic cycle containing only three processes and producing work is to be constructed. The constraints are (a) there must be one isothermal process, (b) there must be one isentropic process, (c) the maximum and minimum cycle pressures and clearance volume are fixed and (d) polytrophic processes are not allowed. Then the number of possible cycles is/are

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

179.

The strength of a fillet weld is

180.

Which of the following is not true of computer numerically controlled (CNC) machines?

- a) They can ‘learn’ from process errors.
b) They can eliminate operator error.

- c) They can give better productivity to the process.
- d) They give more accuracy and precision to the process.

181.

According to Muther, the basic principle of best layout is

- [A]. principle of over-all integration
- [B]. principle of flow
- [C]. principle of flexibility
- [D]. all of these

182.

The swaying couple is maximum or minimum when the angle of inclination of stroke (θ) is equal to

- [A]. 90° and 180°
- [B]. 45° and 225°
- [C]. 180° and 270°
- [D]. 270° and 360°

183.

Which of the following is a characteristic of End standard?

- 1. End standards are highly accurate and are well suited for measurements of close tolerances as small as 0.0005 mm.
- 2. They are time consuming in use and prove only one dimension at a time.
- 3. End standards are subjected to wear on their measuring faces.
- 4. End standards have a 'built in' datum, because their measuring faces are flat & parallel and can be positively located on a datum surface.
- 5. They are not subjected to the parallax effect since their use depends on "feel".
- 6. Groups of blocks may be "wrung" together to build up any length. But faulty wringing leads to damage.
- 7. The accuracy of both end & line standards are affected by temperature change.

184.

In a locomotive, the maximum magnitude of the unbalanced force along the perpendicular to the line of stroke, is known as

- A. tractive force
- B. swaying couple
- C. hammer blow
- D. none of these

185.

In a grillage foundation the maximum shear force occurs

- A. edge of grillage beam
- B. edge of base plate 
- C. centre of grillage beam
- D. centre of base plate.

186.

For a given set of operating pressure limits of a Rankine cycle, the highest efficiency occurs for

- (A) Super heated cycle
- (B) Regenerative cycle**
- (C) Reheat cycle
- (D) Saturated cycle

187.

Which ISO standard is used in international automobile companies to set automotive quality system standards ?

- a. ISO 14000**
- b. TS 16949**
- c. ISO 9000
- d. none of the above

188.

What does a symbol D imply in workstudy

- A) transport
- B) delay temporary storage**
- C) Dummy transport
- D) inspection

189.

What do Flexible Manufacturing systems (FMS) do?

- a) Moves and manipulates products, parts or tools
- b) Co-ordinates the whole process of manufacturing and manufactures a part, component or product
- c) Moves materials between operations
- d) Completely manufactures a range of components without significant human intervention during the processing**

190.

A football was inflated to a gauge pressure of 1 bar when the ambient temperature was 15°C. When the game started next day, the air temperature at the stadium was 5°C. Assume that the volume of the football remains constant at 2500 cm³, the amount of heat lost by the air in the football and the gauge pressure of air in the football at the stadium respectively equal to

- a) 30.6 J, 1.94 bar
- b) 21.8 J, 0.93 bar
- c) 61.1 J, 1.94 bar
- d) 43.7 J, 0.93 bar**

191.

Secondary forces in reciprocating mass on engine frame are

- a) of same frequency as of primary forces
- b) twice the frequency as of primary forces**
- c) four times the frequency as of primary forces
- d) half times the frequency as of primary forces

192.

The time taken by a trained worker to perform an operation, while working a steady pace, is known as

- A.** standard time
- B.** normal time
- C.** representative time
- D.** none of these

193.

A sliding bearing which can support steady loads without any relative motion between the journal and the bearing is called

- a) Zero film bearing
- b) Boundary lubricated bearing
- c) Hydrodynamic lubricated bearing
- d) Hydrostatic lubricated bearing**

194.

Web crippling in beams generally occurs at the points where

- | | |
|-------------------------------|--------------------------------|
| [A]. concentrated load occurs | [B]. shear force is maximum |
| [C]. deflection is maximum | [D]. bending moment is maximum |

195.

ISO 14000 quality standard is related with

ISO 14000 is a family of standards related to environmental management that exists to help organizations (a) minimize how their operations (processes, etc.) negatively affect the environment (i.e. cause adverse changes to air, water, or land); (b) comply with applicable laws, regulations, and other environmentally oriented requirements; and (c) continually improve in the above

196.

Which of the following temperature scales doesn't have negative numbers?

Ans- Kelvin

197.

In a boundary lubricated bearing, there is a of lubricant between the journal and the Bearing

- a) Thick film
- b) Thin film
- c) Zero film
- d) Solid film

198.

The sag tie in a truss is mainly used to reduce

Ans- Moment and deflection

199.

Productivity increases when

Ans- inputs decrease while outputs remain the same.

200.

Which of the following is a contact type of automated inspection method?

- a. Inspection probe
- b. Laser scanning
- c. Electric field
- d. All of the above

ANSWER: Inspection probe

201.

In order to have a complete balance of the several revolving masses in different planes

- a) the resultant force must be zero
- b) the resultant couple must be zero
- c) both the resultant force and couple must be zero
- d) the resultant couple must be infinite

202.

Which of the following statements is true?

203.

Which of the following could NOT be used to indicate a temperature change? A change in:

- a) color of a metal rod
- b) length of a liquid column
- c) electrical resistance
- d) mass of one mole of gas at constant pressure**

204.

The ratio of the plastic moment capacity to the yield moment capacity of a rolled steel beam section is about

[A]. 1

[B]. 1.15

[C]. 1.55

[D]. 1.85

205.

When the bearing is subjected to large fluctuations of load and heavy impacts, the bearing characteristic number should be the bearing modulus.

- a) 5 times
- b) 10 times
- c) 15 times**
- d) 20 times

In a vibrating system, if the actual damping coefficient is 40 N/m/s and critical damping coefficient is 420 N/m/s, then logarithmic decrement is equal to 

[A]. 0.2

[B]. 0.4

[C]. 0.6 

[D]. 0.8

207.

Which of the following is not a therblig?

Abbreviation	Symbol	Name of symbol	Abbreviation	Symbol	Name of symbol
<i>Sh</i>		SEARCH	<i>I</i>		INSPECT
<i>F</i>		FIND	<i>PP</i>		PRE-POSITION
<i>St</i>		SELECT	<i>RL</i>		RELEASE LOAD
<i>G</i>		GRASP	<i>TE</i>		TRANSPORT EMPTY
<i>TL</i>		TRANSPORT LOADED	<i>R</i>		REST FOR OVERCOMING FATIGUE
<i>P</i>		POSITION	<i>UD</i>		UNAVOIDABLE DELAY
<i>A</i>		ASSEMBLE	<i>AD</i>		AVOIDABLE DELAY
<i>U</i>		USE	<i>Pn</i>		PLAN
<i>DA</i>		DISASSEMBLE	<i>H</i>		HOLD

Ans- Anything apart from this is not a therblig

208.

The property of a system that does not change when the system is undergoing adiabatic process

- a) Pressure
- b) Temperature
- c) Volume
- d) Quantity of Heat

209.

When a body moves with simple harmonic motion, the product of its periodic time and frequency is equal to

- [A]. zero
- [B]. one
- [C]. $\pi/2$
- [D]. π

210.

The most economical section for a column is

- A. rectangular
- B. solid round
- C. flat strip

D. tubular section

E. hexagonal.

211.

If Z = Absolute viscosity of the lubricant in kg/m-s, N = Speed of the journal in r.p.m., and p = Bearing pressure in N/mm², then the bearing characteristic number is

A. $\frac{pZ}{N}$

B. $\frac{pN}{Z}$

C. $\frac{p}{ZN}$

D. $\frac{ZN}{p}$

212.

Micromotion study is

[A]. Enlarged view of motion study

[B]. Analysis of one stage of motion chart

[C]. Motion study when seen on a time chart

[D]. Sub-division of an operation into therbligs and their analysis

[E]. Motion study with micro-seconds as units

Answer: Option D

213.

Calculate diameter of best wire for a Withworth thread of M 24 x 7 mm size.

- a. 4.04 mm
- b. 7.8 mm
- c. 3.94 mm
- d. 8.08 mm

ANSWER: 3.94 mm

214.

Which of the following methods is unreliable to evaluate the surface finish?

- a. Electrical stylus profilometer
- b. Wallace surface dynamometer
- c. Profilograph
- d. Tomlinson surface tester

ANSWER: Wallace surface dynamometer

215.

If the ratio of frequency of excitation to the natural frequency of vibrations is 1.414, then the transmissibility of vibration will be

- a) 1
- b) 2
- c) 0.5
- d) 0

216.

A moist sample of soil weighs 24g in a tin lid. The tin lid above weighs 14 g. Oven dry weight of tin and sample is 22g. What is the water content of the soil?

Weight of container with lid W_1 gm

Weight of container with lid +wet
soil W_2 gm

Weight of container with lid +dry
soil W_3 gm

Water/Moisture content

$$W = [(W_2 - W_3) / (W_3 - W_1)] \times 100$$

217.

Greater flexibility in plant layout is achieved in case of

- (A) Process layout
- (B) Product layout
- (C) Combination layout
- (D) Fixed position layout

Answer: option (a)

218.

The ball bearings are usually made from

- a) Low carbon steel
- b) Medium carbon steel
- c) High speed steel
- d) Chrome nickel steel**

219.

A heat engine takes in some amount of thermal energy and performs 50 J of work in each cycle and rejects 150 J of energy. What is its efficiency?

- a) 500 %
- b) 400 %
- c) 25 %**
- d) 20 %

220.

In radial bearings, the load acts

- a) Along the axis of rotation
- b) Perpendicular to the axis of rotation**
- c) parallel to the axis of rotation
- d) in any direction

221.

-Routing and Scheduling are integral part of

- A) Product planning**
- B) Work study
- C) Job analysis
- D) Quality control

222.

In under damped vibrating system, the amplitude of vibration

- [A]. decreases linearly with time
- [B]. increases linearly with time
- [C]. decreases exponentially with time ✓
- [D]. increases exponentially with time

223.

Which principle does Taylor-Hobson-Talysurf tester work on?

- a. Capacitive demodulating principle
- b. Intensity modulating principle
- c. Inductive modulating principle
- d. Carrier modulating principle

ANSWER: Carrier modulating principle

224.

A rigid container holds an ideal gas ($C_v = 0.75 \text{ kJ/(kg K)}$). The container is cooled from 110°C to 20°C . Find the specific heat transfer (kJ/kg) for the process

Ans- 67.5 kJ/kg

225.

If the soil stays at a place above the parent rock where it is produced, that it is called

(a) stationary soil
(c) residual soil

(b) static soil
 (d) immobile soil.

Ans-(c) Residual Soil

226.

Shearing strength of cohesionless soil depends upon

- A.** dry density
- B.** rate of loading
- C.** confining pressure 
- D.** nature of loading.

227.

Work sampling is applied for 

- **A.** estimation of the percentage utilisation of machine tools
- **B.** estimating the percentage of the time consumed by various job activities
- **C.** finding out time standards, specially where the job is not repetitive and where time study by stop watch method is not possible
- **D.** all of the above

Ans d

228.

Match items in List-I (Process) with those in List-II (Characteristic) and select the correct answer using the codes given below the lists:

List-I

List-II

- | | |
|-----------------------|-----------------------------|
| A. Throttling process | 1. No work done |
| B. Adiabatic process | 2. No heat transfer |
| C. Free expansion | 3. Constant internal energy |
| D. Isothermal process | 4. Constant enthalpy |

Ans.a-4 b-2 c-1 d-3

229.

The steering of a ship means

- a) movement of a complete ship up and down in vertical plane about transverse axis
- b) turning of a complete ship in a curve towards right or left, while it moves forward
- c) rolling of a complete ship side-ways
- d) tilting of a complete ship

230.

Which type of light source is used in N.P.L. type of flatness interferometer?

- a. Mercury vapour lamp
- b. Cadmium lamp
- c. Both a. and b.
- d. None of the above

ANSWER: Mercury vapour lamp

231.

When the length of the journal is less than the diameter of the journal, then the bearing is said to be a

- a) short bearing
- b) long bearing
- c) medium bearing
- d) square bearing

232.

The angular contact ball bearing can be used for

- a) Radial load only
- b) axial load only
- c) both radial and axial loads
- d) to adjust for misalignments

233.

Think about how a refrigerator works and the system of the refrigerator and the area outside of the refrigerator at ambient temperature. Is the high temperature the body refrigerator or the ambient air around the refrigerator?

- a) Not enough information to answer
- b) Provided the refrigerator is working, the refrigerator is the higher temperature body
- c) Provided the refrigerator is working, the area around the refrigerator is the higher temperature body
- d) Provided the refrigerator is working, the bodies are of the same temperature

234.

The maximum differential settlement in case of foundation on clayey soils is restricted to

ans 40mm

235.

A shaft carrying three rotors will have

- a) no node
- b) one node
- c) two nodes
- d) three nodes

236.

The closeness of the measured value to the actual value is _____

- a) Accuracy
- b) Precision
- c) Repeatability
- d) Sensitivity

237.

Which one of the following chart gives simultaneously information about the progress of work and machine loading?

- A. Process chart
- B. Machine load chart
- C. Man-machine chart ✓
- D. Gantt chart

238.

A rigid vessel contains pure substance and it passes through the critical state on heating only if the initial state is

Ans- Liquid State

239.

A bearing is designated by the number 305. It means that a bearing is of

- a) Light series with bore of 25 mm
- b) medium series with bore of 25 mm
- c) Heavy series with bore of 25 mm
- d) extra light series with width of 25 mm

240.

Which of the following statement is correct?

241.

Compaction of soil is aimed at

The main aim of compacting soil is to improve some desirable properties of the soil, such as reduction of compressibility, water absorption and permeability, increase in soil strength, bearing capacity.

242.

The unit cost in case of batch production is _____ as compared to jobbing production.

A. same

B. low

C. high

243.

When a rigid body is suspended vertically and it oscillates with a small amplitude under the action of the force of gravity, the body is known as

A. simple pendulum

B. compound pendulum

C. torsional pendulum

D. second's pendulum

244.

The ratio of settlement at any time t, to the final settlement is called as

A. co-efficient of consolidation

B. degree of consolidation

C. consolidation index

D. consolidation of undisturbed soil.

245.

The spherical roller bearing can be used for

- a) Radial load only
- b) axial load only
- c) both radial and axial loads
- d) to adjust for misalignments

246.

Side rake angle of a single point cutting tool is the angle

- a) between the surface of the flank immediately below the point and a line drawn from the point perpendicular to the base
- b) by which the face of the tool is inclined towards back
- c) by which the face of the tool is inclined sideways
- d) between the surface of the flank immediately below the point and a plane at right angles to the centre line of the point of the tool

247.

The temperature recorded by a thermometer when its bulb is surrounded by a wet cloth exposed to air.

- A. wet bulb temperature ✓
- B. dry bulb temperature
- C. dew point temperature
- D. none of these

248.

For a product layout the material handling equipment must

- a) Have full flexibility
- b) Be general purpose type
- c) Be designed as special purpose for a particular application
- d) Employ conveyor belts, trucks, tractors etc.

249.

If the centre distance of the mating gears having involute teeth is increased, then the pressure angle

- a) increases
- b) decreases
- c) remains unchanged
- d) none of these

250.

The spark advance is usually specified in terms of

- a) engine speed in rev/sec
- b) time in seconds
- c) degree of crank rotation
- d) piston displacement from TDC

251.

A measurement system only includes operators and gauges

- a) Can't predict
- b) False

- c) Always True
- d) May be true or false

252.

Black cotton soil is not suitable for foundations because of its

- [A]. bearing capacity is low
- [B]. permeability is uncertain
- [C]. particles are cohesive
- [D]. property to undergo a volumetric change due to variation of moisture content.

253.

The secondary unbalanced force is maximum _____ in one revolution of the crank.

- a) four times
- b) two times
- c) eight times
- d) sixteen times

254.

Which of the following is independent of sales forecast?

Ans- Productivity

255.

Lewis equation in spur gears is applied

- a) only to the pinion
- b) only to the gear
- c) to stronger of the pinion or gear 87

d) to weaker of the pinion or gear

256.

Precision is related to the accuracy of the measurements

- a) True
- b) Always False**
- c) May be true or false
- d) can't predict

257.

Drainage conditions during test can be controlled best in

258.

In reciprocating compressors, clearance is provided

- a) To improve the volumetric efficiency of the compressor
- b) To accommodate valves**
- c) To account for thermal expansion due to temperature variation**
- d) To reduce power consumption of the compressor

259.

Which of the following layouts is suited for mass production?

A. process layout

B. product layout

C. fixed position layout

D. plant layout

E. functional layout.

260.

This is a solid shape that fits inside the mold and forms a hole in a cooled cast metal or molten plastic object:

- a) Core**
- b) Cavity
- c) Prototype
- d) Hole mold

261.

The commercial refrigeration system which is closer to reversed carnot cycle in terms of performance is

Ans- Air refrigeration system

262.

For two governors A and B, the lift of sleeve of governor A is more than that of governor B, for a given fractional change in speed. It indicates that

- a) governor A is more sensitive than governor B
- b) both governors A and B are equally sensitive
- c) governor B is more sensitive than governor A
- d) both governors A and B are isochronous

263.

In helical gears, the distance between similar faces of adjacent teeth along a helix on the pitch cylinders normal to the teeth, is called

- a) normal pitch
- b) axial pitch
- c) diametral pitch
- d) module

264.

Negative skin friction is to be considered when

<input checked="" type="checkbox"/>	Fill material
<input type="checkbox"/>	Dense coarse sand
<input type="checkbox"/>	Over consolidated stiff clay
<input type="checkbox"/>	Dense fine sand

265.

Air ($C_p = 1.0 \text{ kJ/kg}$ ratio of specific heat = 1.4) enter a compressor at a temperature of 27 deg.C. The compressor ratio is 4. Assuming an mechanical efficiency of 80%, the compressor work required in kJ/kg is

- a) 160
- b) 172
- c) 182
- d) 225

266.

Which of the following is used to control the speed variations of the engine caused by the fluctuations of the engine turning moment?

- a) Governor
- b) flywheel
- c) connecting rod
- d) piston

267.

When a metal is specified as "tough" in the part drawing, the manufacturing engineer should understand that this metal:

- a) resists grinding
- b) does not deform plastically but breaks into pieces when stressed
- c) dulls tools almost immediately

d) resists being broken or deformed by mechanical shock forces

268.

The seepage flow through a porous medium is generally

269.

The root angle of a bevel gear is equal to

- a) pitch angle – addendum angle
- b) pitch angle + addendum angle
- c) pitch angle – dedendum angle
- d) pitch angle + dedendum angle

270.

Performance rating is equal to

- [A]. observed performance + normal performance
- [B]. observed performance - normal performance
- [C]. observed performance x normal performance
- [D]. none of the above

$$\text{Rating Factor} = \frac{\text{Observed Performance}}{\text{Normal Performance}}$$

271.

A major river basin is divided into four sub-basin with areas of 900, 700, 1000 and 1400 km² respectively. If the average annual rainfalls on the sub-basins are 100, 80, 100 and 110 cm respectively, what is the rainfall for the basin as a whole?

- (a) 85 cm
- (c) 100 cm

- (b) 95 cm
- (d) 105 cm.



Ans-(C)

272.

A system in dynamic balance implies that

- a) there will absolutely no wear of bearings
- b) there is no critical speed in the system
- c) the system is critically damped
- d) the system is also statically balanced

273.

In the cost structure of a product, the selling price is determined by the factors such as

ans -

- (a) sales turn over
- (b) lowest competitive price

(c) various elements of the cost

(d) buyers' capability to pay

(e) all of the above

274.

Which of the following is the best engineering plastics material that has high tensile strength, high compressive strength, with minimal elongation to use for a product that will be injection molded?

a) polycarbonate

b) polystyrene

c) phenolic

d) epoxy

275.

The latent heat load in an auditorium is 25% of sensible heat load. The value of sensible heat factor(SHF) is equal to

a) 0.25

b) 0.5

c) 0.8

d) 1.0

276.

The contact ratio for gears is

a) zero

b) less than one

c) greater than one

d) none of these

277.

The best process for making a kitchen drawer divider tray out of plastic sheets is:

a) pultrusion

b) thermoforming

c) compression forming

d) blow molding

278.

The unit hydrograph is the graphical relation between

Ans- runoff and time

279.

_____ gives the fraction of air which does not come into contact with heating coil surface

a) By pass factor

b) sensible heat factor

c) latent heat factor

d) total heat factor

280.

In a spring mass vibrating system, the natural frequency of vibration is reduced to half the value when a second spring is added to the first spring in series. Determine the stiffness of the second in terms of that of the first spring.

- a) 1/3 of first spring
- b) 3 times of first spring
- c) 2 times of first spring
- d) as the same of first spring

281.

Which one of the following techniques is used for determining allowances in time study?

- A. Acceptance sampling
- B. Linear regression
- C. Performance rating
- D. Work sampling

282.

The allowable static stress for steel gears is approximately _____ of the ultimate tensile stress.

- A. one-fourth
- B. one-third
- C. one-half
- D. double

283.

Merit Rating is the method of determining worth of

- A. a job
- B. an individual employee [Correct Answer]
- C. a particular division in workshop
- D. machine
- E. overall quality.

284.

A turning operation is to be done on a piece of alloy steel that has a diameter of 90mm. If the depth of cut is set at 3.175 mm, the feed is set at 0.30 mm per revolution, and the recommended cutting speed using a carbide tool is 90 meters per minute, what rotational speed you will set on the machine, from the following available speeds on machine, in rpm?

- a) 118

- b) 218
c) 318
d) 418

285.

At what fraction of depth below the free surface does the average velocity occur in open channel flow

- (a) 0.2
(c) 0.6

- (b) 0.4
 (d) 0.8.



Ans- 0.6

286.

What is the minimum damping ratio for an underdamped system such that its overshoot is limited to 10 percent?

Ans –

- a) 0.59
b) 0.69
c) 1
d) 1.59

287.

Fundamental principle of refrigeration is based on _____ law of thermodynamics

- a) First
b) second
c) third
d) none of the above

288.

When bevel gears having equal teeth and equal pitch angles connect two shafts whose axes intersect at right angle, then they are known as

- a) angular bevel gears
b) crown bevel gears
c) internal bevel gears
d) mitre gears

289.

When the spiral angle of a bevel gear is zero, it is called as_____

- a) crown gear
b) zero bevel gear
c) meter gear
d) spiral bevel gear

290.

Humidification or Dehumidification process is also called as

- a) sensible heat process
b) latent heat process

- c) total heat process
- d) all the answers

291.

The purpose of a riser in a mold is

- a) to help raise the mold from the floor while preparing the mold
- b) to do a function same as the cope while preparing the mold
- c) to enhance the draft
- d) to feed liquid metal into the body of casting as it solidifies**

292.

Routing is essential in the following type of industry

A. assembly industry [Correct Answer]

B. process industry

C. job order industry

D. mass production industry

E. steel industry.

293.

The duty at the field of a crop is 1000 hectares/cumec. If the canal losses are 25 %, what is the duty at the head of the canal?

(a) 750
(c) 250

(b) 1250
 (d) 800.

Ans- (d)

294.

If magnification factor is high for constant damping factor

295.

The production scheduling is simpler and high volume of output and high labour efficiency are achieved in the case of

A. product layout 

B. process layout

C. fixed position layout

D. a combination of line and process layout

296.

The property of a bearing material which has the ability to accommodate small particles of dust, grit etc., without scoring the material of the journal, is called

- a) bondability
- b) embeddability**
- c) comformability
- d) fatigue strength

297.

Emulsified oils which are used in machine shop are

- a) high in sulphur content
- b) mixture of oil and water used for lubricating and cooling**
- c) lubricating oils diluted with naphta, kerosene or other petroleum-base solvents.
- d) oils that have degraded over time

298.

A canal meant to convey water from one source to the other is known as

- | | | | |
|---------------------------|--------------------------|----------------------------|--------------------------|
| (a) feeder canal | <input type="checkbox"/> | (b) perennial canal | <input type="checkbox"/> |
| (c) commuter canal | <input type="checkbox"/> | (d) link canal. | <input type="checkbox"/> |

Ans- (a) Feeder Canal

299.

What type of vibration is predominant in the beam structure?

Ans- Transverse Vibrations

300.

The air refrigeration system is working on _____ cycle

- a) bell column cycle**
- b) carnot cycle
- c) driving cycle
- d) VCR cycle

301.

A lubrication system in which a scoop connected at the lowest part of the connecting rod is used to spread the lubricating oil on the cylinder wall is called

- a) petroil system
- b) splash system**

- c) pressure system
- d) dry sump system

302.

Chills are used in moulds to

- a) reduce the possibility of blow holes
- b) achieve directional solidification
- c) reduce freezing time
- d) smoothen metal flow for reducing splatter

303.

The disadvantage of product layout is

- a) Costly and complex production control
- b) High inspection cost
- c) High initial investment for the specialised facilities
- d) None of these

304.

Non-coplaner concurrent forces are those forces which

- a) do not meet at one point and their lines of action do not lie on the same plane
- b) meet at one point, but their lines of action do not lie on the same plane
- c) meet at one point and their lines of action also lie on the same plane
- d) do not meet at one point, but their lines of action lie on the same plane

305.

The material used for lining of friction surfaces of a clutch should have coefficient of friction.

- a) low
- b) high
- c) medium
- d) zero

306.

The ordinate of the instantaneous unit hydrograph is proportional to

<input type="checkbox"/>	the slope of the 1 hour unit hydrograph at the time
<input checked="" type="checkbox"/>	the slope of the direct runoff unit hydrograph at that time
<input type="checkbox"/>	difference in the slope of the S curve and 1 hour unit hydrograph
<input checked="" type="checkbox"/>	the slope of the S curve with effective rainfall intensity of 1 cm/hr ⁻¹

307.

The base period of a 6 h unit hydrograph of a basin is 84 h. Then the base period of a 12 h unit hydrograph of the same basin will be

72 h
78 h
84 h
<input checked="" type="checkbox"/> 90 h

Solution:

Base period for a 6h hydrograph = 84 hrs

$$\begin{aligned}\text{Base period for 12 h hydrograph} &= 84 + 6 \\ &= 90 \text{ hrs}\end{aligned}$$

308.

The amount of heat removed from 1 ton (1000 kg) of pure water supplied at 0°C to form ice at 0°C in 24 hours is known as _____

Ans- 1 Tonne Refrigeration

309.

In foundry work, a runner is which one of the following:

- a) channel in the mold leading from the downspurte to the main mold cavity
- b) foundryman who moves the hot molten metal from the furnace to the mold
- c) vertical channel into which the metal is poured into the mold from a laddle

310.

In case of a multiple disc clutch, if n_1 are the number of discs on the driving shaft and n_2 are the number of the discs on the driven shaft, then the number of pairs of contact surfaces will be

- a) $n_1 + n_2$
- b) $n_1 + n_2 - 1$**
- c) $n_1 + n_2 + 1$
- d) none of these

311.

Inventory control in production, planning and control aims at

Ans - acceptable customer service at low capital investment in inventory

312.

Which of the following statement is correct?

313.

The allowed time for a job equals standard time plus

A. policy allowance [Correct Answer]

B. interference allowance

C. process allowance

D. learning allowance

E. unforeseen allowance.

314.

A 40 kW engine has a mechanical efficiency of 80 %. If the frictional power is assumed to be constant with load, what is the approximate value of the mechanical efficiency at 50% of the rated load?

a) 47%

b) 57%

c) 67%

d) 77%

315.

If 20 ml of 0,02 H₂SO₄ is needed to produce methyl orange end point with 200 ml of water sample, then the total alkalinity of the water sample is

Ans- 100mg/l

316.

The cone clutches have become obsolete because of

a) small cone angles

b) exposure to dirt and dust

c) difficulty in disengaging

d) all of these

317.

The principle of transmissibility of forces states that, when a force acts upon a body, its effect is

a) maximum, if it acts at the centre of gravity of the body

b) minimum, if it acts at the centre of gravity of the body

c) same at every point on its line of action

d) different at different points on its line of action

318.

Total solidification time is defined as which one of the following:

- (a) time between pouring and complete solidification,
- (b) time between pouring and cooling to room temperature,
- (c) time between solidification and cooling to room temperature, or
- (d) time to give up the heat of fusion?

319.

A waste water sample of 2 ml is made upto 300ml in a BOD bottle with distilled water. Initial D.O. of the sample is 8 and after 5 days it is 2. Therefore its BOD is

- A) 891 mg/L
- B) 900mg/L
- C) 300 mg/L
- D) 1200 mg/L

Explanation:

$$\text{BOD}_5 = [\text{initial DO} - \text{Final DO}] \times \text{dilution factor}$$

Option (b) is correct.

$$= (8 - 2) \times \frac{300}{2} = 900 \text{ mg/L}$$

320.

A refrigerant should have low

- a) boiling point
- b) specific heat of liquid
- c) specific volume of vapour
- d) all of the answers

321.

In a sand-casting mold, the V/A ratio of the riser should be

- a) equal to the V/A ratio of the casting itself
- b) greater than the V/A ratio of the casting itself
- c) smaller than the V/A ratio of the casting itself

322.

A jaw clutch is essentially a

- a) Positive action clutch
- b) cone clutch
- c) friction clutch
- d) disc clutch

323.

In manufacturing management, the term 'Dispatching' is used to describe

- A. dispatch of sales order
- B. dispatch of factory mail

- C. dispatch of finished product of the user
- D. dispatch of work orders through shop floor

324.

The angular velocity (in rad / s) of a body rotating at N revolutions per minute is

- A. $\pi N/60$
- B. $\pi N/180$
- C. $2\pi N/60$
- D. $2\pi N/180$

325.

Absolutely soft waters are required for

- 326.
- For handling materials during manufacture of cement, a _____ is widely used.
- A. belt conveyor
 - B. bucket conveyor
 - C. fork lift truck
 - D. overhead crane

Answer: Option B

327.
Total slip will occur in a belt drive when

- a) angle of rest is zero
- b) angle of creep is greater than angle of rest
- c) angle of rest is greater than angle of creep
- d) angle of creep is zero

328.
In a sand-casting mold, the V/A ratio of the riser should be

- a) equal to the V/A ratio of the casting itself
- b) greater than the V/A ratio of the casting itself
- c) smaller than the V/A ratio of the casting itself

329.

According to the law of moments, if a number of coplaner forces acting on a particle are in equilibrium, then

- a) the algebraic sum of their moments about any point is equal to the moment of their resultant force about the same point.
- b) the algebraic sum of their moments about any point in their plane is zero**
- c) their lines of action are at equal distances
- d) their algebraic sum is zero

330.

Antiknock character of compression ignition engine fuel is increased by

- [A]. tetraethyl lead
- [B]. trimethyl pentane
- [C]. amyl nitrate ✓**
- [D]. hexadecane

331.

Coagulant may not be added for treatment before

332.

In computing the engine performance, the heating value of fuel used is _____

- a) Higher heating value
- b) Lower heating value**
- c) The Average of lower and higher heating values
- d) None of the above

333.

The centroid of a semi-circle area lies at a distance of _____ from its base measured along the vertical radius.

- A. $3r/8$
- B. $4r/3\pi$ ✓
- C. $8r/3$
- D. $3r/4\pi$

334.

The basic load rating of a ball bearing is

- a) the maximum static radial load that can be applied without causing any plastic deformation of bearing components.

- b) the radial load at which 90% of the group of apparently identical bearings run for one million revolutions before the first evidence of failure.
- c) the maximum radial load that can be applied during operation without any plastic deformation of bearing components.
- d) a combination of radial and axial loads that can be applied without any plastic deformation

335.

In sand casting, the volumetric size of the pattern is

- a) bigger than the cast part
- b) same size as the cast part
- c) smaller than the cast part

336.

Process layout is employed

A. batch production [Correct Answer]

- B. continuous type of product
- C. effective utilization of machines
- D. all of the above
- E. none of the above.

337.

A body of weight W is required to move up on rough inclined plane whose angle of inclination with the horizontal is α . The effort applied parallel to the plane is given by (where $\mu = \tan\phi$ = Coefficient of friction between the plane and the body.)

- a) $P = W \tan(\alpha + \phi)$
- b) $P = W \tan\alpha$
- c) **P = W ($\sin\alpha + \mu\cos\alpha$)**
- d) $P = W (\cos\alpha + \mu\sin\alpha)$

338.

Superheating in vapour compression refrigeration cycle is

- a) Increases the specific volume of refrigerant vapour
- b) Increases refrigeration effect
- c) Increases work of compression
- d) All the answers**

339.

The usual amount of residual chlorine required after 10 minutes of contact is

ans - 1.5 mg/l

340.

What does symbol 'O' imply in work study? .

A. operation [Correct Answer]

B. inspection

C. transport

D. delay temporary storage

E. none of the above.

341.

Given that W_m = weight of the molten metal displaced by a core and W_c = weight of the core, the buoyancy force is which one of the following?

- a) downward force = $W_m + W_c$
- b) downward force = $W_m - W_c$
- c) upward force = $W_m + W_c$
- d) upward force = $W_m - W_c$**

342.

The difference between tensions on the tight and slack sides of a belt drive is 3000 N. if the belt speed is 15 m/s, the transmitted power in kW is

<input checked="" type="checkbox"/>	45
<input type="checkbox"/>	22.5
<input type="checkbox"/>	90
<input type="checkbox"/>	100

343.

Intermittent system is more popular in India because

- (a) supply hours can be staggered for different zones of different elevations**
- (b) less quantity of water shall be sufficient**
- (c) wastage is quite less**
- (d) it is highly economical in the long run.**



Ans-(a)

344.

The ratio of tension on the tight side to that on the slack side in a flat belt drive is

- a) proportional to the product of coefficient of friction and lap angle
- b) an exponential function of the product of coefficient of friction and lap angle**
- c) proportional to the lap angle

d) proportional to the coefficient of friction

345.

For a small scale industry, the fixed cost per month is Rs. 5000. The variable cost per product is Rs. 20 and sales price is Rs. 30 per piece. The break even production per month will be

A. 300

B. 460

C. 500

D. 1000

346.

The ratio of high temperature to low temperature in reversed carnot cycle refrigerator is 1.1. The COP of the refrigerator will be

a) 10

b) 4

c) 3.5

d) 4.5

347.

Which of the following is a scalar quantity?

a) Speed

b) Velocity

c) Force

d) Acceleration

348.

Which of the following materials require largest shrinkage allowance while making a pattern for a casting?

a) Plain Carbon steel

b) Aluminum

c) Brass

d) Cast Iron

349.

Disposable patterns are made of

a) wood

b) rubber

c) polystyrene

d) metal

350.

A 1.5 kW motor is running at 1440 rev/min, it is to be connected to a stirrer running at 36 rev/min. The gearing arrangement suitable for this application is

a) Differential gear

b) helical gear

c) bevel gear

d) worm gear

351.

0.7 kg/s of air enters with a specific enthalpy of 290 kJ and leaves it with 450 kJ of specific enthalpy. Velocities at inlet and exit are 6 m/s and 2 m/s respectively. Assuming adiabatic process, what is power input to the compressor?

a) 120 kW

b) 118 kW

c) 115 kW

d) 112 kW

352.

Efficiency of activated sludge process is

the BOD removal is up to 80-95 percent and bacteria removal is up to 90-95%

a) 92%

b) 80%

c) 99%

d) 78%

353.

The type of layout used for manufacturing steam turbines, is

A. product layout

B. process layout

C. fixed position layout 

D. any one of these

354.

The rate of change of momentum is directly proportional to the impressed force, and takes place in the same direction in which the force acts. This statement is known as

a) Newton's first law of motion

b) Newton's second law of motion

c) Newton's third law of motion

d) none of these

355.

The property of a material which enables it to resist fracture due to high impact loads is known as

A. strength

B. stiffness

C. toughness 

D. brittleness

356.

Motion study involves analysis of

A. actions of operator [Correct Answer]

B. layout of work place

C. tooling and equipment

D. all of the above

E. none of the above.

357.

The point, through which the whole weight of the body acts, irrespective of its position, is known as

A. moment of inertia

B. centre of gravity 

C. centre of percussion

D. centre of mass

358.

Activated sludge process is a biological process involving

production of an activated mass of microorganisms capable of aerobically stabilizing the organic content of a waste

359.

Shrinkage allowance on pattern is provided to compensate for shrinkage when

a) temperature of metal drops from pouring to room temperature

b) metal changes from liquid state to solid state at freezing temperature

c) temperature of solid phase drops from freezing temperature to room temperature

d) temperature of liquid metal drops from pouring to freezing temperature of the metal

360.

Which one of the following phenomena occurs when gas in a piston-in-cylinder assembly expands reversibly at constant pressure?

- a) Heat is added to the gas
- b) Heat is removed from the gas
- c) Gas does work from its own stored energy
- d) Gas undergoes adiabatic expansion

361.

The factor deciding the length of a grit chamber is

- (a) detention period
- (b) horizontal velocity of flow
- (c) settling velocity
- (d) surface loading.

Ans- (b)

362.

A couple produces

- a) translatory motion
- b) none of the above
- c) combined translatory and rotational motion
- d) rotational motion

363.

In sand molding, core prints are used to

- a) strengthen the core so that it will not crumble while pouring
- b) form seat to support and hold the core in place
- c) fabricate the core

364.

If a load W is applied instantaneously on a bar, then the stress induced in bar will

A. be independent of ratio of mass of load W to mass of bar (y) [Correct Answer]

B. increase with increase in y

C. decrease with decrease in y

D. depend on other considerations

E. none of the above.

365.

The average time recorded by work study man for an operation is called

A. standard time

B. normal time

C. representative time ✓

D. none of these

366.

The comfort conditions in air conditioning are at (where DBT = Dry bulb temperature, and RH = Relative humidity)

- a) 20°C DBT and 80% RH
- b) 25°C DBT and 100% RH
- c) 22°C DBT and 60% RH**
- d) 25°C DBT and 40% RH

367.

Sludge digestion is

Ans- Aerobic process

368.

If a material fails below its yield point, failure would be due to

A. straining

B. fatigue [Correct Answer]

C. creep

D. sudden loading

E. impact loading.

369.

Indirect expenses include

A. factory expenses

B. selling expenses

C. administrative expenses

D. all of these 

370.

The dry bulb temperature lines, on the psychrometric chart are

- a) vertical and uniformly spaced**
- b) horizontal and uniformly spaced
- c) horizontal and non-uniformly spaced
- d) curved lines

371.

A rubber ball is dropped from a height of 2 m. If there is no loss of velocity after rebounding, the ball will rise to a height of

A. 1m

B. 2m 

C. 3m

D. 4m

372.

In sand molding draft is provided on the

a) casting

b) cavity

c) pattern

373.

Time study is carried out to determine the time required to complete job by

A. a slow worker

B. a fast worker

C. an average worker 

D. an apprentice

374.

In testing a material for endurance strength, it is subjected to

A. static load

B. dynamic load

C. impact load

D. static as well as dynamic load

E. completely reversed load.

375.

The angle of inclination of the plane at which the body begins to move down the plane, is called

a) angle of repose

- b) angle of projection
- c) angle of friction
- d) none of these

376.

The total and static pressures at the inlet of a steam nozzle are 186 kPa and 178 kPa respectively. If the total pressure at the exit is 180 kPa and static pressure is 100 kPa, then the loss of energy per unit mass in the nozzle will be:

- a) 2 kPa
- b) 6 kPa
- c) 8 kPa
- d) 78 kPa

377.

Shell moulding requires

- a) Wooden patterns
- b) Sand patterns
- c) Metal patterns
- d) Polystyrene patterns

378.

A lamp post at the edge of the pavement reduces the capacity of the lane to

- A) 72%
- B) 90%
- C) 60%
- D) 84%

379.

Bitumen stabilisation acts as a

acts as an anti-stripping agent to help disperse the foamed-bitumen

380.

In a casting process, fluidity is mostly influenced by

- a) melting temperature
- b) tapping temperature
- c) pouring temperature
- d) solidification temperature

381.

Guest's theory of failure is applicable for following type of materials

- (A) Brittle
- (B) Ductile
- (C) Elastic
- (D) Plastic

Ans-(B)

382.

Varingon's theorem of moments states that if a number of coplaner forces acting on a particle, then

- a) their algebraic sum is zero
- b) their lines of action are at equal distances
- c) the algebraic sum of their moments about any point in their plane is zero
- d) the algebraic sum of their moments about any point is equal to the moment of their resultant force about the same point.**

383.

In order to avoid excessive multiplication of facilities, the layout preferred is

A. product layout

B. process layout 

C. group layout

D. static layout

384.

In a vapor compression refrigeration cycle, heat is rejected by the refrigerant in a

- a) condenser**
- b) compressor
- c) evaporator
- d) expansion valve

385.

Sprue in sand casting refers to

- a) gate
- b) runner
- c) riser
- d) vertical passage**

386.

In a psychrometric process, the sensible heat added is 30 kJ/s and the latent heat added is 20 kJ/s. The sensible heat factor for the process will be

- a) 0.37
- b) 0.3
- c) 0.6**
- d) 0.67

387.

Father of industrial engineering is

A. Jeck Gilberth

B. Gnatt

C. Taylor

D. Newton

E. none of the above.

388.

With the percentage increase of carbon in steel, decreases its

A. strength

B. hardness

C. brittleness

D. ductility, [Correct Answer]

389.

The minimum radius for intersection curve when the speed is 35 kmph is

390.

Onejoule is equal to

A. 10^5 ergs

B. 10^3 ergs

C. 10^7 ergs

D. 10^{11} ergs

391.

In sand molding, a slick refers to

a) a round sieve

b) a long, flat metal plate fitted with an offset handle

c) used to make or repair corners in the mould

d) used to scoop sand deep in the mould

392.

Moment of inertia of a triangular section of base (b) and height (h) about an axis passing through its vertex and parallel to the base, is _____ than that passing through its C.G. and parallel to the base.

a) seven times

b) five times

c) nine times

d) six times

393.

Choose the wrong statement Time study is used to

A. determine overhead expenses [Correct Answer]

B. provide a basis for setting piece prices or incentive wages

C. determine standard costs

D. determine the capability of an operator to handle the number of machines

E. compare alternative methods.

394.

Centre line for an urban road of more than 4 lanes is

- broken line
- 3m broken line with 4.5m spacing
- continuous thick line
- two thick parallel lines with a gap of 75mm in between

395.

The maximum percentage of carbon content in cast iron is _____.

(a) 3 to 5

396.

During adiabatic saturation process on unsaturated air _____ remains constant.

A. relative humidity

B. dew point temperature

C. dry bulb temperature

D. wet bulb temperature

397.

The purpose of sprue is to

- a) feed the cavity at a rate consistent with the rate of solidification
- b) act as a reservoir for molten metal
- c) help feed the casting until the solidification takes place
- d) feed molten metal from pouring basin to gate

398.

In most machine members, the damping capacity of the material should be

- [A]. High [B]. Zero
- [C]. Around zero [D]. Low
- [E]. Anything
- 399.
- In full grouted method of construction of Bituminous roads, bitumen is applied at the rate of
- (a) 1 to 2 kg/m² (b) 4 to 8 kg/m²
 (c) 8 to 14 kg/m² (d) 10 to 20 kg/m².
- Ans-(C) 8 to 14 kg/m²

400.
Works cost implies

- A. primary cost
- B. factory cost
- C. factory expenses
- D. primary cost + factory expenses
- E. none of the above.

401.
The difference between dry bulb temperature and wet bulb temperature, is called

- a) degree of saturation
 b) dry bulb depression
 c) dew point depression
 d) wet bulb depression

402.
According to lami's theorem

- a) the three forces must be at 120° to each other
 b) the three forces must be in equilibrium
 c) the three forces must be equal
 d) if the three forces acting at a point are in equilibrium, then each force is proportional to the sine of the angle between the other two

403.
A rising gradient of 1 in 50 meets a falling gradient of 1 in 500. The length of the vertical curve if the rate of change of gradient is 1% per 100 m.

- (a) 45.45 m** (b) 180 m
 (c) 200 m (d) 220 m.

Ans- (B)

404.

Stress concentration is caused due to

- a) variations in load acting on a member
- b) variations in properties of materials in a member
- c) abrupt change of cross-section
- d) all of these

405.

In sand mold, the purpose of gate is to

- a) feed the cavity at a rate consistent with the rate of solidification
- b) act as a reservoir for molten metal
- c) help feed the casting until all solidification takes place
- d) feed molten metal from pouring basin to the gate

406.

The coefficient of restitution for inelastic bodies is

- a) more than one
- b) one
- c) between zero and one
- d) zero

407.

Sub-cooling in a refrigeration cycle

- Sub-cooling in a refrigeration cycle
- a) increases COP
 - b) decreases COP
 - c) COP remains unaltered
 - d) unpredictable

408.

A refrigeration cycle operates between condenser temperature of + 27°C and evaporator temperature of -23°C. The Carnot coefficient of performance of cycle will be

- a) 0.2
- b) 1.2
- c) 5
- d) 10

409.

Resilience of a material is important, when it is subjected to

A. combined loading

B. fatigue

C. thermal stresses

D. wear and tear

E. shock loading.

410.

Which of the following charts are used for plant layout design?

A. Operation process chart

B. Man machine chart

C. Travel chart

D. all of these

411.

The purpose of riser is to

a) feed the cavity at a rate consistent with the rate of solidification

b) act as a reservoir for molten metal

c) help feed the casting until solidification takes place

d) feed molten metal from pouring basin to gate

412.

A lead ball with a certain velocity is made to strike a wall, it falls down, but rubber ball of same mass and with same velocity strikes the same wall, it rebounds. Select the correct reason from the following:

a) both the balls undergo an equal change in momentum

b) the change in momentum suffered by rubber ball is more than the lead ball

c) the change in momentum suffered by rubber ball is less than the lead ball

d) none of the above

413.

In sand molding there is no need to provide one of the following allowance, it is

a) Shrinkage allowance

b) draft allowance

c) distortion allowance

d) machining allowance

414.

A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act

a) away from the wall at its upper end

b) towards the wall at its upper end

c) downward at its upper end

d) upward at its upper end

415.

Factor of safety is the ratio of

- a. allowable stress to critical stress
- b. critical stress to allowable stress**
- c. normal stress to shear stress
- d. shear stress to normal stress

416.

Euler equation for turbomachines is derived on the basis of

- a) Rate of change of angular momentum**
- b) Conservation of mass
- c) Rate of change of velocity
- d) Rate of change of linear momentum

417.

In vapour compression refrigeration system, refrigerant occurs as liquid and vapour between

- a) condenser and expansion valve**
- b) compressor and evaporator
- c) expansion valve and evaporator
- d) compressor and condenser

418.

Slow plastic deformation of metals under a constant stress is known as

[A]. Fatigue

[B]. Proof deformation

[C]. Gradual deformation

[D]. Creep

[E]. Endurance failure

419.

The purpose of chaplets in a mould is to

- a) provide venting
- b) induce directional solidification
- c) compensate for shrinkage from pouring temperature to freezing temperature
- d) to support the core**

420.

Which of the following statement is correct in connection with projectiles?

- a) The angle, with the horizontal, at which a projectile is projected is known as angle of projection.
- b) A path, traced by a projectile in the space, is known as trajectory.
- c) The velocity with which a projectile is projected, is known as the velocity of projection.
- d) all of the above**

421.

In a vapour compression refrigeration cycle, the flow of refrigerant is controlled by

- a) compressor
- b) condenser
- c) evaporator
- d) expansion valve**

422.

Where does the lowest temperature occur in a vapour compression cycle ?

- a) condenser
- b) evaporator
- c) compressor
- d) expansion valve**

423.

Two solid circular shafts of radii R_1 and R_2 are subjected to same torque. The maximum shear stresses developed in the two shafts are 1 t and 2 t . If $R_1/R_2=2$, then 2 t / 1 t is _____.

$$\tau = \frac{16T}{\pi d^3}$$

$$\Rightarrow \frac{\tau_2}{\tau_1} = \left(\frac{d_1}{d_2} \right)^3 = \left(\frac{R_1}{R_2} \right)^3 = 2^3 = 8.$$

424.

The acceleration of a body sliding down an inclined surface is

- a) $g \sin \theta$**
- b) $g \cos \theta$
- c) $g \tan \theta$
- d) none of these

425.

In centrifugal compressor terminology, vane-less space refers to the space between

- a) blades in the impeller
- b) diffuser exit and volute casing
- c) impeller tip and diffuser inlet edge**
- d) the inlet and blade inlet edge

426.

In metrology, a feeler gauge is used to check

- a) Radius
- b) Screw pitch
- c) Surface roughness
- d) Thickness of clearance**

427.

A solid circular shaft of 60 mm diameter transmits a torque of 1600 N.m. The value of maximum shear stress developed is

(A) 37.72 MPa

(B) 47.72 MPa

(C) 57.72 MPa

(D) 67.72 MPa

428.

In product layout

429.

In surface roughness measurements, the term "secondary texture" represents _____

- a) roughness
- b) Flaw
- c) Lay direction
- d) Waviness**

430.

Combustion in compression ignition engines is

- a) homogeneous
- b) heterogeneous**
- c) homogeneous and heterogeneous
- d) laminar

431.

Two forces are acting at an angle of 120° . The bigger force is 40N and the resultant is perpendicular to the smaller one. The smaller force is

- a) 40 N
- b) 30 N
- c) 20 N**

d) none of these

432.

The centroid a T-section 100 mm x 150 mm x 50 mm from its bottom is

- a) 87.5mm
- b) 75mm
- c) 50mm
- d) 125mm

433.

Tomlinson's surface meter and Taylor Hobson Talysurf are _____ instruments

- a) surface roughness measuring
- b) lay direction measuring
- c) Surface waviness measuring

434.

A solid shaft of diameter, d length and length L is fixed at both ends. A torque, T_0 is applied at a distance $L/4$ from the left end. The maximum shear stress in the shaft is

Ans- $12T_0/\pi(d)^3$

435.

To reduce the possibility of knock in the C.I. engines, the first elements of fuel and air should have

- a) high temperature
- b) high density
- c) short delay
- d) all of the above.

436.

Slip gauges are _____ standards

- a) wave length
- b) secondary
- c) Line
- d) end

437.

The detonation tendency in petrol engines for specified conditions of fuel rating, compression ratio, speed etc. can be controlled by having

- a) smaller cylinder bore
- b) bigger cylinder bore
- c) medium cylinder bore
- d) cylinder bore could be anything as it does not control detonation

438.

A company spends considerable amount on publicity to promote sales. This expenditure in break even chart is shown below the

- A. fixed cost line
- B. variable cost line
- C. total cost line
- D. sales revenue line

439.

A solid circular shaft needs to be designed to transmit a torque of 50 Nm. If the allowable shear stress of the material is 140 MPa, assuming a factor of safety of 2, the minimum allowable design diameter in mm is

(A) 8

(B) 16

(C) 24

(D) 32

440.

The range of projectile on a downward inclined plane is _____ the range on upward inclined plane for the same velocity of projection and angle of projection.

- a) less than
- b) more than**
- c) equal to
- d) All of these

441.

If the resultant of two equal forces has the same magnitude as either of the forces, then the angle between the two forces is

- a) 30°
- b) 60°
- c) 90°
- d) 120°**

442.

The piston rod and the crosshead in a steam engine are usually connected by means of

- [A]. knuckle joint
- [B]. cotter joint**

[C]. oldham coupling

[D]. universal joint

443.

Supercharging is the process of

a) supplying the intake of an engine with air at a density greater than the density of the surrounding atmosphere

b) providing forced cooling air

c) Injecting excess fuel for raising more load

d) supplying compressed air to remove combustion products fully

444.

Dial gauge is a _____

a) linear measuring instrument

b) Angular measuring instrument

c) Surface measuring instrument

d) None of these

445.

Square key of side " $d/4$ " each and length l is used to transmit torque "T" from the shaft of diameter "d" to the hub of a pulley. Assuming the length of the key to be equal to the thickness of the pulley, the average shear stress developed in the key is given by

a) $4T/l d$

b) $16 T/l d^2$

c) $8T/l d^2$

d) $16 T/\pi d^3$

446.

The main objective of work measurement is to

[A]. plan and schedule of production

[B]. formulate a proper incentive scheme

[C]. estimate the selling prices and delivery dates

[D]. all of the above

447.

Among the various terminologies related to surface roughness, 'Ra' represents _____

a) Roughness average

b) Root Mean square value

c) Mean roughness depth

d) sampling length

448.

The knocking in diesel engines for given fuel, will be

- a) enhanced by increasing compression ratio
- b) enhanced by decreasing compression ratio**
- c) unaffected by compression ratio
- d) dependent on other factors

449.

Moment of inertia of a circular section about an axis perpendicular to the section is

- a) $\pi d^3/16$
- b) $\pi d^3/32$
- c) $\pi d^4/32$**
- d) $\pi d^4/64$

450.

The least measurement that can be detected by a measuring instrument is _____

- a) accuracy
- b) Sensitivity**
- c) calibration
- d) Precision

451.

A 60 mm long and 6 mm thick fillet weld carries a steady load of 15 kN along the weld. The shear strength of the weld material is equal to 200 MPa. The factor of safety is

- a) 2.4
- b) 3.4**
- c) 4.8
- d) 6.8

452.

In fixed position layout

- A.** total production cost is less
- B.** material movement is less
- C.** capital investment is minimum
- D.** all of these

453.

If a rigid body is in equilibrium under the action of three forces, then

- a) these forces are equal
- b) the lines of action of these forces meet in a point**
- c) the lines of action of these forces are parallel
- d) none of the above.

454.

Ignition quality of diesel-fuel oil is expressed by an index called

- a) octane number
- b) cetane number**
- c) calorific value
- d) carbon content

455.

Fuel consumption with increase in back pressure in engine will

- a) increase
- b) decrease
- c) remain unaffected
- d) none of the options

456.

In a gib and cotter joint, the gib and cotter are subjected to

- a) Single Shear only
- b) Double Shear only
- c) Single shear and crushing
- d) Double shear and crushing

457.

The ratio of actual whirl velocity to the ideal whirl velocity in the centrifugal compressor is called as

- a) velocity factor
- b) slip factor
- c) work factor
- d) flow coefficient

458.

Two coplanar couples having equal and opposite moments

- a) balance each other
- b) produce a couple and an unbalanced force
- c) are equivalent
- d) can not balance each other.

459.

The closeness of the measured value to the actual value is _____

- a) Accuracy
- b) Precision
- c) Repeatability
- d) Sensitivity

460.

The comparators eliminate the _____

- a) Measuring time
- b) need for machining
- c) surface roughness
- d) sourface waviness

461.

The coefficient of friction depends on

- a) area of contact
- b) nature of surface**
- c) strength of surfaces
- d) all of the above

462.

A spur gear transmitting power is connected to the shaft with a key of rectangular section. The type (s) of stresses developed in the key is fare.

- (a) shear stress alone**
 - (b) bearing stress alone**
 - (c) both shear and bearing stresses**
 - (d) shearing, bearing and bending stresses.**
16. Ans. (c) Key develops both shear and bearing stresses.

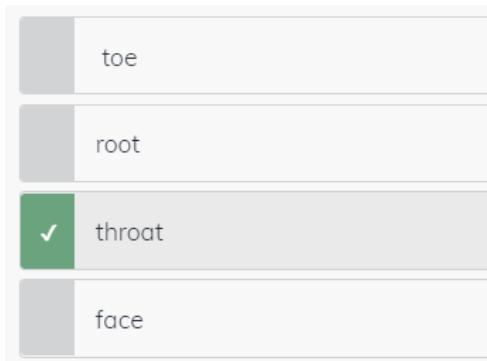
463.

Thermal efficiency of high speed diesel engine at design load may be of the order of

- a) 20%
- b) 35%
- c) 50%
- d) 70%**

464.

In a fillet welded joint, the weakest area of the weld is



465.

The scientist 'Carl Edvard Johansson' invented _____

- a) Sine bar
- b) Comparators
- c) Slip gauges**
- d) Surface table

466.

A single force and a couple acting in the same plane upon a rigid body

A force and a couple acting in the same plane upon a rigid body are equivalent to a single force, equal and parallel to the original single force

467.

The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called

- a) net efficiency
- b) efficiency ratio
- c) relative efficiency**

d) overall efficiency

468.

A systematic job improvement sequence will consist of

A. motion study

B. time study

C. job enrichment

D. all of these

469.

Primary standards are kept at all leading industries across the globe

a) True

b) False

470.

In petrol engine using a fixed octane rating fuel and fixed compression ratio, super charging will

a) increase the knocking tendency

b) decrease the knocking tendency

c) not affect the knocking tendency

d) unpredictable.

471.

A double fillet welded joint with parallel fillet weld of length L and leg B is subjected to a tensile force P. Assuming uniform stress distribution, the shear stress in the weld is given by

$$[A]. \frac{\sqrt{2} P}{s.l}$$

$$[B]. \frac{P}{2 s.l}$$

$$[C]. \frac{P}{\sqrt{2} s.l} \quad \checkmark$$

$$[D]. \frac{2 P}{s.l}$$

472.

A body moves, from rest with a constant acceleration of 5 m per sec. The distance covered in 5 sec is most nearly

a) 38 m

b) 62.5 m

c) 96 m

d) kinematic friction

473.

An axial flow compressor stage is suitable for

- a) high volume flow rates with a small pressure rise
- b) high volume flow rates with high pressure rise
- c) low volume flow rates with low pressure rise
- d) low volume flow rates with high pressure rise

474.

The bolts in a rigid flanged coupling connecting two shafts transmitting power are subjected to

Option (A)

Shear force and bending moment

Option (B)

Axial force

Option(C)

Torsion and bending moment

Option(D)

Torsion

475.

A boat is traveling along a circular path having a radius of 20 m. Determine the magnitude of the boat's acceleration if at a given instant the boat's speed is $v = 5 \text{ m/s}$ and the rate of increase in speed is $v = 2 \text{ m/s}^2$.

- a) $a = 2.00 \text{ m/s}^2$
- b) $a = 2.36 \text{ m/s}^2$
- c) $a = 1.25 \text{ m/s}^2$
- d) $a = 12.50 \text{ m/s}^2$

476.

In aircraft gas turbines, the axial flow compressor is preferred because

- a) of high pressure rise per stage
- b) of high pressure rise
- c) it is stall free
- d) of low frontal area

477.

The closeness among the measured value is _____

- a) Accuracy
- b) Precision
- c) Repeatability
- d) Calibration

478.

Inter cooling in compressors

- a) cools the delivered air
- b) results in saving of power in compressing a given volume to given pressure
- c) is the standard practice for big compressors
- d) enables compression in two stages

479.

In metrology, angular measurements are made using _____

- a) sine bar alone
- b) surface plates and slip gauges
- c) Sine bar and slip gauges
- d) Slip gauge alone

480.

An axial flow compressor has

- a) larger blades at gas entry and smaller blades at exit
- b) smaller blades at gas entry and larger blades at exit
- c) identical blades at exit as well as entry
- d) size of blades remains same only angles changes

481.

A clutch has outer and inner diameters 100 mm and 40 mm respectively. Assuming a uniform pressure of 2 MPa and coefficient of friction of liner material 0.4, the torque carrying capacity of the clutch is

- a) 148 N-m
- b) 196 N-m
- c) 372 N-m
- d) 490 N-m

482.

A force acting on a body may

- a) introduce internal stresses
- b) balance the other forces acting on it
- c) retard its motion
- d) all of the above

483.
In metrology, calibration is performed to _____

- a) manufacture the equipments
- b) measure the repeatability of the instrument.
- c) measure the surface roughness
- d) to fix the errors

484.

Total slip will Occur in a belt drive when

- a) angle of rest is zero
- b) angle of creep is greater than angle of rest
- c) angle of rest is greater than angle of creep
- d) angle of creep is zero

485.

If a number of forces act simultaneously on a particle, it is possible

- a) not to replace them by a single force
- b) to replace them by a single force**
- c) (c) to replace them by a single force through C.G.
- d) to replace them by a couple

486.

A compressor at high altitude will draw

- [A]. same
- [B]. less ✓**
- [C]. more

487.

In a centrifugal pump, water enters

- A. axially
- B. radially**
- C. both (a) and (b)
- D. none of these.

488.

Multi stage centrifugal pumps in parallel connection are used to

is to produce large amount of discharge

489.

Which one of the following is not a friction clutch?

Plate clutch
✓ Jaw clutch
Cow clutch
Centrifugal clutch

490.

In a nozzle, whole frictional loss is assumed to occur between

- a) inlet and outlet

b) throat and exit

c) inlet and throat

d) all the options

491.

Error of measurement = _____

492.

Which of the following do not have identical dimensions ?

a) Momentum and impulse

b) Torque and energy

c) Torque and work

d) None of the above

493.

The ability by which a measuring device can detect small differences in the quantity being measured by it, is called its _____

a. Damping

b. Sensitivity

c. Accuracy

d. None of the above

494.

Which one of the following belts should not be used above 40°C?

(a) balata belt

(b) rubber belt

(c) fabric belt

(d) synthetic belt

Ans- (b) Rubber Belt

495.

The weight of a body is due to

a) centripetal force of earth

b) gravitational pull exerted by the earth

c) forces experienced by body in atmosphere

d) gravitational force of attraction towards the center of the earth,

496.

A centrifugal pump delivers water at the rate of 50 litres/s against a total head of 40 metres. Then the power required to drive the pump is

a) 2 kW

b) 15.2 kW

c) 19.6 kW

d) 25.8 kW

497.

If the intake air temperature of I.C. engine increases, its efficiency will

a) increase

b) decrease

c) remain same

d) unpredictable

498.

Which one of the following helps in avoiding cavitation in centrifugal pumps?

- a) Low suction pressure
- b) High delivery pressure
- c) Low delivery pressure
- d) High suction pressure**

499.

Two balls of equal mass and of perfectly elastic material are lying on the floor. One of the ball with velocity v is made to struck the second ball. Both the balls after impact will move with a velocity

- a) v
- b) $v/2$**
- c) $v/4$
- d) $v/8$

500.

The curved lines on a psychrometric chart indicates

- a) dry bulb temperature
- b) wet bulb temperature
- c) dew point temperature
- d) relative humidity**

501.

Which type of gear is used for shaft axes having an offset?

1. Mitre gears
2. Spiral bevel gears
3. Hypoid gears
4. Zerol gears

Ans.- 3. Hypoid gears

502.

Comparing an unknown with a standard through calibrated system is called _____

- a. Direct comparison
- b. Indirect comparison**
- c. both 'a' and 'b'
- d. None of the above

503.

Moment of inertia of a triangular section of base (b) and height (h) about an axis passing through its C.G. and parallel to the base, is

- a) $bh^3/4$**
- b) $bh^3/8$

- c) $bh^3/12$
- d) $bh^3/36$

504.

A Francis turbine is used when the available head of water is

- a) 0 to 25 m
- b) 25 m to 250 m
- c) 250 m to 500 m
- d) Above 500 m

505.

When two shafts are neither parallel nor intersecting, power can be transmitted by using

- a. Hypoid gears
- b. Worm gears
- c. Both a and b
- d. None of the above

506.

One tonne of refrigeration (1TR) means that the heat removing capacity is

- a) 420 kJ/min
- b) 210 kJ/min
- c) 21 kJ/min
- d) 620 kJ/min

507.

. Among the following options, pick the line standard of measurement

If the distance is measured as the length between 2 parallel lines it is called line standard.
Examples: The scale is a good example for line standard. A scale with divisions shown as lines is used as the measurement.

508.

When trying to turn a key into a lock, following is applied

- a) coplanar force
- b) non-coplanar forces
- c) moment
- d) couple

509.

Specific speed of a Kaplan Turbine ranges between

- a) 30 to 60
- b) 60 to 300
- c) 300 to 600
- d) 600 to 1000

510.

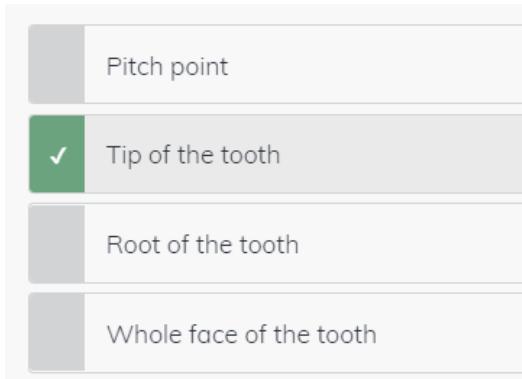
The angle gauge by Dr. Tomlinson consists of a set of _____

- a. 10 gauges
- b. 12 gauges
- c. 14 gauges

d. 16 gauges

511.

In the formulation of Lewis equation for toothed gearing, it is assumed that tangential tooth load F_t acts on the



512.

Consider the following statements regarding an impulse turbine:

1. Relative velocity at the inlet and exit of the rotor blades are the same.
2. Absolute velocity at the inlet and exit of the rotor blades are the same.
3. Static pressure within the rotor blade channel is constant.
4. Total pressure within the rotor blade channel is constant.

Of these statements:

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

513.

In a 50% reaction turbine stage, tangential component of absolute velocity at rotor inlet is 537 m/s and the blade velocity is 454 m/s. The power output in kW for unit steam flowrate will be

(a) 302

(b) 282

(c) 260

(d) 284

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IAS-27. Ans. (b) If reaction is 50% then work done = $\frac{V_b}{1000}(2V_i \cos \alpha - V_b) \text{ kJ/kg}$

$$V_i \cos \alpha = 537 \text{ m/s and } V_b = 454 \text{ m/s} \therefore \text{Work done} = \frac{454}{1000}(2 \times 537 - 454) = 282 \text{ kW/kg}$$

514.

A number of forces acting at a point will be in equilibrium if

- a) their total sum is zero
- b) two resolved parts in two directions at right angles are equal
- c) sum of resolved parts in any two perpendicular directions are both zero
- d) none of the above

515.

The principle of 'Inter-changeability' is normally employed for _____

- a. Mass production
- b. Production of identical parts
- c. Parts within the prescribed limits of sizes
- d. All of the above

516.

Consider the following characteristics:

- 1. The fluid enters the pump axially and is discharged radially
- 2. Maximum efficiency may be of the order of 90%
- 3. Development of a low head
- 4. A limited suction capacity

Which of the above characteristics are possessed by axial flow pumps?

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

517.

If reduction ratio of about 50 is required in a gear drive, then the most appropriate gearing would be

Ans- Worm and worm wheel

518.

The shearing area of a key of length 'L', breadth 'b' and depth 'h' is equal to

$$\text{The shearing area of a key of length 'L' breadth 'b' depth 'h' is equal to}$$

(a) $b \times h$ (b) $L \times h$ (c) $L \times b$ (d) $L \times (h/2)$

Ans.- (c) $L \times b$

519.

Which one of the following is the correct statement?

The degree of reaction of an impulse turbine:

Ans- 0

520.

Following is the theoretical size which is common to both the parts of a mating pair

- a. Normal size
- b. Actual size
- c. Base size
- d. All of the above

521.

- Increase in entropy of a system represents
- a) Increase in availability of energy
 - b) increase in temperature
 - c) decrease in pressure
 - d) degradation of energy**

522.

D'Alembert's principle is used for

- a) reducing the problem of kinetics to equivalent statics problem**
- b) determining stresses in the truss
- c) stability of floating bodies
- d) solving kinematic problems

523.

A heavy ladder resting on floor and against a vertical wall may not be in equilibrium, if

- a) the floor is smooth, the wall is rough
- b) the floor is rough, the wall is smooth
- c) the floor and wall both are smooth surfaces**
- d) will be in equilibrium under all conditions.

524.

Consider the following statements:

A splined shaft is used for

- 1. Transmitting power
- 2. Holding a flywheel rigidly in position
- 3. Moving axially the gear wheels mounted on it
- 4. Mounting V-belt pulleys on it.

Of these statements

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

32. Ans. (d)

525.

Braking jet in an impulse turbine is used

- a) to bring the runner to rest in a short time**
- b) to change the direction of runner
- c) to break the jet of water
- d) to stop flow from penstock

526.

The temperature of water flowing through the turbine increases from 25°C to 27°C due to friction. If there is no heat transfer, determine the change of entropy of water.

- a) 2.8 J/kgK
- b) 28J/kgK**
- c) -2.8kJ/kgK
- d) -28kJ/kgK

527.

_____ is equal to the differences of the two limits of size of the part

A. nominal size

B. basic size

C. actual size

D. tolerance

528.

Consider the following statements regarding an impulse turbine:

1. Relative velocity at the inlet and exit of the rotor blades are the same.
2. Absolute velocity at the inlet and exit of the rotor blades are the same.
3. Static pressure within the rotor blade channel is constant.
4. Total pressure within the rotor blade channel is constant.

Of these statements:

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

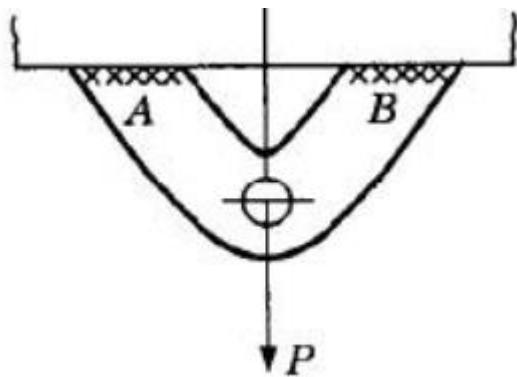
529.

The ratio of limiting friction and normal reaction is known as

- a) coefficient of friction**
- b) angle of friction
- c) angle of repose
- d) friction resistance.

530.

In the welded joint shown in the given figure, if the weld at B has thicker fillets than that at A, then the load carrying capacity P, of the joint will



Increase

Decrease

Remain unaffected

Exactly get doubled

Solution:

Load carrying capacity doesn't depends upon the thickness of weld

531.

The amount by which the actual size of a shaft is less than the actual size of mating hole in an assembly

Ans. **clearance**

532.

A paddle wheel fitted with a 300 W motor is used to stir water in a large container. The water in the container is maintained at 300 K and if the motor runs for 2 hours, determine the change in entropy of water.

- a) 7200 J/K
- b) -7200 J/K
- c) 0
- d) 72 J/K

533.

Interference is the basis of interferometry

superposition to combine waves in a way that will cause the result of their combination to have some meaningful property that is diagnostic of the original state of the waves. ...

Most**interferometers** use light or some other form of electromagnetic wave.

534.

Pick up wrong statement about friction force for dry surfaces. Friction force is

- a) proportional to normal load between the surfaces
- b) dependent on the materials of contact surface
- c) **proportional to velocity of sliding**
- d) independent of the area of contact surfaces

535.

A system of 100 kg mass undergoes a process in which its specific entropy increases from 0.3 kJ/kgK to 0.4 kJ/kgK. At the same time, the entropy of the surroundings decreases from 80 kJ/K to 75 kJ/K. Determine the process.

a) Reversible and isothermal

b) Irreversible

c) Reversible

d) Impossible

536.

Which of the following stresses are associated with the design of pins in bushed pin-type flexible coupling?

1. Bearing stress 2. Bending stress

3. Axial tensile stress 4. Transverse shear stress

Select the correct answer using the codes given below

Select the correct answer using the codes given below:

(a) 1, 3 and 4

(b) 2, 3 and 4

(c) 1, 2 and 3

(d) 1, 2 and 4

Ans-(d)

537.

If the enthalpy drops of moving blade and fixed blade of a stage in a reaction turbine are 9 and 11 kJ/kg respectively,

then degree of reaction of the stage is

a) 0.1

b) 0.45

c) 0.55

d) 1.0

538.

The degree of reaction of a turbine is the ratio of enthalpy drop in

a) moving blades to enthalpy drop in fixed blades

b) fixed blades to enthalpy drop in moving blades

c) moving blades to enthalpy drop in the stage

d) fixed blades to enthalpy drop in the stage

539.

A 1.5mm surface is being measured on an interferometer. A lamp is used which can emit wave lengths as follows.

Red: 0.842 μm , Blue: 0.6628 μm .

What are the nominal fractions expected for the gauge for the two wave lengths?

For red light

$$\begin{aligned} n &= \lambda/2 \\ &= 0.842 / 2 = 0.421 \mu\text{m} \\ &= 0.421 \times 10^{-3} \text{ mm} \end{aligned}$$

For blue light

$$\begin{aligned} n &= \lambda/2 \\ &= 0.6628 / 2 = 0.3314 \mu\text{m} \\ &= 0.3314 \times 10^{-3} \text{ mm} \end{aligned}$$

Now, calculate the nominal fraction of the surface N_f

$$\therefore N_f = l/n \text{ (where } l \text{ is the length of the surface to be checked)}$$

For red light

$$N_f = 1.5 / (0.421 \times 10^{-3}) = 3562.9454$$

∴ consider the nominal fractions for $N_f = 0.9454$

For blue light

$$\begin{aligned} N_f &= 1.5 / (0.3314 \times 10^{-3}) \\ &= 4526.2523 \end{aligned}$$

∴ consider the nominal fractions for $N_f = 0.2523$

∴ the nominal fractions expected for the gauge for the two wavelengths are 0.9454 for red and 0.2523 for blue.

540.

When pressure is raised in an isentropic process, the enthalpy of the substance

- a) Remains same
- b) Increases
- c) decreases
- d) First increases and then decreases

541.

The angle of twist for a transmission shaft is inversely proportional to

- [A]. directly proportional to (shaft diameter)²
- [B]. inversely proportional to (shaft diameter)²
- [C]. directly proportional to (shaft diameter)⁴
- [D]. inversely proportional to (shaft diameter)⁴

542.

Coulomb friction is the friction between

- a) bodies having relative motion
- b) two dry surfaces
- c) two lubricated surfaces
- d) solids and liquids

543.

In motion and time study which of the following is used in product analysis?

544.

A muff coupling is

A coupling in which a hollow cylinder or muff is used to connect the abutting ends of two shafts

545.

Dynamic friction as compared to static friction is

- a) same
- b) more
- c) less

546.

Cylindricity measurement comes under the category of _____

Ans- Geometric Dimensioning and Tolerancing (GD&T)- Form Feature

547.

The dryness fraction at the end of expansion of a Reheat cycle operating under the same temperature limits has

- a) Same as that of Rankine cycle
- b) More than that of Rankine cycle
- c) Less than that of Rankine cycle
- d) Not able to correlate with provided data

548.

The maximum frictional force which comes into play when a body just begins to slide over another surface is called

- a) limiting friction
- b) sliding friction
- c) rolling friction
- d) kinematic friction

549.

The maximum shear stress in the spring is induced at

Ans-at the inside of the coil

550.

Consider the following statements regarding the axial flow in an air compressor:

- 1. Surging is a local phenomenon while stalling affects the entire compressor.
 - 2. Stalling is a local phenomenon while surging affects the entire compressor.
 - 3. The pressure ratio of an axial compressor stage is smaller than that of a centrifugal compressor stage.
- Of these statements

Option (A)

1, 2 and correct

Option (B)

1 and 2 are correct

Option(C)

2 and 3 are correct

Option(D)

1 and 3 are correct

Correct Option:

(C)

551.

Which one of the following thermodynamic relations is incorrect

- a) $T.dS = du + p.dv$
- b) $T.dS = dh + v.dp$
- c) $dH = T.dS + v.dp$
- d) $dG = Vdp - SdT$

552.

"Piston -profile tester" is an instrument to check _____

Piston Ovality (d-m),

Piston Major Diameter (d),

Piston Minor Diameter (m),

Taper Over the Total Length (L) of Piston The angular difference between the major and minor axes by comparison

553.

The hydraulic efficiency of a reaction turbine, is the ratio of

- a) actual work available at the turbine to energy imparted to the wheel
- b) power produced by the turbine to the energy actually supplied by the turbine
- c) workdone on the wheel to the energy (or head of water) actually supplied to the turbine
- d) none of the above

554.

A flywheel on a motor goes from rest to 1000 rpm in 6 sec. The number of revolutions made is nearly equal to

- a) 25
- b) 50
- c) 100
- d) 250

555.

Which one of the following is the extensive property of a thermodynamic system?

- a) Volume
- b) Pressure
- c) Temperature
- d) Density

556.

When a helical spring is cut into two halves, the stiffness of each spring will be

- a) Same
- b) Double
- c) Half
- d) Thrice

557.

NO-GO gauge checks the _____

Ans- Minimum Material Condition

558.

Fatigue failure results due to fluctuating stresses when the stress magnitude is

Ans- Periodic/cyclic variation

559.

A boat is traveling along a circular path having a radius of 20 m. Determine the magnitude of the boat's acceleration if at a given instant the boat's speed is $v = 5 \text{ m/s}$ and the rate of increase in speed is $v = 2 \text{ m/s}^2$.

- a) $a = 2.00 \text{ m/s}^2$
- b) $a = 2.36 \text{ m/s}^2$
- c) $a = 1.25 \text{ m/s}^2$
- d) $a = 12.50 \text{ m/s}^2$

GO gauge checks the _____

Ans- Maximum Material Limit

561.

In motion and time study which of the following is used in man analysis?

562.

The sequence of events that eventually returns the working fluid to its original state is known as

- a) process
- b) cycle
- c) path
- d) property

563.

The function of the draft tube in a reaction turbine is

- a) to enable the shaft of the turbine to be vertical
- b) to transform a large part of pressure energy at turbine outlet into kinetic energy
- c) to avoid whirl losses at the exit of the turbine
- d) to transform a large part of kinetic energy at the turbine outlet into

pressure energy

564.

In unilateral tolerance system, the gauge tolerance zones lie entirely within the

- A.** one side of the actual size
- B.** one side of the nominal size ✓
- C.** both sides of the actual size
- D.** both sides of the nominal size

565.

Rankine theory of failure is applicable to

- A.** brittle [Correct Answer]
- B.** ductile
- C.** elastic
- D.** plastic
- E.** tough.

566.

If C is the number of components and ϕ is the number of phases in a system, the number of independent intensive properties required to specify the state of the system

- a) $F=C-\phi-2$
- b) $F=C+\phi+2$
- c) $F=C-\phi+2$**
- d) $F=C+\phi-2$

567.

A train travels along a horizontal circular curve that has a radius of 200 m. If the speed of the train is uniformly increased from 30 km/h to 45 km/h in 5 s, determine the magnitude of the acceleration at the instant the speed of the train is 40 km/h.

- a) $a = 0.617 \text{ m/s}^2$
- b) $a = 1.037 \text{ m/s}^2$**
- c) $a = 1.451 \text{ m/s}^2$
- d) $a = 0.833 \text{ m/s}^2$

568.

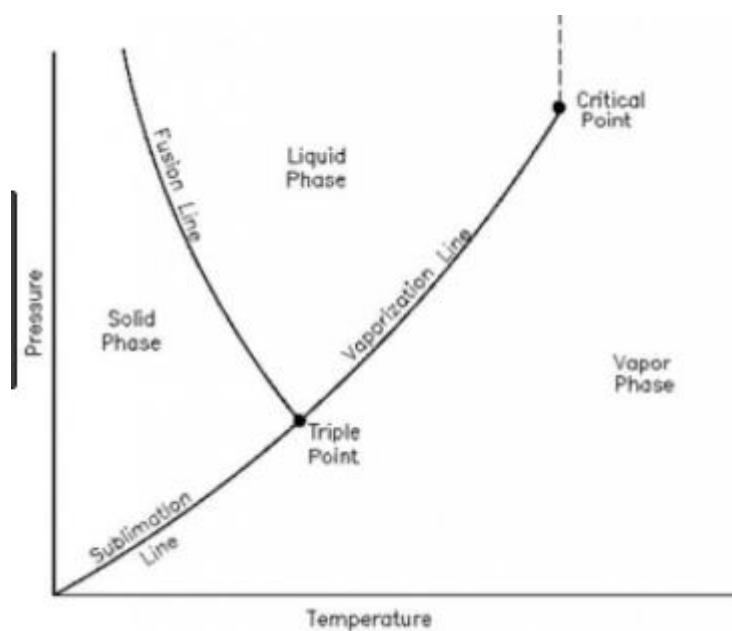
Which option given here is not the limitations/disadvantages of limit gauges

These are advantages :
Quicker Inspection Method
Used In-Mass Production
Ensure Interchangeability
Need Semiskilled Operator

569.

Which of the following is unavoidable delay?

570.
Which of the following curve has a negative slope for water as working fluid in the P-T phase diagram



Ans- Fusion Curve

571.
Distortion energy theory of failure is applicable to

- a) Plain carbon steel
- b) composites
- c) cast iron
- d) non - metals

572.
The mechanism used in a shaping machine is

- a) a closed 4-bar chain having 4 revolute pairs
- b) a closed 6-bar chain having 6 revolute pairs
- c) a closed 4-bar chain having 2 revolute pair and 2 sliding pairs
- d) an inversion of the single slider-crank chain

573.
The lengths of the links of a 4-bar linkage with revolute pairs only are p, q, r and s units. Given that $p < q < r < s$. Which of these links should be the fixed one, for obtaining a "double crank" mechanism?

- a) links of length p
- b) links of length q
- c) links of length r
- d) links of length s

574.

Griffith's law states that fracture strength brittle material is

Observed fracture strength is always lower than theoretical cohesive strength. • Griffith explained that the discrepancy is due to the inherent defects in brittle materials leading to stress concentration implies lower the fracture strength of the materials

575.

The most important objective behind plant layout is

- A. overall simplification, safety of integration**
- B. economy in space
- C. maximum travel time in plant
- D. to provide conveniently located shops
- E. to avoid any bottlenecks.

576.

The work output of a Reheat cycle operating under the same temperature limits is:

Ans. Higher

577.

Which option given here is not the advantages of limit gauges

578.

Flat head rivets are used in

- (a) ship hulls
- (b) light sheet metal work**
- (c) structural work
- (d) air conditioning ducts

579.

Which of the following statements about absolute zero temperature is true?

- a) At absolute zero all translational motion of the particles ceases.
- b) At absolute zero all rotational motion of the particles ceases.
- c) Absolute zero is defined at -273.15°C .
- d) All the above.**

580.

The number of degrees of freedom of a planar linkage with 8 links and 9 simple revolute joint is

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

581.

The main aim of compounding of steam turbine is to

- a) avoid steam condensation
- b) reduce steam consumption
- c) reduce rotor speed
- d) improve efficiency

582.

Reference gauges are also known as _____

583.

Productivity can be rational defined by

- A. Outputs/Inputs
- B. $(\text{Input} + \text{Output}) / \text{Output}$
- C. $\text{Output}/(\text{Input} + \text{Output})$
- D. Inputs/Outputs

584.

_____ may be used to check the contour of a profile of work piece for conformance to certain shape.

Form Gauge

585.

In a four- bar linkage, S denotes the shortest link length, L is the longest link length, P and Q are the lengths of other two links. At least one of the three moving links will rotate by 360 degree if

- a) $S + L \leq P + Q$
- b) $S + L > P + Q$
- c) $S + P \leq L + Q$
- d) $S + P > L + Q$

586.

What mass of He gas occupies 8.5 liters at 0°C and 1 atmosphere? (The molar mass of He = 4.00 g/mol.)

- a) 10.5 g
- b) 1.52 g
- c) 0.38 g
- d) 2.6 g

587.

Maximum shear stress theory is used for

A. brittle materials

B. ductile materials [Correct Answer]

C. plastic materials

D. non-ferrous materials

588.

Mobility of a statically indeterminate structure is

a) **Less than equal to -1**

b) 0

c) 1

d) Greater than or equal to 2

589.

What is the productivity for a company produces 40kg of plastic parts of acceptable quality by consuming 50kg of raw material

A. 0.8

B. 1.25

C. 0.44

D. 2.25

590.

A template gauge comes under the category of _____

591.

Resilience of a material is important, when it is subjected to

(a) combined loading

(b) fatigue

(c) thermal stresses

(d) wear and tear

(e) **shock loading**

592.

A gas has a density X at standard temperature and pressure. What is the new density when the absolute temperature is doubled and the pressure increased by a factor of 3?

a) $(2/3)X$

b) $(4/3)X$

c) **$(3/2)X$**

d) $(3/4)X$

593.

A rigid container of air is at atmospheric pressure and 27°C. To double the pressure in the container, heat it to

- a) 54°C
- b) 300°C
- c) 327°C
- d) 600°C

594.

The tool maker's microscope is based on the principle of _____

Optics

595.

Stress concentration in static loading is more serious in

- (a) brittle materials
- (b) ductile materials
- (c) brittle as well as ductile materials
- (d) elastic materials

596.

Based on the direction of flow, which one of the following turbines is different from the other three?

- a) Pelton turbine
- b) Parson's turbine
- c) De Laval turbine
- d) Kaplan turbine

597.

For a four bar linkage in toggle position, the value of mechanical advantage is?

- a) 0
- b) 0.5
- c) 1
- d) infinite

598.

One of the following doesn't mean "Partial Productivity"

Productivity is an overall measure of the ability to produce a good or service. More specifically, productivity is the measure of how specified resources are managed to accomplish timely objectives as stated in terms of quantity and quality. Productivity may also be defined as an index that measures output (goods and services) relative to the input (labor, materials, energy, etc., used to produce the output).

Example:-

Partial productivities

$$\begin{aligned}\text{Material productivity} &= \text{total output} / \text{material input} \\ &= 5,00,000 / 20,000 = 25\end{aligned}$$

$$\begin{aligned}\text{Human productivity} &= \text{total output} / \text{human input} \\ &= 5,00,000 / 30,000 = 16.66\end{aligned}$$

$$\begin{aligned}\text{Energy productivity} &= \text{total output} / \text{energy input} \\ &= 5,00,000 / 10,000 = 50\end{aligned}$$

599.

A collimator is a device that narrows a beam of particles or waves

True

600.

The mechanism used in a shaping machine is

- a) a closed 4-bar chain having 4 revolute pairs
- b) a closed 6-bar chain having 6 revolute pairs
- c) a closed 4-bar chain having 2 revolute pair and 2 sliding pairs
- d) an inversion of the single slider-crank chain**

Quick Return Mechanism

601.

If a mass of oxygen gas occupies a volume of 8 L at standard temperature and pressure, what is the change in the volume if the temperature is reduced by one half and the pressure is doubled?

- a) It increases to 12 L
- b) It decreases to 6 L
- c) It decreases to 2 L**
- d) It increases to 24 L

602.

Bushed pin flexible coupling is used to joint two shafts which

Are not in exact alignment, (the axes do NOT intersect at a small angle)

603.

The sleeve or muff coupling is designed as a

- [A]. dun cylinder
- [B]. thick cylinder
- [C]. solid shaft
- [D]. hollow shaft**

604.

Inter-changeability is the ability to select components for assembly at random and fit them together within proper tolerances

True

605.

For prosperity growth of any business we need

- (A) Both Effectiveness and Efficiency
- (B) Effectiveness only
- (C) Efficiency only
- (D) Sound like no answer

606.

If the pressure and volume of an ideal gas are both reduced to half their original value, the absolute temperature of the gas is

- a) unchanged.
- b) increased by a factor of 4.
- c) doubled.
- d) decreased by a factor of 4.

607.

The lengths of the links of a 4-bar linkage with revolute pairs only are p, q, r and s units. Given that $p < q < r < s$. Which of these links should be the fixed one, for obtaining a "double crank" mechanism?

- (A) Link of the length p
- (B) Link of the length q
- (C) Link of the length r
- (D) Link of the length s

608.

Following type of pipe joint is mostly used for pipes carrying water at low pressures

- A. socket joint
- B. nipple joint
- C. union joint
- D. spigot and socket joint

609.

The relationship between the pressure and the volume of a gas expressed by Boyle's law holds true

- a) for some gases under any conditions.
- b) for all gases under any conditions.
- c) if the container of the gas can expand with increasing pressure.
- d) if the temperature is constant.

610.

. In a lathe, to check the Parallelism of the Main Spindle to Saddle Movement, we conduct

This has to be checked in both vertical and horizontal planes. In this we require the use of mandrel.

611.

In order to draw the acceleration diagram, it is necessary to determine the Coriolis component of acceleration in the case of

- a) crank and slotted lever quick return mechanism
- b) slider-crank mechanism
- c) four bar mechanism
- d) pantograph

612.

The determination of standard time in a complex job system is best done through

- A. stop watch time study
- B. analysis of micromotions
- C. grouping timing technique
- D. analysis of standard data system

613.

The direction of linear velocity of any point on a link with respect to another point on the same link is

- a) parallel to the link
- b) perpendicular to the link joining the points
- c) at 45 degree to the link joining the points
- d) at 30 degree

614.

Which of the following are the principles of material handling?

- A. keep all the handling to the minimum
- B. select only efficient handling equipment
- C. move the heaviest weight to the least distance
- D. all of the above

615.

For two parallel shafts, the distance between whose axes is small and variable, which coupling will you use?

A. universal joint

B. knuckle joint

C. Oldham's coupling [Correct Answer]

- [D.](#) flexible coupling
- [E.](#) electromagnetic coupling.

616.

The air around us has 78% nitrogen and 21% oxygen. If the pressure is 1 atm, the pressure due to oxygen is

- a) 0.21 atm
- b) 0.78 atm
- c) 1 atm
- d) 0.67 atm

617.

An _____ interferometer is a device in which two or more light waves are combined together to produce interference

Ans.OPTICAL

618.

The strap end of the a connecting rod of steam engine is joined by

- A.** big of cotter joint [Correct Answer]
- [B.](#) sleeve and cotter joint
- [C.](#) spigot socket cotter joint
- [D.](#) knuckle joint
- [E.](#) universal coupling.

619.

A screw thread measurement involves _____

A **thread gauge**,^[1] also known as a **screw pitch gauge**^[2] or **pitch gauge**,^[3] is used to measure the [pitch or lead](#) of a [screw thread](#).

620.

Which of the following type of layout is suitable for automobile manufacturing concern?

- A.** product layout
- B. process layout
- C. fixed position layout
- D. combination layout

621.

Ball and socket forms a

- a) turning pair

- b) rolling pair
- c) sliding pair
- d) spherical pair

622.

The work output of theoretical Otto cycle

- a) increases with increase in compression ratio
- b) increases with increase in pressure ratio
- c) increases with increase in adiabatic index γ
- d) follows all the above.

623.

A combination of kinematic pairs, joined in such a way that the relative motion between link is completely constrained, is called as

- A. structure
- B. mechanism
- C. kinematic chain
- D. inversion

624.

Which of the following pipe joints would be suitable for pipes carrying steam

- a) Flanged
- b) Threaded
- c) Bell and spigot
- d) Expansion
- e) Compression

625.

In Rankine cycle the work output from the turbine is given by

- a) change of internal energy between inlet and outlet
- b) change of enthalpy between inlet and outlet
- c) change of entropy between inlet and outlet
- d) change of temperature between inlet and outlet.

626.

A diffuser is used to

- a) increase velocity and decrease pressure
- b) increase velocity as well as pressure
- c) decrease velocity and increase pressure
- d) decrease velocity as well as pressure

627.

2-wire and 3-wire methods measure _____

Thread diameter/pitch diameter

628.

which of the following is an inversion of slider crank chain?

- a) beam engine
- b) watt indicator
- c) elliptical trammel
- d) whit worth quick return motion mechanism**

629.

Universal coupling is used to join two shafts

True

OR

Whose axes intersect at a small angle

632.

Universal coupling is used to join two shafts

True

OR

Whose axes intersect at a small angle

630.

Calibration is performed to _____

- a) manufacture the equipments
- b) measure the repeatability of the instrument.
- c) measure the surface roughness
- d) to fix the errors**

631.

The stagnation pressure rise in a centrifugal compressor takes place

- **A.in the diffuser only**
- **B.in the impeller only**
- **C.in the diffuser and impeller**
- **D.in the inlet guide vanes only**

632.

In SHM motion, acceleration is proportional to

- a) velocity
- b) displacement**

- c) rate of change of velocity
- d) stroke

633.

What a calibration certificate contains

634.

For a single stage impulse turbine with a rotor diameter of 2 m and a speed of 3000 rpm when the nozzle angle is 20° , the optimum velocity of steam in m/s is

(a) 334

(b) 356

(c) 668

(d) 711

GATE-2.Ans. (c) Just use $u = \frac{V \cos \alpha}{2}$ and $u = \frac{\pi D N}{60}$

635.

The most important dimension in the design of nut is

A. pitch diameter

B. inside diameter

C. outside diameter

D. height 

636.

For a SHM motion of the follower, a cosine curve represents

a) displacement

b) velocity

c) acceleration

d) jerk

637.

Gauge blocks are a system for producing precision lengths

True

638.

Manometric efficiency of a centrifugal pump is defined as the ratio of

a) suction head to the head imparted by the impeller to water

b) head imparted by the impeller to water to the suction head

c) manometric head to the head imparted by the impeller to water

d) manometric head to the head imparted by the impeller to water

639.

The valve rod in a steam engine is connected to an eccentric rod by

A. cotter joint

- B. knuckle joint
- C. universal joint
- D. flange coupling

640.

An important feature of gauge blocks is that they can be joined together with very little dimensional uncertainty

True

641.

Which one of the following helps in avoiding cavitation in centrifugal pumps?

- a) Low suction pressure
- b) High delivery pressure
- c) Low delivery pressure
- d) High suction pressure

642.

cam size depends on

- a) base circle
- b) pitch circle
- c) prime circle
- d) outer circle

643.

Strain energy is the

- A. energy stored in a body when strained within elastic limits
- B. energy stored in a body when strained upto the breaking of a specimen
- C. maximum strain energy which can be stored in a body
- D. proof resilience per unit volume of a material

644.

Transmission angle is the angle between

- a) Input link and coupler
- b) Input link and fixed link
- c) Output link and coupler
- d) Output link and fixed link

645.

In a pelton Wheel the bucket peripheral speed is 10 m/s, the water jet velocity is 25 m/s and volumetric flow rate of the jet is $0.1\text{m}^3/\text{s}$. If the jet deflection angle is 120° and the flow is ideal, the power developed is

- a) 7.5 kW
- b) 15 kW
- c) 22.5 kW
- d) 37.5 kW

646.

The _____ on thickness of tooth is the variation of actual thickness of tooth from its theoretical value

Permissible error or the tolerance

647.

The object of caulking in a riveted joint is to make the joint

- a) free from corrosion
- b) stronger in tension
- c) free from stresses
- d) leak-proof

648.

Why Micrometer carries a ratchet stop?

Ratchet stop supports to measure accurate reading applying uniform pressure on the measuring faces irrespective of operator's skill and strength

649.

A steel bar of 5 mm is heated from 15°C to 40°C and it is free to expand. The bar Will induce

- a) no stress
- b) shear stress
- c) tensile stress
- d) compressive stress

650.

A fixed gear having 200 teeth is in mesh with another gear having 50 teeth. The two gears are connected by an arm. The number of turns made by the smaller gear for one revolution of arm about the centre of bigger gear is

A. 2

B. 3

C. 4

D. 5

651.

A Pelton wheel turbine is,

- a) A:-High head and low discharge
- b) B:-High head and high discharge
- c) C:-Low head and low discharge
- d) D:-Medium head and medium discharge)

652.

In ideal machines, mechanical advantage is _____ velocity ratio.

- a) less than
- b) none of these
- c) greater than
- d) equal to**

653.

A body is subjected to a tensile stress of 1200 MPa on one plane and another tensile stress of 600 MPa on a plane at right angles to the former. It is also subjected to a shear stress of 400 MPa on the same planes. The maximum normal stress will be

- a) 400 MPa
- b) 500 MPa
- c) 900 MPa
- d) 1400 MPa**

654.

What are the reasons behind false reading on Micrometer while taking measurements?

- a) There is zero error in Micrometer.
- b) Dirty work piece or measuring faces of micrometer.
- c) Unengaged Ratchet stop.
- d) Taking measurement when the job on motion.**
- e) Wrong way of holding Micrometer.
- f) Temperature variation between the work piece and the Micro meter.**

655.

Kaplan turbine need to have the following for maintaining high efficiency

Ans- Adjustable Blades

656.

Concurrent forces are those forces whose lines of action

- a) meet at one point**
- b) meet on the same plane
- c) none of these
- d) lie on the same line

657.

Mention the features of a Universal Bevel Protractor?

- a) Minimum reading is 5 minutes.
- b) Main scale and Vernier scale are on the same plane to eliminate the reading parallax.**
- c) Fine adjustment of the blade insures the precision measuring and laying out of angle.
- d) Main parts are of hardened stainless steel to prevent rust.**
- e) Combined with an attachment or Height gauge, a wide range of measurements is available.**

658.

A body is subjected to a tensile stress of 1000 MPa on one plane and another tensile stress of 500 MPa on a plane at right angles to the former. It is also subjected to a shear stress of 250 MPa on the same planes. The maximum normal stress will be

Ans- 1103.55

659.

A Kaplan turbine is,

Kaplan turbine is axial flow reaction turbine. It has got adjustable blades. Whereas propeller turbines have fixed blades.

660.

An eutectoid steel consists of

- A. wholly pearlite
- B. wholly austenite
- C. pearlite and ferrite
- D. pearlite and cementite

661.

A body is subjected to a tensile stress of 1000 MPa on one plane and another tensile stress of -1000 MPa on a plane at right angles to the former. It is also subjected to no shear stress on any planes. The maximum shear stress will be

1000

662.

Which of the following components of reaction turbine increases the head on the turbine by an amount equal to the height of runner outlet above the tail race?

- a) Scroll casing
- b) Guide vanes
- c) Moving vanes
- d) Draft tube**

663.

The motion of a particle round a fixed axis is

- a) rotary
- b) translatory
- c) circular**
- d) translatory as well as rotatory

664.

If a number of forces are acting at a point, their resultant will be inclined at an angle θ with the horizontal, such that

- a) $\tan \theta = \Sigma H / \Sigma V$
- b) $\tan \theta = \Sigma V_x \Sigma V$
- c) $\tan \theta = \Sigma V_x \Sigma H$
- d) $\tan \theta = \Sigma V / \Sigma H$**

665.

Steam enters the rotor of a reaction turbine with an absolute velocity of 236 m/s and the relative velocity of 132 m/s. It leaves the rotor with a relative velocity of 232 m/s absolute velocity of 126 m/s. The specific work output is

- a) 38.1 kJ/kg
- b) 40.1 kJ/kg
- c) 43.8 kJ/kg
- d) 47.4 kJ/kg

666.

Shock resisting steels should have

- [A]. low wear resistance
- [B]. low hardness
- [C]. low tensile strength
- [D]. toughness

667.

Consider the following statements:

1. Almost all flow losses take place in the diverging part of a nozzle.
2. Normal shocks are likely to occur in the converging part of a nozzle.
3. Efficiency of reaction turbines is higher than that of impulse turbines.

Of these statements

- a) 1, 2 and 3 are correct
- b) 2 and 3 are correct
- c) 1 and 2 are correct
- d) 1 and 3 are correct

668.

The unit of energy in S.I. units is

Joule

669.

Cast iron is a

- A. ductile material
- B. malleable material
- C. brittle material
- D. tough material

670.

Which of the following operating systems is used with CAD systems?

- a) DOS
- b) UNIX
- c) LINUX
- d) all the answers

671.

Whenever a force acts on a body and the body undergoes a displacement, then

- a) none of these
- b) body has kinetic energy of translation
- c) power is being transmitted
- d) work is said to be done**

672.

The hardness is the property of a material due to which it

- A. can be drawn into wires
- B. breaks with little permanent distortion
- C. can cut another metal**
- D. can be rolled or hammered into thin sheets

673.

Which of the followings are the demerits of single impulse stage

- 1. Requirement of C-D nozzle
- 2. Enhanced shock associated losses
- 3. More boundary layer associated losses in comparison with single reaction stage

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

674.

CAD programs which incorporate parametric modeling utilize a system in which the dimensions control the _____.

- a) size and shape of the model features**
- b) perspective of the model
- c) shading used to render the model
- d) colouring

675.

Malleable cast iron is produced

- (A) By adding magnesium to molten cast iron
- (B) By quick cooling of molten cast iron
- (C) From white cast iron by annealing process**
- (D) None of these

676.

CAD programs which incorporate parametric modeling utilize a system in which the dimensions control the _____.

- a) size and shape of the model features**

- b) perspective of the model
- c) shading used to render the model
- d) colouring

677.

The pressure rise in the impeller of centrifugal compressor is achieved by

- a) the centrifugal action and decrease in volume
- b) the centrifugal and diffusion action
- c) the decrease in volume and diffusion action
- d) the centrifugal and push-pull action

678.

The rate of doing work is known as

Power

679.

The resultant of the two forces P and Q is R. If Q is doubled, the new resultant is perpendicular to P. Then

- a) $Q = 2R$
- b) $Q = R$
- c) $P = Q$
- d) none of these

680.

Which of the following operating systems is used with CAD systems?

- a) DOS
- b) UNIX
- c) LINUX
- d) **all the answers**

681.

Stalling of blades in axial- flow compressor is the phenomenon of

- a) motion of air at sonic velocity
- b) unsteady, periodic and reversed flow
- c) **air steam not able to follow the blade contour**
- d) air stream blocking the passage

682.

The percentage of carbon in cast iron varies from

- A. 0.1 to 0.5
- B. 0.5 to 1
- C. 1 to 1.7
- D. **1.7 to 4.5**

683.

Brass is an alloy of

Copper and Zinc

684.

When the spring of a watch is wound, it will possess

- a) kinetic energy
- b) heat energy
- c) electrical energy
- d) strain energy

685.

With incremental tool positioning, ____.

- a) each tool movement is made with reference to the last tool position
- b) all tool movement is measured from a fixed point or origin
- c) all tool movement is measured from a zero point
- d) No tool Movement

686.

An impulse turbine produces 50 kW of power when the blade mean speed is 400 m/s. What is the rate of change of momentum tangential to the rotor?

- a) 150 N
- b) 200 N
- c) 125 N
- d) 175 N

687.

Considering the variation of static pressure and absolute velocity in an impulse steam turbine, across one row of moving blades

- a) pressure remains constant, while velocity decreases
- b) pressure decreases but velocity increases
- c) both pressure and velocity decrease
- d) pressure remains constant, while velocity increases

688.

A material is said to be allotropic, if it has

- A. fixed structure at all temperatures
- B. atoms distributed in random pattern
- C. different crystal structures at different temperatures
- D. any one of the above

689.

The total energy possessed by a system of moving bodies

- a) is minimum in the start and maximum at the end
- b) is maximum in the start and minimum at the end
- c) varies from point to point
- d) is constant at every instant**

690.

The point-to-point NC movement system ____.

- a) permits controlled tool travel along one axis at a time
- b) is used for operations performed at a fixed location in terms of a two-axis coordinate position**
- c) precisely controls machine and tool movement at all times and in all planes
- d) All the answers

691.

The static friction

- a) is independent of the area of contact, between the two surfaces
- b) bears a constant ratio to the normal reaction between the two surfaces
- c) always acts in a direction, opposite to that in which the body tends to move
- d) all of the above**

692.

The static temperature and Mach number at the inlet of a centrifugal compressor are 303 K and 0.5 respectively. The stagnation temperature of the air at the inlet will be:

- a) 34.6 degree Celcius
- b) 45.15 degree Celcius**
- c) 60.3 degree Celcius
- d) 31.5 degree Celcius

693.

Closed packed hexagonal space lattice is found in

- [A]. zinc, magnesium, cobalt, cadmium, antimony and bismuth**
- [B]. gamma-iron, aluminium, copper, lead, silver and nickel
- [C]. alpha-iron, tungsten, chromium and molybdenum
- [D]. none of the above

694.

A straight-cut system ____.

- a) permits controlled tool travel along one axis at a time**
- b) is used for operations performed at a fixed location in terms of a two-axis coordinate position
- c) precisely controls machine and tool movement at all times and in all planes
- d) permits controlled tool travel along three axis at a time

695.

Which of the following are vector quantities?

- a) all of these**

- b) Angular acceleration
- c) Angular displacement
- d) Angular velocity

696.

When the contour or continuous path system is used, ____.

- a) tool travel is controlled along one axis at a time
- b) machine and tool movements are precisely controlled at all times and in all planes**
- c) tool movement from one point to the next does not have to follow a specific path
- d) No movement of tool

697.

The hardness and tensile strength in austenitic stainless steel can be increased by

- [A]. hardening and cold working** ✓
- [B]. normalising
- [C]. martempering
- [D]. full annealing

698.

When $n = 1.3$ and $\gamma = 1.4$, the polytropic efficiency of a turbine is

$$\text{Ans- } ((n-1)/n) * (\gamma/(\gamma-1)) = 80.76$$

699.

The overall efficiency of the compressor is _____ than the stage efficiency

less

700.

With contour or continuous path NC movement system, ____.

- a) cutter size and other variables must be considered when the program is prepared
- b) cutter location is monitored continuously
- c) cutting is continuous and can be in six axes simultaneously
- d) All of the answers**

701.

The quenching of steel from the upper critical point results in a fine grained structure.

- A. Agree** ✓
- B. Disagree

702.

The term 'centroid' is

- a) the point of suspension
- b) the point of application of the resultant of all the forces tending to cause a body to rotate about a certain axis
- c) none of the above
- d) the same as centre of gravity**

703.

In a CAD package, mirror image of a 2D point P (5, 10) is to be obtained about a line which passes through the origin and makes an angle of 45° counterclockwise with the X-axis. The coordinates of the transformed point will be

- a) (7.5, 5)
- b) (10, 5)**
- c) (7.5, -5)
- d) (10, -5)

704.

When the steel is normalised, its

- [A]. yield point increases
- [B]. ductility decreases
- [C]. ultimate tensile strength increases
- [D]. all of these**

705.

The pressure of the working fluid changes in both stator and rotor for a impulse stage of turbine

True

False

706.

The matter contained in a body, is called

- a) momentum
- b) impulsive force
- c) mass**
- d) weight

707.

What is the ratio of isentropic work to Euler work in an centrifugal compressor called?

- a. Work coefficient
- b. Velocity coefficient
- c. Pressure coefficient**
- d. Flow coefficient

708.

If P is the force acting on the body, m is the mass of the body and a is the acceleration of the body, then according to Newton's second law of motion,

- a) $P - m.a = 0$
- b) $P + m.a = 0$
- c) $P \times m.a = 0$
- d) $P/m.a = 0$

709.

During the execution of a CNC part program block NO20 GO2 X45.0 Y25.0 R5.0 the type of tool motion will be

- a) Circular Interpolation - clockwise
- b) Circular Interpolation - counterclockwise
- c) Linear Interpolation
- d) Rapid feed

710.

The unit cells

711.

The ratio of actual whirl velocity to the ideal whirl velocity in the centrifugal compressor is called as _____.

- a. velocity factor
- b. slip factor
- c. work factor
- d. none of the above

712.

The energy possessed by a body, for doing work by virtue of its position, is called

- a) potential energy

- b) chemical energy
- c) kinetic energy
- d) electrical energy

713.

The lower critical point for all steels is

- A. 600°C
- B. 700°C
- C. 723°C
- D. 913°C

714.

The shape of the Bezier curve is controlled by:

- a) Control points
- b) Knots
- c) End points
- d) All of the answers

715.

In order to completely specify angular displacement by a vector, it must fix

- A. direction of the axis of rotation
- B. magnitude of angular displacement
- C. sense of angular displacement
- D. all of these

716.

For a zero percent reaction stage of axial flow turbine, $\beta_2 = \beta_3$

True

717.

The degree of the B-spline with varying knot vectors:

- a) Increases with knot vectors
- b) Decreases with knot vectors
- c) Remains constant
- d) No influence with knot vectors

718.

The material in which the atoms are arranged regularly in some directions but not in others, is called

- A. amorphous material
- B. mesomorphic material** ✓
- C. crystalline material
- D. none of these

719.

Iron-carbon alloys containing 1.7 to 4.3% carbon are known as

- [A]. eutectic cast irons
- [B]. hypo-eutectic cast irons** ✓
- [C]. hyper-eutectic cast irons
- [D]. none of these

720.

Vaneless diffusers are suitable for _____.

- a. only low pressure rise
- b. only high pressure rise
- c. both low as well as high pressure rise

721.

If a body is acted upon by a number of coplaner non-concurrent forces, it may

- A. Rotate about itself without moving
- B. Move in any one direction
- C. Move in any direction rotating about itself
- D. All the above [Correct Answer]**

722.

IGES stands for

Initial Graphics Exchange Specification

723.

The hardness of steel increases if it contains

- A. pearlite
- B. ferrite

C. cementite 

D. martensite

724.

A number of forces acting at a point will be in equilibrium, if

Sum of resolved parts in any two perpendicular directions are zero

725.

Group technology and CAPP are the activities of

- a) Computer Aided Engineering
- b) Computer Aided Manufacturing
- c) **Computer Integrated Manufacturing**
- d) Flexible manufacturing

726.

The diffuser blades are kept _____ the number of impeller blades.

- a. 1/10 th of
- b. **1/3 rd of**
- c. 10 times
- d. 3 times

727.

B-Rep is a methods of _____

- a) **Solid modeling**
- b) Surface modeling

- c) Wire frame modeling
- d) 2D modeling

728.

Which is the correct statement about law of polygon of forces ?

- a) if any number of forces acting at a point can be represented by the sides of a polygon taken in order, then the forces are in equilibrium
- b) if any number of forces acting at a point can be represented in direction and magnitude by the sides of a polygon, then the forces are in equilibrium
- c) if a polygon representing forces acting at a point is closed then forces are in equilibrium
- d) none of the above.

729.

In full annealing, the hypo-eutectoid steel is heated from 30° C to 50° C above the upper critical temperature and then cooled

- A.in still air
- B.slowly in the furnace
- C.suddenly in a suitable cooling medium
- D.any one of these

730.

The function of _____ is to convert high kinetic energy of gases into pressure energy.

- a. impeller
- b. diffuser
- c. casing
- d. None of the above

731.

The tool of an NC machine has to move along a circular arc from (5, 5) to (10,10) while performing an operation. The centre of the arc is at (10, 5). Which one of the following NC tool path commands performs the above mentioned operation?

- a) N010G02 X10 Y10 X5 Y5 R5
- b) N010G03 X10 Y10 X5 Y5 R5 12

c) N010G01 X5 Y5 X10 Y10 R5

d) N010G02 X5 Y5 X10 Y10 R5

732.

The lower critical temperature

- A. decreases as the carbon content in steel increases
- B. increases as the carbon content in steel increases
- C. is same for all steels
- D. depends upon the rate of heating

733.

Two non-collinear parallel equal forces acting in opposite direction

- a) balance each other
- b) constitute a moment
- c) constitute a couple
- d) constitute a moment of couple

734.

What is the number of jets generally employed in an impulse turbine without jet interference?

- [A]. two
- [B]. four
- [C]. six
- [D]. eight

735.

What are the main components of an NC machine?

Part program 2. Machine Control Unit 3. Servo meter

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

1.

736.

The product of either force of couple with the arm of the couple is called

- a) resultant couple
- b) moment of the forces
- c) moment of the couple
- d) none of the above

737.

Which of the following is an amorphous material?

- [A]. Tin
- [B]. Lead
- [C]. Zinc
- [D]. Glass

738.

The number of blades for a Francis turbine lies between

The number of blades in the runner is generally between 16 and 24

739.

Center of gravity of a solid cone lies on the axis at the height

- a) one-fourth of the total height above base
- b) one-third of the total height above base
- c) three-eighth of the total height above the base
- d) none of the above.

740.

Preheating of parent metal plates before welding is done to

- a) make the steel softer
- b) burn away oil, grease, etc from the plate surface
- c) prevent cold cracks
- d) prevent plate distortions

741.

Which of the following statement is correct as regard to water wheels?

- A. They have slow speeds.
- B. They are suitable even for low water heads.
- C. They give constant efficiency, even if the discharge is not constant
- D. all of the above

42.

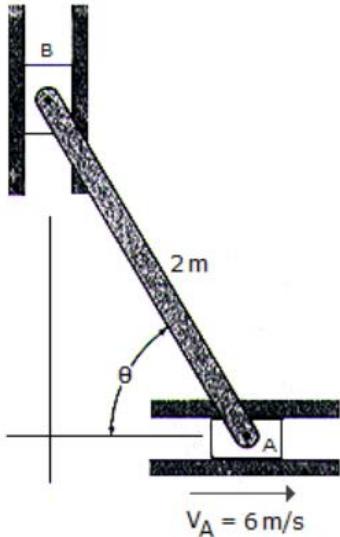
Which of the following are the rules of programming NC machine tools in APT language?

1. only capital letters are used
2. A period is placed at the end of each statement
3. Insertion of space does not affect the APT word

Select the correct answer using the codes given below:

- a) 1 and 2
- b) 2 and 3
- c) 1 and 3
- d) 1 alone

743.



The 2-m-long bar is confined to move in the horizontal and vertical slots A and B. If the velocity of the slider block at A is 6 m/s, determine the bar's angular velocity and the velocity of block B at the instant = 60° .

$\omega_{AB} = 3.46 \text{ rad/s}$ $v_B = 3.46 \text{ m/s}$ 9

$\omega_{AB} = 3.00 \text{ rad/s}$ $v_B = 3.00 \text{ m/s}$ 9

$\omega_{AB} = 3.00 \text{ rad/s}$ $v_B = 6.00 \text{ m/s}$ 9

$\omega_{AB} = 6.00 \text{ rad/s}$ $v_B = 10.39 \text{ m/s}$ 9

744.

Which of the following are valid statements for point to point motion of the tool in APT language?

1. GOTO/..... 2. GO DLTA/..... 3. GO/TO,

 - a) 1 and 2
 - b) 2 and 3
 - c) 1 and 3

1.

745.

Metal better weldable with itself is

746.

Which of the following is not an impulse turbine?

A. Girad turbine

B. Turgo turbine

C. Pelton wheel

D. Kaplan turbine 

747.

Metal which can be suitable welded by TIG welding is

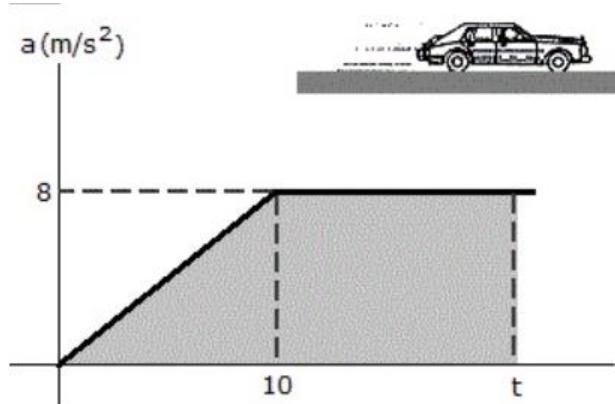
a) aluminum

b) stainless steel

c) pure titanium

d) aluminum, stainless steel and pure titanium

748.



A race car starting from rest moves along a straight track with an acceleration as shown in the graph (where for $t = 10 \text{ s}$, $a = 8 \text{ m/s}^2$). Determine the time t for the car to reach a speed of 50 m/s .

A. $t = 11.25 \text{ s}$ 

B. $t = 6.25 \text{ s}$

C. $t = 12.5 \text{ s}$

D. $t = 3.53 \text{ s}$

749.

The stress induced in a body, when suddenly loaded, is _____ the stress induced when the same load is applied gradually.

A. equal to

B. one-half

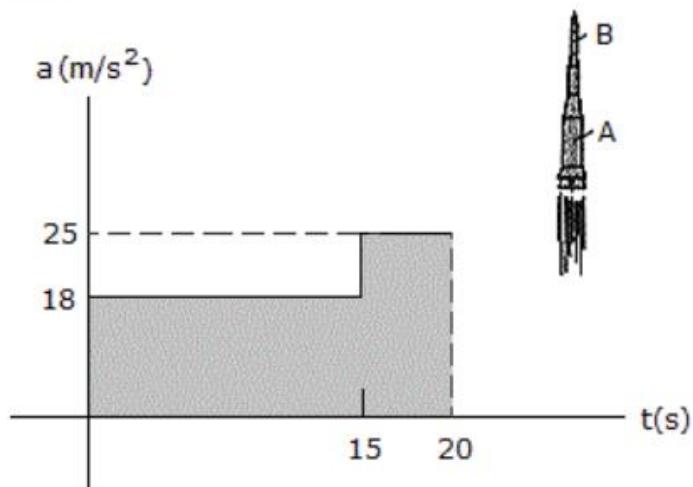
C. twice

D. four times

750.

Which of the following statement is wrong ?

751.



A two-stage missile is fired vertically from rest with an acceleration as shown in the graph. In 15 s the first stage A burns out and the second stage B ignites. How fast is the rocket moving and how far has it gone at $t = 20 \text{ s}$? How fast is the missile moving and how far has it gone at $t = 20 \text{ s}$?

[A]. $v = 430 \text{ m/s}, s = 4.30 \text{ km}$

[B]. $v = 395 \text{ m/s}, s = 3.69 \text{ km}$

[C]. $v = 360 \text{ m/s}, s = 3.60 \text{ km}$

[D]. $v = 500 \text{ m/s}, s = 5.00 \text{ km}$

752.

Francis, Kaplan and propeller turbines fall under the category of

- A) Impulse Turbine
- B) Reaction Turbine**
- C) Axial Flow Turbine
- D) Mixed Flow Turbine

753.

The bending moment at a point on a beam is the algebraic _____ of all the moments on either side of the point.

[A]. sum

[B]. difference

754.

Main advantage of MIG welding (GMAW) over TIG welding is that

- a) the former can be used to weld hard metals
- b) former permits use of large currents thereby allowing higher deposition
- c) welding rate is very fast
- d) welding is completely automatic

755.

The deformation per unit length is called

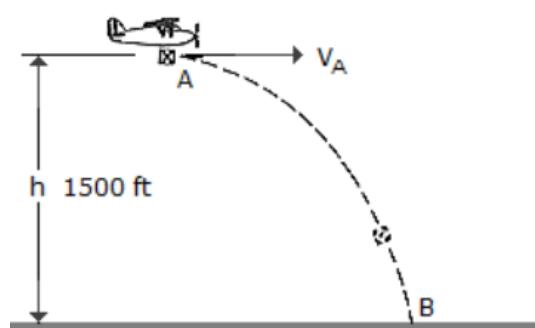
- a. strain
- b. stress
- c. modulus of elasticity
- d. none of the above

756.

Thermit welding is

- a) a process which uses a mixture of iron oxide and granular aluminum
- b) accomplished by maintaining a hot molten metal pool between plates
- c) a process in which arc is maintained under a blanket of flux
- d) not a welding process

757.



A package is dropped from the plane which is flying with a constant horizontal velocity of $v_A = 150 \text{ ft/s}$ at a height $h = 1500 \text{ ft}$. Determine the radius of curvature of the path of the package just after it is released from plane at A.

[A]. $\rho_2 = 9860 \text{ ft}$

[B]. $\rho_2 = 3000 \text{ ft}$

[C]. $\rho_2 = 1500 \text{ ft}$

[D]. $\rho_2 = 8510 \text{ ft}$

758.

A turbine develops 10000 kW under a head of 25 meters at 135 r.p.m. Its specific speed is

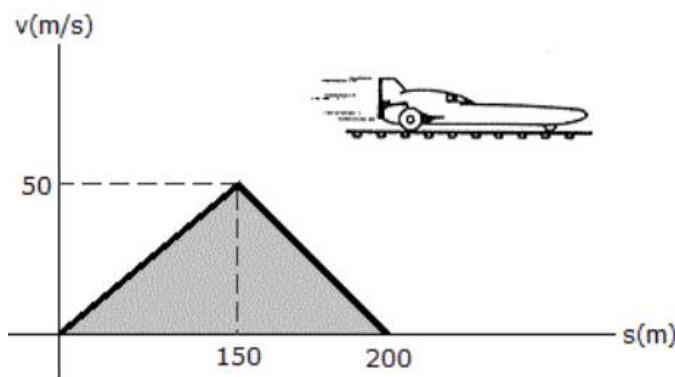
A. 175.4 r.p.m.

B. 215.5 r.p.m.

C. 241.5 r.p.m.

D. 275.4 r.p.m

759.



The v-s graph for a rocket sled is shown. Determine the acceleration of the sled when $s = 100 \text{ m}$ and $s = 175 \text{ m}$.

[A]. $a_{100} = 3.75 \text{ m/s}^2, a_{175} = -1.250 \text{ m/s}^2$

[B]. $a_{100} = 11.11 \text{ m/s}^2, a_{175} = -25.0 \text{ m/s}^2$

[C]. $a_{100} = 0.333 \text{ m/s}^2, a_{175} = -1.000 \text{ m/s}^2$

[D]. $a_{100} = 33.3 \text{ m/s}^2, a_{175} = -25 \text{ m/s}^2$

760.

Submerged arc welding is

a) a process which uses a mixture of iron oxide and granular aluminum

b) accomplished by maintaining a hot molten metal pool between the plates

c) a process in which arc is maintained under a blanket of flux

761.

A thin cylindrical shell of diameter (d) and thickness (t) is subjected to an internal pressure (p). The ratio of longitudinal strain to volumetric strain is

A. $\frac{m - 2}{2m - 1}$ ✓

B. $\frac{2m - 1}{m - 2}$

C. $\frac{m - 2}{2m + 1}$

D. $\frac{2m + 1}{m - 2}$

62.

For harnessing lower variable water heads, the suitable hydraulic turbine with high percentage of reaction and runner adjustable vanes is,

- a) Kaplan
- b) Francis
- c) Pelton
- d) Impeller

763.

A Curtis stage, Rateau stage and a 50% reaction stage in a steam turbine are examples of

- (a) Different types of impulse stages
 (b) Different types of reaction stages
 (c) A simple impulse stage, a velocity compounded impulse stage and reaction stage
(d) A velocity compounded impulse stage, a simple impulse stage and a reaction stage

764.

A thick cylindrical shell having r_o and r_i as outer and inner radii, is subjected to an internal pressure (p). The maximum tangential stress at the inner surface of the shell is

[A]. $\frac{p(r_o^2 + r_i^2)}{r_o^2 - r_i^2}$ ✓

[B]. $\frac{p(r_o^2 - r_i^2)}{r_o^2 + r_i^2}$

[C]. $\frac{2pr_i^2}{r_o^2 - r_i^2}$

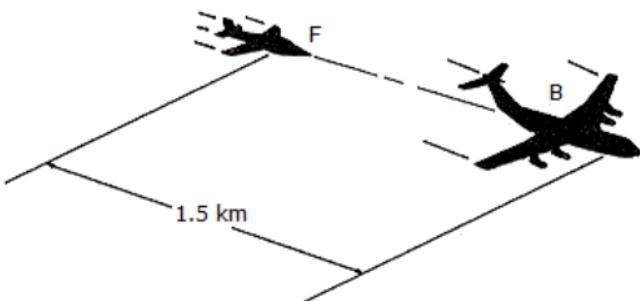
[D]. $\frac{r_o^2 - r_i^2}{2pr_i^2}$

765.

Submerged arc welding is

- a) a process which uses a mixture of iron oxide and granular aluminum
 b) accomplished by maintaining a hot molten metal pool between the plates
c) a process in which arc is maintained under a blanket of flux

766.



The pilot of fighter plane F is following 1.5 km behind the pilot of bomber B. Both planes are originally traveling at 120 m/s. In an effort to pass the bomber, the pilot in F gives his plane a constant acceleration of 12 m/s². Determine the speed at which the pilot in the bomber sees the pilot of the fighter plane pass at the start of the passing operation the bomber is decelerating at 3 m/s². Neglect the effect of any turning.

A. $v_{F/B} = 150 \text{ m/s}$

B. $v_{F/B} = 367 \text{ m/s}$

C. $v_{F/B} = 90 \text{ m/s}$

D. $v_{F/B} = 212 \text{ m/s}$

767.

Which of the following components of reaction turbine increases the head on the turbine by an amount equal to the height of runner outlet above the tail race?

- a. Scroll casing
- b. Guide vanes
- c. Moving vanes
- d. Draft tube**

768.

In gas welding, maximum temperature occurs at

- a) the tip of flame
- b) the inner cone
- c) next to the inner cone**
- d) at the outer cone

769.

$$\frac{T}{J} = \frac{\tau}{R} = \frac{C\theta}{I}$$

In the torsion equation the term J/R is called

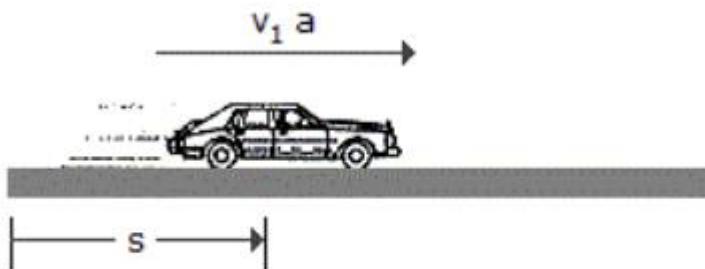
A. shear modulus

B. section modulus

C. polar modulus 

D. none of these

770.



A car, initially at rest, moves along a straight road with constant acceleration such that it attains a velocity of 60 ft/s when $s = 150$ ft. Then after being subjected to another constant acceleration, it attains a final velocity of 100 ft/s when $s = 325$ ft. Determine the average velocity and average acceleration of the car for the entire 325-ft displacement.

A. $v_{avg} = 80.0$ ft/s, $a_{avg} = 15.15$ ft/s 2

B. $v_{avg} = 45.2$ ft/s, $a_{avg} = 13.91$ ft/s 2

C. $v_{avg} = 80.0$ ft/s, $a_{avg} = 12.57$ ft/s 2

D. $v_{avg} = 55.0$ ft/s, $a_{avg} = 15.15$ ft/s 2

771.

Strain resetters are used to

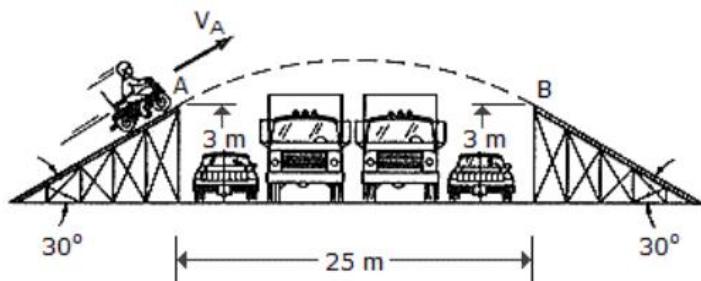
A. measure shear strain

B. measure linear strain

C. measure volumetric strain

D. relieve strain

772.



The motorcyclist attempts to jump over a series of cars and trucks and lands smoothly on the other ramp, i.e., such that his velocity is tangent to the ramp at B. Determine the launch speed v_A necessary to make the jump.

A. $v_A = 11.90$ m/s

B. $v_A = 11.07$ m/s

C. $v_A = 16.83$ m/s

D. $v_A = 15.66$ m/s

773.

Temperature of the plasma torch is of the order of

- a) 1000 deg C
- b) 5000 deg C
- c) 10000 deg C
- d) 30000 deg C

774.

Which of the following is a reaction turbine?

Examples of reaction turbine are- Francis, Kaplan, Archimedean Screw,

775.

Which of the followings are the demerits of single impulse stage

- 1. Requirement of C-D nozzle
- 2. Enhanced shock associated losses
- 3. More boundary layer associated losses in comparison with single reaction stage

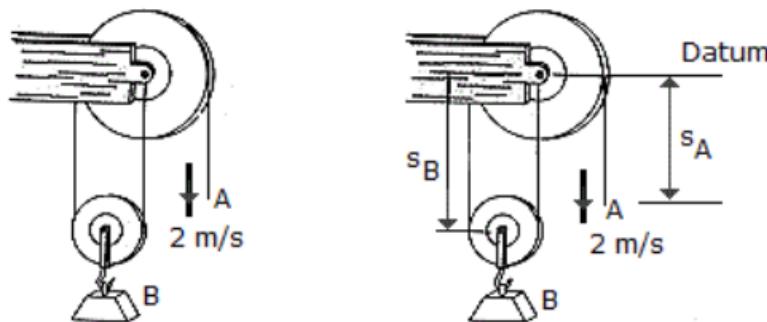
- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only
- d) 1,2 and 3

776.

In reverse polarity welding

- a) electrode holder is connected to negative polarity and the work to the positive polarity
- b) electrode holder is connected to positive polarity and the work to the negative polarity
- c) work is positive and the holder is earthed
- d) holder is positive and the work is earthed

777.



If the end of the cable at A is pulled down with a speed of 2 m/s, determine the speed at which block B arises.

A. $v_B = 4.00 \text{ m/s}$ ↓

B. $v_B = 1.000 \text{ m/s}$ ↑ ✓

C. $v_B = 1.000 \text{ m/s}$ ↓

D. $v_B = 4.00 \text{ m/s}$ ↑

778.

The torque transmitted by a solid shaft of diameter (D) is (where τ = Maximum allowable shear stress)

A. $\frac{\pi}{4} \times \tau \times D^3$

B. $\frac{\pi}{16} \times \tau \times D^3$ ✓

C. $\frac{\pi}{32} \times \tau \times D^3$

D. $\frac{\pi}{64} \times \tau \times D^3$

779.

When a rectangular cantilever beam is loaded transversely, the maximum compressive stress is developed on the

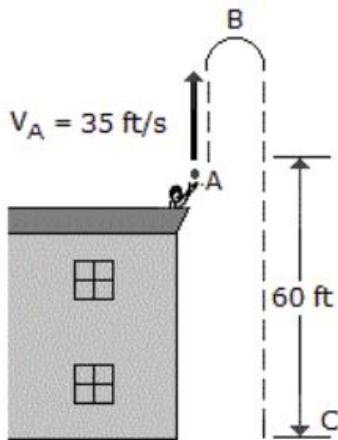
[A]. top layer

[B]. bottom layer ✓

[C]. neutral axis

[D]. every cross-section

780.



A ball thrown vertically upward from the top of a building with an initial velocity of $v_A = 35 \text{ ft/s}$. Determine (a) how high above the top of the building the ball will go before it stops at B, (b) the time t_{AB} it takes to reach its maximum height, and (c) the total time t_{AC} needed for it to reach the ground at C from the instant it is released.

$$h = 19.02 \text{ ft}, t_{AB} = 1.087 \text{ s}, t_{AC} = 2.17 \text{ s}$$

$$h = 62.4 \text{ ft}, t_{AB} = 3.57 \text{ s}, t_{AC} = 8.56 \text{ s}$$

$$\boxed{h = 19.02 \text{ ft}, t_{AB} = 1.087 \text{ s}, t_{AC} = 3.30 \text{ s}}$$

$$h = 62.4 \text{ ft}, t_{AB} = 3.57 \text{ s}, t_{AC} = 7.14 \text{ s}$$

781.

Amperage setting in the electric arc welding (SMAW) depends on

- a) work thickness
- b) arc gap
- c) electrode rod diameter

782.

Which one of the following is used to bring down the speed of an impulse steam turbine to practical limits?

- (a) A centrifugal governor
- (b) Compounding of the turbine**
- (c) A large flywheel
- (d) A gear box

783.

An impulse turbine produces 50 kW of power when the blade mean speed is 400 m/s. What is the rate of change of momentum tangential to the rotor?

- (a) 200 N
- (b) 175 N
- (c) 150 N
- (d) 125 N**

784.

Consumable electrode is used in the following welding process: -

- a) TIG
- b) MIG(GMAW)**
- c) Thermit
- d) LBM

785.

When a rectangular simply supported beam is loaded transversely, the maximum compressive stress is developed on the

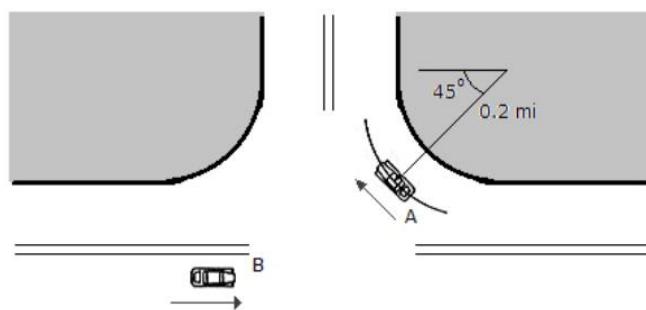
- A. top layer
- B. bottom layer**
- C. neutral axis
- D. every cross-section

786.

Ratio of oxygen to acetylene for complete combustion is

- a) 1:1
- b) 1.5:1
- c) 2:1
- d) 2.5:1**

787.



As the instant shown, cars A and B are traveling at speeds of 20 mi/h and 45 mi/h, respectively. If B is accelerating at 1600 mi/h^2 while A maintains a constant speed, determine the magnitudes of the velocity and acceleration of A with respect to B.

A. $v_{A/B} = 33.9 \text{ mi/h}$, $a_{A/B} = 1600 \text{ mi/h}^2$

B. $v_{A/B} = 60.8 \text{ mi/h}$, $a_{A/B} = 1600 \text{ mi/h}^2$

C. $v_{A/B} = 33.9 \text{ mi/h}$, $a_{A/B} = 1426 \text{ mi/h}^2$

D. $v_{A/B} = 60.8 \text{ mi/h}$, $a_{A/B} = 1426 \text{ mi/h}^2$

788.

When a rectangular cantilever beam is loaded transversely, the maximum tensile stress is developed on the

[A]. top layer

[B]. bottom layer

[C]. neutral axis

[D]. every cross-section

789.

In a circular pipe of certain length carrying oil at a Reynolds number 100, it is proposed to triple the discharge. If the viscosity remains unchanged, the power input will have to be

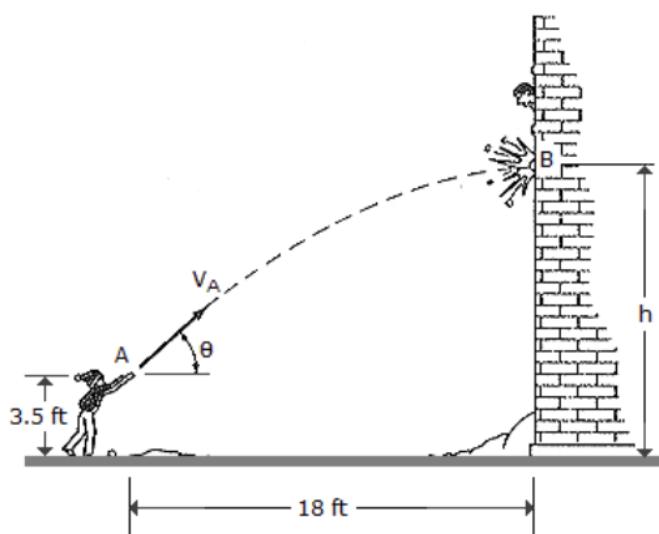
a) decreased to 1/3 its original value

b) increased by 100%

c) increased to 3 times the original value

d) increased to 9 times its original value

790.



A boy throws a snowball such that it strikes the wall of the building at the maximum height of its trajectory. If it takes $t = 1.5 \text{ s}$ to travel from A to B, determine the velocity v_A at which it was thrown, the angle of release, and the height h .

$$\text{Time of flight, } t = \frac{2v_0 \sin \theta}{g}$$

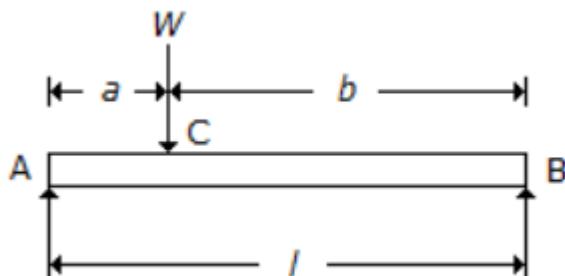
$$\text{Maximum height reached, } H = \frac{v_0^2 \sin^2 \theta}{2g}$$

$$\text{Horizontal range, } R = \frac{v_0^2 \sin 2\theta}{g}$$

- A. $v_A = 12.00 \text{ ft/s}, \theta = 24.4^\circ, h = 21.7 \text{ ft}$
- B. $v_A = 48.3 \text{ ft/s}, \theta = 65.6^\circ, h = 39.7 \text{ ft}$
- C. $v_A = 36.3 \text{ ft/s}, \theta = 24.4^\circ, h = 18.2 \text{ ft}$
- D. $v_A = 49.8 \text{ ft/s}, \theta = 76.0^\circ, h = 39.7 \text{ ft}$

791.

For a beam, as shown in the below figure, when the load W is applied in the centre of the beam, the maximum deflection is



A. $\frac{Wl^3}{48EI}$ ✓

B. $\frac{5Wl^3}{384EI}$

C. $\frac{Wl^3}{192EI}$

D. $\frac{Wl^3}{384EI}$

792.

An oil of kinematic viscosity 0.25 stokes flows through a pipe of diameter 10cm. The flow is critical at a velocity of

a) 7.2 m/s

b) 5 m/s

c) 0.5 m/s

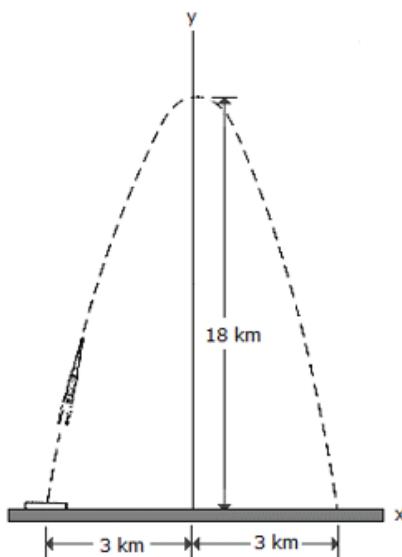
d) 0.72 m/s

793.

If two pieces of different metals are to be welded by projection welding, then the projection should be done on the metal piece having

- a) higher conductivity
- b) lower conductivity**
- c) same conductivity

794.



For a short time the missile moves along the parabolic path $y = (18 - 2x^2)$ km. If motion along the ground is measured as $x = (4t - 3)$ km, where t is in seconds, determine the magnitudes of the missile's velocity and acceleration when $t = 1$ s.

(A): $v = 16.00$ km/s, $a = 22.6$ km/s 2

✓(B): $v = 16.49$ km/s, $a = 64.0$ km/s 2

(C): $v = 4.00$ km/s, $a = 16.03$ km/s 2

(D): $v = 5.66$ km/s, $a = 4.0$ km/s 2

795.

Multi spot welding is infact a

- a) seam welding
- b) projection welding**

- c) thermit welding
- d) percussion welding

796.

When a machine member is subjected to torsion, the torsional shear stress set up in the member is

- a) zero at both the centroidal axis and outer surface of the member
- b) maximum at both the centroidal axis and outer surface of the member
- c) zero at the centroidal axis and maximum at the outer surface of the member
- d) maximum at the centroidal a

797.

Oil of viscosity 1.5 Pa.s and relative density 0.9 flows through a circular pipe of diameter 5cm with a mean velocity of 1.2 m/s. The shear stress at the wall in Pa is

- a) 360
- b) 288
- c) 180
- d) 144

798.

Material difficult to be spot welded is

- a) stainless steel
- b) copper
- c) mild steel

799.

A shaft is subjected to fluctuating loads for which the normal torque (T) and bending moment (M) are 1000 N-m and 500 N-m respectively. If the combined shock and fatigue factor for bending is 1.5 and combined shock and fatigue factor for torsion is 2, then the equivalent twisting moment for the shaft is

- a) 2000 N-m

b) 2050 N·m

c) 2100 N·m

d) 2136 N·m

800.

The viscosity of

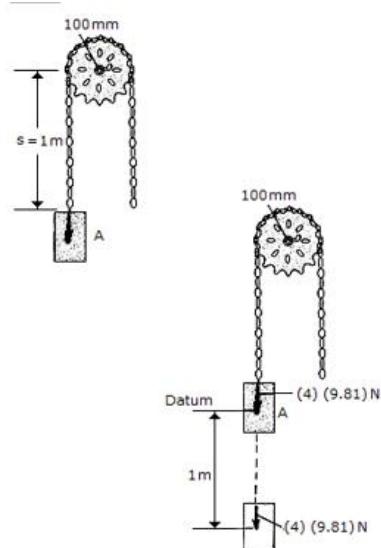
a) liquids increases with temperature

b) gases increases with temperature

c) fluids decreases with temperature

d) fluids increases with temperature

801.



A chain that has a negligible mass is draped over a sprocket which has a mass of 2 kg and a radius of gyration of $k_O = 50 \text{ mm}$. If the 4-kg block A is released from rest in the position shown, $s = 1 \text{ m}$, determine the angular velocity which the chain imparts to the sprocket when $s = 2 \text{ m}$.

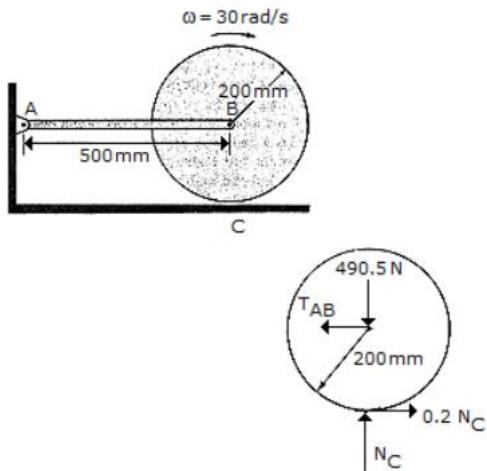
[A]. $\omega = 44.3 \text{ rad/s}$

[B]. $\omega = 39.6 \text{ rad/s}$

[C]. $\omega = 41.8 \text{ rad/s}$ ✓

[D]. $\omega = 59.1 \text{ rad/s}$

802.



The 50-kg cylinder has an angular velocity of 30 rad/s when it is brought into contact with the horizontal surface at C. If the coefficient of friction is $c = 0.2$, determine how long it takes for the cylinder to stop spinning. What force is developed at the pin A during this time? The axis of the cylinder is connected to two symmetrical links. (Only AB is shown.) For the computation, neglect the weight of the links.

- A. $t = 3.06 \text{ s}, A = 49.1 \text{ N}$
 B. $t = 1.529 \text{ s}, A = 49.1 \text{ N}$
 C. $t = 2.129 \text{ s}, A = 47.1 \text{ N}$
 D. $t = 1.529 \text{ s}, A = 0$

803.

A U-tube manometer measures

- a) absolute pressure at a point
- b) local atmospheric pressure
- c) difference in total energy between two points
- d) difference in pressure between two points**

804.

In fusion welding, porosity defect is due to

- a) high welding speed

- b) low welding speed
- c) wrong size of electrode
- d) poor base metal**

805.

The value of stress concentration factor depends upon

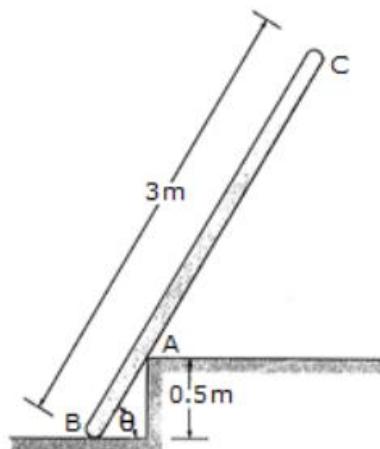
- a) material of the part
- b) geometry of the part
- c) material and geometry of the part**
- d) none of these

806.

Stress concentration is caused due to

- a) variations in load acting on a member
- b) variations in properties of materials in a member
- c) abrupt change of cross-section**

807.



The uniform pole has a mass of 15 kg and falls from rest when $\theta = 90^\circ$ until it strikes the edge at $A, \theta = 60^\circ$. If the pole then begins to pivot about this point after contact, determine the pole's angular velocity just after the impact. Assume that the pole does not slip at B as it falls until it strikes A.

$\omega_3 = 1.528 \text{ rad/s}$ $\omega_3 = 0.537 \text{ rad/s}$ $\omega_3 = 2.15 \text{ rad/s}$ $\omega_3 = 1.146 \text{ rad/s}$

808.

In water jet machining, the water jet is issued through a 0.3mm diameter orifice at a pressure of 400 MPa. The density of water is 1000 kg/cubic meter. The coefficient of discharge is 1.0. Neglecting all losses during water jet formation through the orifice, the power of the water in kW is _____

- a) 25.3
- b) 50.6
- c) 75.9
- d) 101.2

809.

Adding 'C' to pure Fe will,

Adding 'C' to pure Fe will,

Should increase hardness

810.

Which of the following is the hardest one?

- A. Coarse pearlite
- B. Bainite
- C. Fine perlite
- D. Martensite

Martensite

811.

When a machine member is subjected to torsion, the torsional shear stress set up in the member is

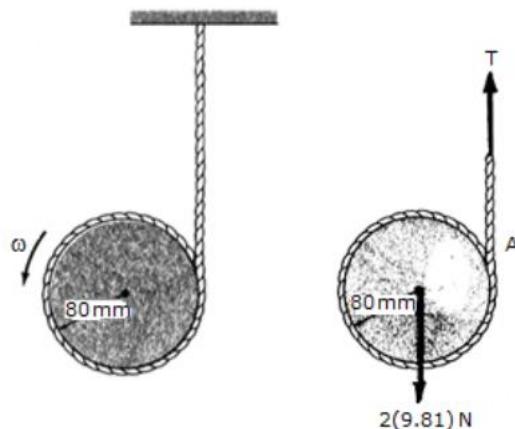
- a) zero at both the centroidal axis and outer surface of the member
- b) maximum at both the centroidal axis and outer surface of the member
- c) zero at the centroidal axis and maximum at the outer surface of the member
- d) maximum at the centroidal axis

812.

Two identical pipes of length L, diameter D and friction factor f, are connected in parallel between two reservoirs. The size of a pipe of length L and of the same friction factor f, equivalent to the above pipes, is

- a) 0.5D
- b) 0.87D
- c) 1.40D
- d) 2.0D

813.



A cord of negligible mass is wrapped around the outer surface of the 2-kg disk. If the disk is released from rest, determine its angular velocity in 3 s.

- $\omega = 735 \text{ rad/s}$
- $\omega = 183.9 \text{ rad/s}$
- $\omega = 245 \text{ rad/s}$
- $\omega = 263 \text{ rad/s}$

814.

The strain energy stored in a spring, when subjected to maximum load, without suffering permanent distortion, is known as

- [A]. impact energy [B]. proof resilience
- [C]. proof stress [D]. modulus of resilience

815.

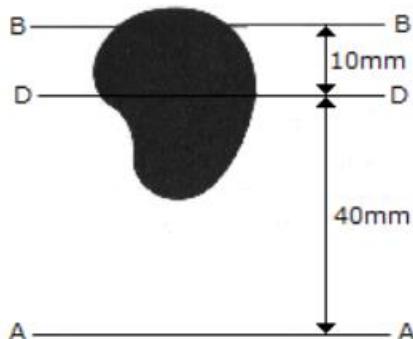
When all the conditions are identical, in the case of flow through pipes with heat transfer, the velocity profiles will be identical for:

- a) Liquid heating and liquid cooling
b) Gas heating and gas cooling
c) Liquid heating and gas cooling
d) Heating and cooling of any fluid

816.

What is the major driving force for any phase transformation?

817.



The irregular area has a moment of inertia about the AA axis of 35 (106) mm⁴. If the total area is 12.0(103) mm², determine the moment of inertia if the area about the BB axis. The DD axis passes through the centroid C of the area.

- [A]. $I_{BB} = 5.00(10^6) \text{ mm}^4$

[B]. $I_{BB} = 17.00(10^6) \text{ mm}^4$ ✓

[C]. $I_{BB} = 16.80(10^6) \text{ mm}^4$

[D]. $I_{BB} = 55.4(10^6) \text{ mm}^4$

818.

Minor losses in a pipe flow are those losses

- a) which are insignificantly small
- b) which can be neglected always
- c) caused by local disturbance due to pipe fittings
- d) caused by frictional resistance

819.

A rod of length L having uniform cross-sectional area A is subjected to a tensile force P. If the Young's modulus of the material varies linearly from E₁ to E₂ (Given that; E₁>E₂) along the length of the rod, the normal stress developed at the mid section of the beam is

1 P/A

✓ Correct Answer

2 $\frac{P(E_1 - E_2)}{A(E_1 + E_2)}$

3 $\frac{PE_2}{AE_1}$

4 $\frac{PE_1}{AE_2}$

820.

Which of the following are intensive properties

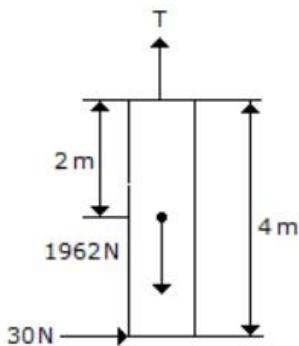
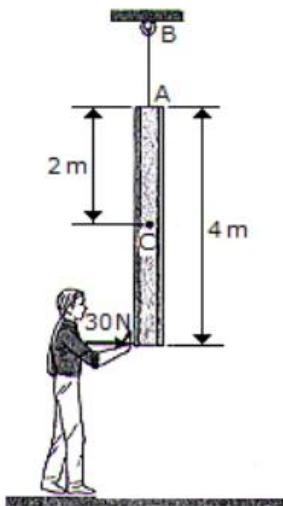
[A]. Volume

[B]. Temperature ✓

[C]. Mass

[D]. Energy

821.



The slender 200-kg beam is suspended by a cable at its end as shown. If a man pushes on its other end with a horizontal force of 30 N, determine the initial acceleration of its mass center G, the beam's angular acceleration, and the tension in the cable AB.

- a) $a_G = 0, \alpha = 0.1125 \text{ rad/s}^2, T = 1.962 \text{ kN}$
- b) $a_G = 0, \alpha = 0.225 \text{ rad/s}^2, T = 1.962 \text{ kN}$
- c) $a_G = 0.0750 \text{ m/s}^2, \alpha = 0.1125 \text{ rad/s}^2, T = 1.962 \text{ kN}$
- d) $a_G = 0.1500 \text{ m/s}^2, \alpha = 0.225 \text{ rad/s}^2, T = 1.962 \text{ kN}$

822.

Two pipelines of equal length and diameter of 20 cm and 30 cm respectively are connected in parallel between two reservoirs. If the friction factor f is the same for both the pipes, the ratio of the discharges in the smaller to the larger size of the pipe is

- a) 0.363
- b) 0.444
- c) 0.667
- d) 0.137

823.

The radial distance of a tooth from pitch circle to the bottom of the tooth is called

- a) dedendum
- b) addendum
- c) clearance
- d) working depth

824.

Voltage during the arc-striking compared to the voltage during welding in electric arc welding is

- a) same
- b) more
- c) less
- d) unpredictable

825.

The bending stress in a beam is _____ section modulus.

[A]. directly proportional to

[B]. inversely proportional to

826.

Two identical circular rods of same diameter and same length are subjected to same magnitude of axial tensile force. One of the rods is made out of mild steel having the modulus of elasticity of 206 GPa. The other rod is made out of cast iron having the modulus of elasticity of 100 GPa. Assume both the materials to be homogeneous and isotropic and the axial force causes the same amount of uniform stress in both the rods. The stresses developed are within the proportional limit of the respective materials. Which of the following observations is correct?

- (a) Both rods elongate by the same amount
- (b) Mild steel rod elongates more than the cast iron rod
- (c) Cast iron rod elongates more than the mild steel rod
- (d) As the stresses are equal strains are also equal in both the rods

Ans-(c)

827.

The weld pool is surrounded by an inert gas in

- a) arc welding (SMAW)
- b) carbon arc welding
- c) MIG(GMAW)
- d) submerged arc welding

828.

The module is reciprocal of

- a) diametral pitch
- b) circular pitch

- c) pitch diameter
- d) pressure angle

829.

Bernoulli equation is applicable between any two points

- a) in any rotational flow of an incompressible fluid
- b) in any type of irrotational flow of a fluid
- c) in steady rotational flow of an incompressible fluid
- d) in steady, irrotational flow of an incompressible fluid**

830.

The condition for correct gearing is

the common normal at the point of contact between a pair of teeth must always pass through the pitch point

831.

In a sample of water an increase of pressure by 18 MN/m^2 caused 1% reduction in the volume. The bulk modulus of elasticity of this sample, in MN/m^2 is

- a) 1.8
- b) 180
- c) 1800**
- d) 0.18

832.

Filler metal is used in

- a) electric spot welding
- b) electric arc welding**
- c) projection welding

833.

A perfect fluid (also known as an ideal fluid is)

- a) a real fluid
- b) the one which obeys perfect gas laws
- c) compressive and gaseous
- d) incompressible and frictionless**

834.

Interference can be avoided in involute gears with 20 degree pressure angle by

- a) Decreasing center distance between gear pair
- b) Decreasing module
- c) Decreasing pressure angle
- d) Increasing number of gear teeth**

835.

If the principal stresses in a plane stress problem, are 100MPa, and 40MPa, the magnitude of the maximum shear stress (in MPa) will be

1 60

2 50

3 30

 Correct Answer

4 20

836.

Typical example of a non-Newtonian fluid of pseudoplastic variety is

- a) Water
- b) Air
- c) Blood**
- d) Printing ink

837.

Electroslag welding is

- a) a process which uses a mixture of iron oxide and granular aluminum
- b) accomplished by maintaining a hot molten metal pool between plates**
- c) a process in which arc is maintained under a blanket of flux
- d) there is nothing called electro slag welding

838.

Which of these factors doesn't affect the stress of a wire?

- diameter
- original length
- load
- cross sectional area

839.

Arc length in an arc welding should be equal to

- a) half the diameter of the electrode rod

b) diameter of the electrode rod

c) twice the diameter of the electrode rod

d) 2.5 times the electrode rod diameter

840.

The fall velocity of a sand grain in water is to be modelled by using particles of the same relative density as sand and a liquid whose kinematic viscosity is 100 times larger than that of water. The diameters of the particles in the model that will have the same fall velocity as the prototype will be

a) 10 times smaller

b) 10 times larger

c) 100 times smaller

d) 100 times larger

841.

In simple gear train, if the number of idle gears is odd, then the motion of driven gear will

a) be same as that of driving gear

b) be opposite as that of driving gear

c) depend upon the number of teeth on the driving gear

d) none of the above

842.

Stress concentration is caused due to

a) variations in load acting on a member

b) variations in properties of materials in a member

c) abrupt change of cross-section

d) all of these

843.

The train value of gear is

a) equal to velocity ratio of a gear train

b) reciprocal of velocity ratio of a gear train

c) always greater than unity

d) always less than unity

844.

Filler material is essentially used in

a) gas welding

b) spot welding

c) seam welding

845.

The potential function exist for

a) irrotational motion of incompressible fluids only

b) irrotational motion of fluids whether compressible or incompressible

- c) for two-dimensional irrotational flow only
- d) for steady flows only

846.

Grey iron is generally welded by

- a) gas welding
- b) arc welding
- c) TIG welding
- d) MIG welding

847.

Given that W_m = weight of the molten metal displaced by a core and W_c = weight of the core, the buoyancy force is which one of the following?

- a) downward force = $W_m + W_c$
- b) downward force = $W_m - W_c$
- c) upward force = $W_m + W_c$
- d) upward force = $W_m - W_c$

848.

Which of the following is not a basic type of strain?

- a. Compressive strain
- b. Shear strain
- c. Area strain
- d. Volume strain

849.

In a gear train, when the axes of the shafts, over which the gears are mounted, move relative to a fixed axis is called

- a) epicyclic gear train
- b) reverted gear train
- c) compound gear train
- d) simple gear train

850.

The centre of buoyancy of a submerged body

- a) coincides with the centre of gravity of the body
- b) coincides with the centroid of the displaced volume of the fluid
- c) is always below the centre of gravity of the body
- d) is always above the centroid of the displaced volume of liquid

851.

Copper is

- a) easily spot welded
- b) very difficult to be spot welded
- c) suitable for spot welding just as any other metal
- d) preferred to be welded by spot welding

852.

Which bearing is best for space constraint?

Needle Bearing

853.

A triangular gate with a base width of 2m and a height of 1.5 m lies in a vertical plane. The top vertex of the gate is 1.5m below the surface of a tank which contains oil of specific gravity 0.8. Considering the density of water and acceleration due to gravity to be 1000 kg/cu.m and 9.81 m/s² respectively, the hydrostatic force (in KN) exerted by the oil on the gate is

Ans. 29.43 KN

854.

A thin cylinder of inner radius 500mm and thickness 10mm is subjected to an internal pressure of 5MPa. The average circumferential (hoop) stress in MPa is

- a) 250
- b) 500
- c) 750
- d) 1000

855.

A differential gear in automobile is used to

- a) reduce the speed
- b) assist in changing in speed
- c) provide jerk free movement of vehicle
- d) help in turning**

856.

In electrical resistance welding

- a) voltage is high and current is low**
- b) voltage is low and current is high**

- c) both voltage and current are high
- d) both voltage and current are low

857.

The angle between the direction of the follower motion and a normal to the pitch curve is called

- a) pitch angle
- b) prime angle
- c) base angle
- d) pressure angle**

858.

A disk clutch is required to transmit 5 kW at 2000 rpm. The disk has a friction lining with coefficient of friction equal to 0.25. Bore radius of friction lining is equal to 25 mm. Assume uniform contact pressure of 1 MPa. The value of outside radius of the friction lining is

<input checked="" type="checkbox"/>	39.4 mm
<input type="checkbox"/>	49.5 mm
<input type="checkbox"/>	97.9 mm
<input type="checkbox"/>	142.9 mm

859.

Consider the following statements:

1. If a condensing liquid does not wet a surface drop wise, then condensation will take place on it.
2. Drop wise condensation gives a higher heat transfer rate than filmwise condensation.
3. Reynolds number of condensing liquid is based on its mass flow rate.
4. Suitable coating or vapour additive is used to promote film-wise condensation.

Of these statements:

- a) 1 and 2 are correct
- b) 2, 3 and 4 are correct
- c) 4 alone is correct
- d) 1, 2 and 3 are correct**

860.

An example of plastic welding is

- a) arc welding
- b) gas welding
- c) forge welding**

861.

In sintering stage of powder metallurgy, which of the following process take place?

- a) all the pores reduce in size
- b) the powder particles fuse and join together**
- c) Particles do not meet, but a bond is formed between them
- d) some of the pores grow

862.

The following is not included in title block of drawing sheet.

- a. Sheet No
- b. Scale
- c. Method of Projection
- d. Size of sheet**

(Ans: d)

863.

The friction factor f in a laminar pipe flow was found to be 0.04. The Reynolds number of the flow was

- a) 2000
- b) 1000
- c) 800
- d) 1600**

864.

When shear force at a point is zero, then bending moment is _____ at that point.

- A. zero
- B. minimum
- C. maximum**
- D. infinity

865.

Which of the following represent reducing scale?

- a) 1:1
- b) 1:2**
- c) 2:1
- d) 10:1

866.

A clutch has outer and inner diameters 100 mm and 40 mm respectively. Assuming a uniform pressure of 2 MPa and coefficient of friction of liner material is 0.4, the torque carrying capacity of the clutch is

- a) 148 Nm

- b) 196 Nm
- c) 372 Nm
- d) 490 Nm

867.

In production of precision components, the use of powder metallurgy technique mainly reduces

- a) material cost
- b) machining cost
- c) equipment cost
- d) tool-related costs

868.

The Reynolds number for the flow of oil in a certain pipe is 640. The Darcy-Weisbach friction factor f for the flow is

- a) 0.02
- b) 0.01
- c) 0.1
- d) 0.064

869.

In a turbulent flow through a pipe the centreline velocity is 3.61 m/s and the friction factor $f=0.002$. The mean velocity of the flow in m/s is

- a) 4.80
- b) 3.00
- c) 2.21
- d) 0.96

870.

The clutch used in scooter is

ANS- Centrifugal Clutch

871.

Widely used metal powder production method for powder metallurgy is

- a) crushing using impact (BALL MILLING)
- b) liquid metal spray
- c) electrolytic deposition

872.

In first angle projection method, object is assumed to be placed in

- A.)First quadrant
- B.)Second quadrant
- C.)Third Quadrant
- D.)Fourth quadrant

873.

One of the process used to manufacture crankshafts is

- a) cold heading
- b) casting
- c) pressure die casting
- d) investment casting

874.

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

- | | |
|---------------------------------|------------------|
| A. Single-plate friction clutch | 1. Scooters |
| B. Multi-plate friction clutch | 2. Rolling mills |
| C. Centrifugal clutch | 3. Trucks |
| D. Jaw clutch | 4. Mopeds |

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

Ans- D

875.

Metric thread of 10mm diameter is represented by

Metric bolts are written down as an "M" followed by 3 numbers. For example M10x1.25x35 The first number is the diameter, the second the thread pitch, and the third the length all in millimeters

876.

In a steady flow

- a) streamlines and pathlines are identical but are different from streakline
- b) streakline and pathlines are identical but are different from streamlines
- c) streamline, streakline and pathline can all be different from each other
- d) none of the above

877.

If B=centre of buoyancy, G=is the centre of gravity and M=metacentre of a floating body, the body will be in stable equilibrium if

- a) MG=0
- b) M is below G
- c) BG=0
- d) M is above G**

878.

This is the term for the range of tightness or looseness resulting from the allowances and tolerances in mating parts

A. Limits

B. Fit ✓

C. Specifications

D. Allowance

879.

The commonly used angle between leather or asbestos friction lining surface and axis of cone clutch for a cone clutch is

5-15 degrees

880.

Most suitable process for manufacturing carburettor body is

- a) cold heading
- b) casting
- c) pressure die casting**
- d) investment casting

881.

In a radial cam, the follower moves

- a) in a direction perpendicular to the cam axis
- b) in a direction parallel to cam axis
- c) in any direction irrespective of the cam axis
- d) along the cam axis

882.

In a band brake the ratio of tight side band tension to the tension on the slack side is 3. If the angle of overlap of band on the drum is 180° , the coefficient of friction required between drum and the band is

- a) 0.20
- b) 0.25
- c) 0.30
- d) 0.35

883.

The head loss in 100m length of a 0.1m diameter pipe ($f=0.02$) carrying water is 10m. The boundary shear stress, in kPa, is

- a) 9.79
- b) 0.298
- c) 0.1958
- d) 0.0245

884.

Most suitable process for manufacturing nails is

- a) cold heading
- b) casting
- c) pressure die casting
- d) investment casting

885.

In block brakes, the ratio of shoe width and drum diameter is kept between

- A. 0.1 and 0.25
- B. 0.25 and 0.50
- C. 0.50 and 0.75
- D. 0.75 and 1

886.

This means that a feature of a finished product contains the maximum amount of material permitted by the tolerated dimensions for that feature:

A. Maximum material condition ✓

B. Machined material condition

C. Maximum machined indication

D. Machine mark indication

887.

Extrusion process can effectively reduce the cost of production through

- a) in-process tooling costs
- b) material saving
- c) saving in administrative cost
- d) processing time saving

888.

A circular pipe has a diameter of 1m, bed slope of 1 in 1000, and Manning's roughness coefficient equal to 0.01. It may be treated as an open channel flow when it is flowing just full, i.e., the water level just touches the crest. The discharge in this condition is denoted by $Q(\text{full})$. Similarly, the discharge when the pipe is flowing half-full, i.e. with a flow depth of 0.5m, is denoted by $Q(\text{half})$. The ratio of $Q(\text{full})/ Q(\text{half})$

- a) 1
- b) 1.414
- c) 2
- d) 4

889.

Fabric belts are used in industrial applications because

- (A) They are cheap
- (B) They can work at high temperature
- (C) They are unaffected by moisture and humidity
- (D) None of the above

890.

In a hydraulic jump occurring in a horizontal rectangular channel the sequent depths are 0.25m and 1.25m. The energy loss in this jump is

$$\Delta E = (y_2 - y_1)^3 / (4y_1 y_2)$$

- a) 0.8m
- b) 1.0m
- c) 1.25m
- d) 1.50m

891.

Major problem in hot extrusion is

- a) design of punch
- b) design of die
- c) wear and tear of die
- d) wear of punch 892.

A radial follower is one

893.

Upsetting or cold heading is a

- a) rolling process
- b) extrusion process
- c) bending process
- d) forging process

894.

The power transmitted by the belt drive can be increased by

- | | |
|----------------------------|----------------------|
| (a) revolutions per minute | (b) T_f and T_s |
| (c) arc of contact | (d) all of the above |

All of them

895.

This is the theoretically exact size from which limits of size are determined:

- 1) Actual Size
- 2) Basic size
- 3) Dimensioned size
- 4) Production size

896.

In a two-dimensional, steady, horizontal, uniform laminar flow the shear gradient in the normal direction is equal to

- a) the velocity gradient in the normal direction
- b) the velocity gradient in the longitudinal direction
- c) the pressure gradient in the normal direction
- d) the pressure gradient in the direction of flow

897.

In a 6×20 wire rope, No.6 indicates the

- a. Diameter
- b. Strands
- c. Wires
- d. None of the above

898.

offset is provided to a cam follower mechanism to

- a) minimise the side thrust
- b) accelerate
- c) avoid jerk
- d) reduced the noise

899.

Material good for extrusion is

- a) stainless steel
- b) brass casting
- c) low carbon annealed steel
- d) low carbon work hardened steel

900.

In hydraulic modelling of flow pattern around a body submerged in a fluid the non-dimensional number which has to be kept the same in the model and prototype is

- a) Weber number
- b) Froude number
- c) Reynolds number

d) Strouhal number

901.

Seam less tube can be produced by

- a) two high rolling mill
- b) ring rolling combined with stretch forming
- c) **piercing**
- d) steam hammer forging

902.

Acceptable parts must not extend beyond this:

- 1) Specification
- 2) Hole limits
- 3) Tolerances
- 4) Boundary limits

903.

In a flat belt drive the belt can be subjected to a maximum tension T and centrifugal tension T_c . What is the condition for transmission of maximum power?

- (a) $T = T_c$
- (b) $T = \sqrt{3} T_c$
- (c) $T = 2T_c$
- (d) $T = 3T_c$

Ans- (d) $T = 3T_c$

904.

Which of the following is a dimensionless number:

- a) Manning's coefficient n
- b) Pipe friction factor f**
- c) Chezy coefficient C
- d) Hazen-William coefficient CH

905.

A tooth paste tube can be produced by

A tooth paste tube can be produced by

- a) solid forward extrusion

- b) solid backward extrusion
- c) hollow backward extrusion
- d) hollow forward extrusion

906.

This practice considers an individual part's dimensions and tolerances and that part's relation to its related parts:

- 1) Angular dimensioning tolerances
- 2) Creating datum references
- 3) Applying allowances
- 4) Geometric dimensioning and tolerancing

907.

The drag force on a body

- a) is the net frictional force on the body
- b) is the net pressure force on the body
- c) is the component of the resultant force in the direction of the relative velocity
- d) is the component of the resultant force in a direction perpendicular to the direction of gravity

908.

Interference between the teeth of two meshing involute gears can be reduced or eliminated by

1. Increasing the addendum of the gear teeth and correspondingly reducing the addendum of the pinion.
2. Reducing the pressure angle of the teeth of the meshing gears.
3. Increasing the centre distance

Which of the statements given above is/are correct?

Which of the statements given above is / are correct?

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

(c) 1 only

909.

These weld symbols have no arrow-side or other-side significance:

- A. Projection or seam weld

B. Back or backing weld

C. Surface or groove weld

D. Flash and upset weld 

910.

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

- | | |
|-------------------|--------------------------|
| A. Undercutting | 1. Beam strength |
| B. Addendum | 2. Interference |
| C. Lewis equation | 3. Large speed reduction |
| D. Worm and wheel | 4. Intersecting axes |
| | 5. Module |

Codes:

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

Ans- (A)

911.

The lift force on a body

- a) is due to buoyant force
- b) is always in the direction of the gravity
- c) is the component of the resultant force in a vertical directions
- d) is the component of the resultant force in a direction normal to relative velocity

912.

Rolling process can not be used to produce

- a) a T section bar
- b) a hollow circular section
- c) a channel section bar
- d) an I-section bar

913.

The dynamic load capacity of 6306 bearing is 22 kN. The maximum radial load it can sustain to operate at 600 rev/min, for 2000 hours is

- a) 4.16 kN
- b) 3.6 kN
- c) 6.25 kN
- d) 5.29 kN**

914.

Welding drawings are a special type of this kind of drawing:

A. Symbol

B. Perspective

 **Assembly** 

C. Isometric

915.

The discharge Q in a pipe of know f is estimated by using the head loss hf in a length L and diameter D. If an error of 1% is involved in the measurement of D, the corresponding error in the estimation of Q is

- a) 2.5%**
- b) 1.0%
- c) 0.4%
- d) 5%

916.

The linear momentum equation applied to a control volume in a flow through a nozzle yielded the resultant reaction force R, on the fluid in the control volume. The force required to keep the nozzle in position is

- a) the same as R in magnitude and direction
- b) equal to R but opposite in direction
- c) equal to the x-component of R**
- d) equal to R minus the friction force

917.

In sliding contact bearings, a positive pressure can be built up and a load supported by a fluid only by the use of a:

- a) Diverging Film
- b) Converging – Diverging Film
- c) Converging Film**
- d) Flat Film

918.

For a low and moderate speed engines, the cam follower should move with

- a) uniform velocity
- b) simple harmonic motion**
- c) uniform acceleration and retardation
- d) cycloidal motion

919.

The typical parts list should include the_____

- A. part number
- B. manufacturing material
- C. number of parts needed
- D. all of the above**

920.

Hydraulic grade line for flow in a pipe of constant diameter is

- a) always above the centreline of the pipe
- b) always above the energy grade line
- c) always sloping downwards in the direction of the flow**
- d) coincides with the pipe centreline

921.

Assertion (A): In hydrodynamic journal bearings, the rotating journal is held in floating condition by the hydrodynamic pressure developed in the lubricant.

Reason (R): Lubricant flows in a converging-diverging channel.

- (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

922.

For high speed engines, the cam and follower should move with

- a) uniform velocity
- b) simple harmonic motion
- c) uniform acceleration and retardation

d) cycloidal motion

923.

For a single stage impulse turbine with a rotor diameter of 2 m and a speed of 3000 rpm when the nozzle angle is 20°, the optimum velocity of steam in m/s is

(a) 334

(b) 356

(c) 668

(d) 711

GATE-2.Ans. (c) Just use $u = \frac{V \cos \alpha}{2}$ and $u = \frac{\pi D N}{60}$

924.

A typical set of mechanical working drawings includes _____

[A]. exploded assembly

[B]. part details

[C]. parts list

[D]. all of the above

925.

The title block used on working drawings should include the _____

A sheet number

B. line type

C. layer set

D. all of the above

926.

The text used on a typical detail sheet should be

- 1) placed horizontally
- 2) in an architectural text style
- 3) none of the above
- 4) in bold text

927.

In an exploded assembly drawing it is customary for the drafter to use a _____ line to illustrate how parts fit together.

- A. Phantom
- B. hidden
- C. dashed
- D. center

928.

A perfect fluid (also known as an ideal fluid is),

- a) a real fluid
- b) the one which obeys perfect gas laws
- c) compressive and gaseous
- d) incompressible and frictionless

929.

which of the following displacement diagrams should be chosen for better dynamic performance of cam follower motion

- a) simple harmonic motion
- b) parabolic motion
- c) cycloidal motion
- d) none of the mentioned

930.

It is customary for the first sheet of a working drawing set to include _____

- A. a parts list
- B. exploded assembly

C. assembled assembly

D. all of the above 

931.

The thread note for a typical bolt will include the _____

- A. major diameter of the thread
- B. material
- C. center line
- D. offset distance

932.

A combination of kinematic pairs, joined in such a way that the relative motion between the linkage is completely constrained is called as

- a) structure
- b) mechanism
- c) kinematic chain
- d) inversion

933.

The mechanism forms a structure, when the number of degree of freedom is equal to

- a) 0
- b) 1
- c) 2
- d) -1

34.

In a four bar chain or quadric cycle

- a) each of the four pairs is turning pair
- b) one is a turning pair and three sliding pairs
- c) three are turning pairs and one is sliding pair
- d) all are sliding pairs

935.

Broadly speaking, water is ,

- a) 10 times more compressible than steel
- b) 80 times more compressible than steel
- c) 80 times less compressible than steel
- d) 800 times less compressible than steel

936.

This is a conical-shaped recess around a hole, often used to receive a tapered screw head:

1) **Countersink**

2) **Boss**

3) **Counterbore**

4) **Spotface**

937.

This is an angled surface used on cylinders to make them easier to handle:

A. **Fillet**

B. **Taper**

C. **Chamfer** 

D. **Lug**

938.

These are used to attach parts to a cylinder so they won't turn on it:

- Lugs and bearings*
- Keyseats and bearings*
- Knurls and keys*
- Keys and keyways/keyseats*

939.

This is a flat or rounded tab protruding from a surface, usually to provide a method for attachment:

- Lug*
- Boss*
- Chamfer*
- Spotface*

940.

This is a hollow cylinder that is often used as a protective sleeve or guide or as a bearing:

[A]. **Lug**

[B]. **Bushing** 

[C]. **Chamfer**

[D]. **Knurl**

941.

This is a rounded exterior blend between surfaces:

- [A]. Fillet
- [B]. Round**
- [C]. Taper

- [D]. Chamfer

942.

The total number of instantaneous centres for a mechanism consisting of n links are

- A. $n/2$
- B. n
- C. $n - 1$
- D. $n(n - 1)/2$**

943.

The instantaneous centres which vary with the configuration of the mechanism are called

- A. permanent instantaneous centres
- B. fixed instantaneous centres
- C. neither fixed nor permanent instantaneous centres**
- D. none of the above

944.

The two parallel and coplanar shafts are connected by gears having parallel teeth to the axis of the shaft. the arrangement is called

- a) spur gearing
- b) helical gearing
- c) bevel gearing
- d) spiral gearing

945.

An imaginary circle which by pure rolling action gives the same motion as the actual gear is called

- a) addendum circle
- b) dedendum circle
- c) pitch circle
- d) clearance circle

946.

which of the following is incorrect relationship for gears

- a) circular pitch \times diametral pitch = 3.14
-) module = pcd/No of teeth
- c) dedendum = 1.157 module
- d) addendum = 2.157 module

947.

Cam size depends on

- a) base circle
- b) pitch circle
- c) prime circle
- d) outer circle

948.

The maximum value of pressure angle in case of cam is kept as

- a) 10 degree
- b) 14 degree
- c) 20 degree
- d) 30 degree

949.

Consider the following pairs

- 1. pair of gear in mesh
- 2. belt and pulley
- 3. cylinder and piston
- 4. cam and follower

Among these, the higher pairs are

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

d) 1,2 and 4

950.

A cam mechanism imparts following motion

- a) rotating
- b) oscillating
- c) reciprocating
- d) not any of the above

951.

The contact ratio for gear is

- a) 0
- b) 1
- c) more than 1
- d) 1.5

952.

Module of a gear is (T- number of teeth; D-Diameter of the gear)

Ans. $M=D/T$

953.

The type of gears used to connect two non parallel and non intersecting shafts is

- a) Spur gear
- b) Helical gear
- c) Bevel gear
- d) Spiral gear

954.

Angular acceleration of a link can be determined by dividing the

- a) centrepetal component of acceleration with length of link
- b) tangential component of acceleration with length of link
- c) resultant with link length
- d) velocity

955.

The Kutzbach criterion for determining the number of degrees of freedom (n) is (where l = number of links, j = number of joints and h = number of higher pairs)

- a) $n = 3(l-1)-2j-h$
- b) $n = 2(l-1)-2j-h$
- c) $n = 3(l-1)-3j-h$
- d) $n = 2(l-1)-3j-h$

956.

Any point on a link connecting double slider chain will trace a

- a) straight line
- b) circle
- c) ellipse

d) parabola

957.

The coriolis component of acceleration leads the sliding velocity by

- a) 45 degree
- b) 90 degree**
- c) 135 degree
- d) 180 degree

958.

which of the gear train is used for higher velocity ratios in small space?

- a) simple gear train
- b) compound gear train
- c) reverted gear train
- d) epicyclic gear train**

959.

In ideal machines, mechanical advantage is _____ velocity ratio.

A. equal to 

B. less than

C. greater than

960.

In order to draw the acceleration diagram, it is necessary to determine the Coriolis component of acceleration in the case of

- a) crank and slotted lever quick return mechanism**
- b) slider-crank mechanism
- c) four bar mechanism
- d) pantograph

961.

which of the gear train is used for higher velocity ratios in small space?

- a) simple gear train
- b) compound gear train
- c) reverted gear train
- d) epicyclic gear train**

962.

A term used to describe the concept of perfect form at MMC is

- A) datum reference frame
- B) the envelope principle
- C) rule #1
- D) departure from MMC

963.

Which of the following is descriptive of the datum reference frame?

- 1) located based on the functionality of the part
- 2) six degrees of freedom
- 3) all of the above
- 4) three orthogonal planes

964.

A vast majority of functional gages are made to check _____ tolerances

- A) position
- B) runout
- C) circularity
- D) flatness

965.

The single most valuable, flexible, and versatile geometric control is

- A) concentricity
- B) position
- C) perpendicularity
- D) straightness

966.

In establishing datums and datum features the bottom surface of a part is called the _____ and the surface plate is called the _____.

- A) datum, datum feature
- B) datum feature, datum
- C) datum control, datum feature
- D) none of the above

967.

Maximum material condition (MMC) is the condition with which a part will

- A) weigh the least
- B) weigh the most
- C) have the straightest and flattest elements
- D) have its largest allowable tolerance

968.

For practical purposes, any inspection instrument will be considered as "perfect" if it is at least _____ more accurate than the part being measured.

- A) 5 times
- B) 10 times
- C) 50 times
- D) 100 times

969.

The most useful secondary datum feature can be

- A) a hole that is perpendicular to the primary datum
- B) a set of straight parallel grooves.
- C) circular features parallel to the primary datum
- D) any flat feature perpendicular to the primary datum

970.

The number of variables used in locating a part in space are referred to as

- A) three degrees of freedom
- B) four degrees of freedom
- C) six degrees of freedom
- D) eight degrees of freedom

971.

All geometric form controls are variations and combinations of

- A) straightness
- B) cylindricity
- C) flatness
- D) roundness

972.

Indicate the incorrect statement:

A flow net _____

- a) is applicable to irrotational fluid flow
- b) for a given boundary is the same whether the flow is in one direction or the other
- c) for a given boundary is applicable to one chosen direction of flow; if the flow is reversed the flow net will change
- d) will be so constructed that the size of the mesh is inversely proportional to the local velocity

973.

Which symbol is used to indicate a dimension refers to the diameter of a hole?

- A) R
- B) \circ
- C) \emptyset
- D) Ω

974.

Bernoulli equation is applicable between any two points,

- a) in any rotational flow of an incompressible fluid
- b) in any type of irrotational flow of a fluid
- c) in steady rotational flow of an incompressible fluid
- d) in steady, irrotational flow of an incompressible fluid

975.

Which symbol is used with angular dimensions?

- A) R
- B) \circ
- C) \emptyset
- D) Ω

976.

The piezometric head of a flow is

- a) the sum of the velocity head and datum head
- b) the sum of the pressure head and datum head
- c) the sum of the pressure head and velocity head
- d) the sum of the velocity head, pressure head and datum head

977.

In _____ dimensioning, a datum is established for each Cartesian coordinate direction.

- A) baseline
- B) symmetric
- C) hole basis
- D) none of the above

978.

In current ANSI/ASME standards, a _____ is indicated by a 'V' shaped symbol

- A) counterbore
- B) datum surface
- C) countersink
- D) drill

979.

In a flow of a real fluid with no addition of energy

- a) the energy line will be horizontal or sloping upward in the direction of the flow
- b) the energy line can never be horizontal or sloping upward in the direction of the flow
- c) the piezometric line can never be horizontal or sloping downward in the direction of the flow
- d) the centre line of the pipe can never be above the energy line

980.

A limited length or area (such as a polished end of shaft) is indicated with a _____ line.

- A) hidden
 - B) chain
 - C) section
 - D) dimension
-

981.

The total head in a flow is the sum of

- a) potential head and datum head
- b) piezometric head and pressure head
- c) piezometric head and velocity head
- d) piezometric head, velocity head and datum head

982.

The difference between the total head line and the hydraulic grade line represents

- a) the velocity head
- b) the piezometric head
- c) the pressure head

d) the elevation head

983.

As per standards, a blind hole dimension would have to contain which designation?

- A) DP
- B) THRU
- C) C'BORE
- D) CSK

984.

As per standards, a clearance hole dimension would have to contain which designation?

985.

In a pipeline the hydraulic grade line is above the pipe centre line in the longitudinal section at point A and below the pipe centre line at another point B. From this it can be inferred that

- a) vacuum pressure prevail at B
- b) vacuum pressure prevail at A
- c) the flow is from A to B
- d) the flow is from B to A

986.

The _____ of an external feature is the upper limit.

- A) maximum material condition
- B) runnout
- C) minimum material condition
- D) allowance

987.

In a two-dimensional duct flow air flows in the bottom half of the duct with uniform velocity and there is no flow in the upper half. The value of the kinetic energy correction factor for this flow is

- a) 2.0
- b) 2.25
- c) 4.0
- d) 3.0

988.

A 15 cm diameter pipe carries a flow of 70 lit/s of an oil ($RD=0.75$). At a section 12 cm above the datum the pressure is vacuum of 2 cm of mercury. If the kinetic energy correction factor for this section is 1.1, the total head at the section in meters of oil is

- a) 0.648
- b) 0.728
- c) 0.557
- d) 0.637

989.

The _____ of an internal feature is the upper limit.

- A) maximum material condition
 - B) runnout
 - C) minimum material condition
 - D) allowance
-

990.

The total amount a dimension may vary and is the difference between the maximum and minimum limits is called _____

- A) tolerance
- B) limits
- C) fit
- D) offset

991.

A nozzle direct a liquid jet at an angle of elevation 45 deg. The hydraulic grade line for the jet

992.

The type of fit that occurs when two toleranced mating parts are sometimes an interference fit and sometimes a clearance fit when assembled.

- A) interference fit
- B) clearance fit
- C) transition fit
- D) geometric fit

993.

A titleblock contains all of the following information, except:

- A) name and address of the company
- B) parts list
- C) drawing sheet size letter designation
- D) drawing number

994.

The linear momentum equation is based on

- a) Newton's law of viscosity
- b) Newton's first law
- c) Newton's second law
- d) Newton's third law

995.

A control volume is

- a) the volume of fluid flowing per unit of time
- b) a volume fixed in space**
- c) the volume in which a control device is situated
- d) the volume of the fluid controlling device

996.

An assembly drawing normally consists of all of the following pieces, except:

- A) parts drawn in their operating position
- B) detail numbers of the parts
- C) engineering change orders
- D) bill of materials

997.

Which fastening method uses the shape of the components to hold them together.

- A) mechanical fastening
- B) bonding
- C) forming
- D) none of the above

998.

The line momentum equation is

- a) scalar relation
- b) an approximate relation for engineering analysis
- c) a relation applicable to incompressible fluids only
- d) a vector relation**

999.

The linear momentum equation applied to a control volume in a flow through a nozzle yielded the resultant reaction force R , on the fluid in the control volume. The force required to keep the nozzle in position is

- a) the same as R in magnitude and direction
- b) equal to R but opposite in direction
- c) equal to the x-component of R**
- d) equal to R minus the friction force

1000.

What is the tool used to form external threads?

- A) crest
- B) die
- C) chamfer
- D) tap

1001.

What defines the distance a screw will travel when rotated 360 degrees?

- A) crest
- B) root
- C) pitch
- D) lead

1002.

A jet of oil ($R=0.8$) has an area of 0.02 sq.m and a velocity of 10 m/s. If it strikes a plate normally, the force exerted on the plate is

- a) 1597 N
- b) 1996 N
- c) 15665 N
- d) 19581 N

1003.

A water jet has an area of 0.03 sq.m and impinges normally on a plate. If a force of 1 kN is produced as a result of this impact, the velocity of the jet, in m/s, is

- a) 15
- b) 33.4
- c) 3.4
- d) 5.78

1004.

All of the following are part of the English thread specification, except:

- A) thread form
- B) major diameter
- C) tap drill
- D) class of fit

1005.

A water jet 0.015 sq.m in area has a velocity of 15 m/s. If this jet impinges normally on a plate which is moving at a velocity of 5 m/s in the direction of the jet, the force on the plate due to this impact is

- a) 3368 N
- b) 2246 N
- c) 14907 N
- d) 14686 N

1006.

All of the following are part of a metric thread specification, except:

- A) general purpose tolerance
- B) pitch
- C) nominal size
- D) thread series

1007.

Which type of threaded fastener was designed to prevent rotation between parts?

- A) bolt
- B) set screw
- C) stud
- D) cap screw

1008.

A fire hose has a nozzle attached to it and the nozzle discharges a jet of water into the atmosphere at 20 m/s. This places the joint of the nozzle

- a) in compression
- b) in tension
- c) in a state of zero stress
- d) in bending stresses

1009.

A two-dimensional jet strikes a fixed two-dimensional plane at 45 deg. To the normal to the plane. This causes the jet to split into two streams whose discharges are in the ratio

- a) 1.0
- b) 2.41
- c) 5.83
- d) 1.414

1010.

All of the following are part of the basic weld symbol, except:

- A) weld temperature
- B) leader line and arrow
- C) dimensions
- D) tail

1011.

When constructing an assembly model using 3-D solid modeling software, the assembly model normally begins with

- A) a feature
- B) an instance
- C) a sub component
- D) a base component

1012.

The velocity distribution over one half of a cross section is uniform and is zero over the remaining half. The momentum correction factor for this cross section is

- a) 2.0
- b) 4.0
- c) 1.0
- d) 3.0

1013.

In solid modeling software, defining the geometric relations between components in a 3-D assembly model is primarily done with _____ and _____ tools.

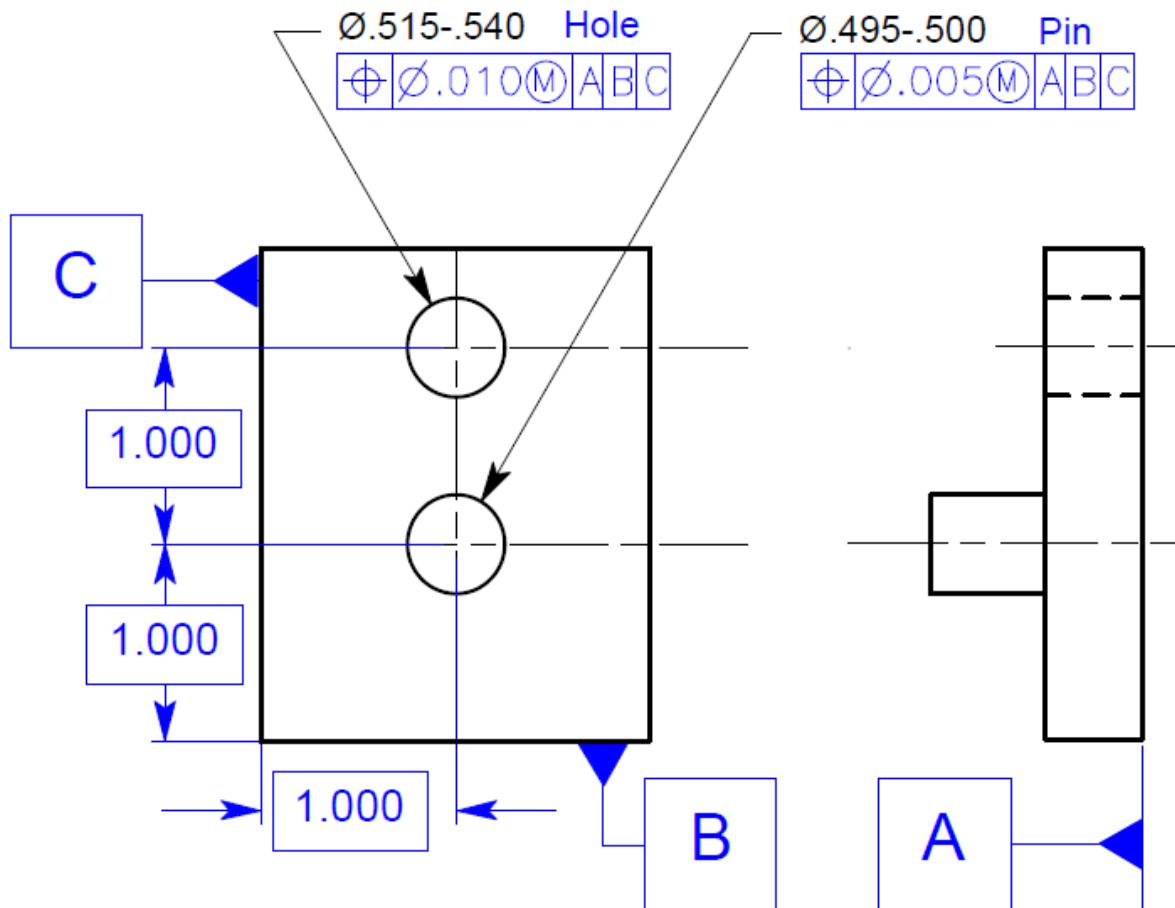
- A) feature & coordinate plane
- B) mate & align
- C) instance & component
- D) parallel & perpendicular

1014.

Hydraulic grade line for flow in a pipe of constant diameter is

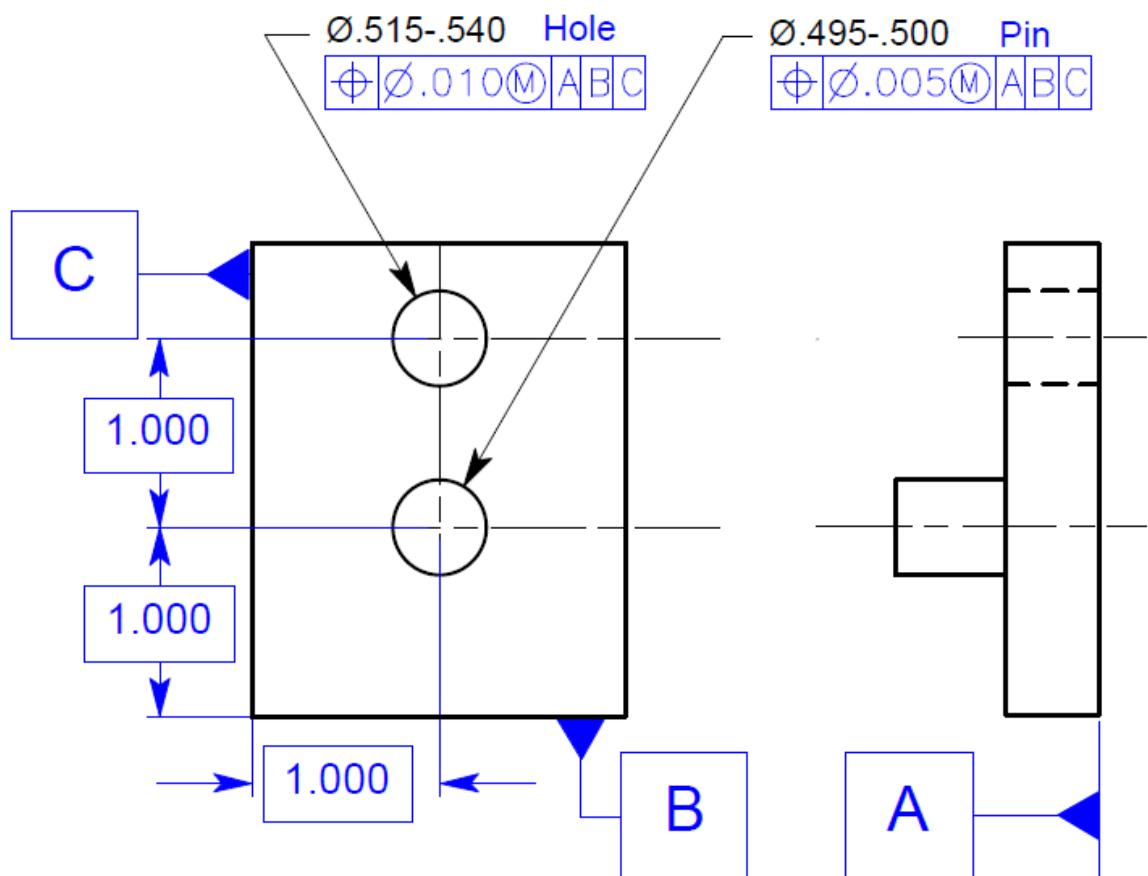
- a) always above the centreline of the pipe
- b) always above the energy grade line
- c) always sloping downwards in the direction of the flow
- d) coincides with the pipe centreline

1015.



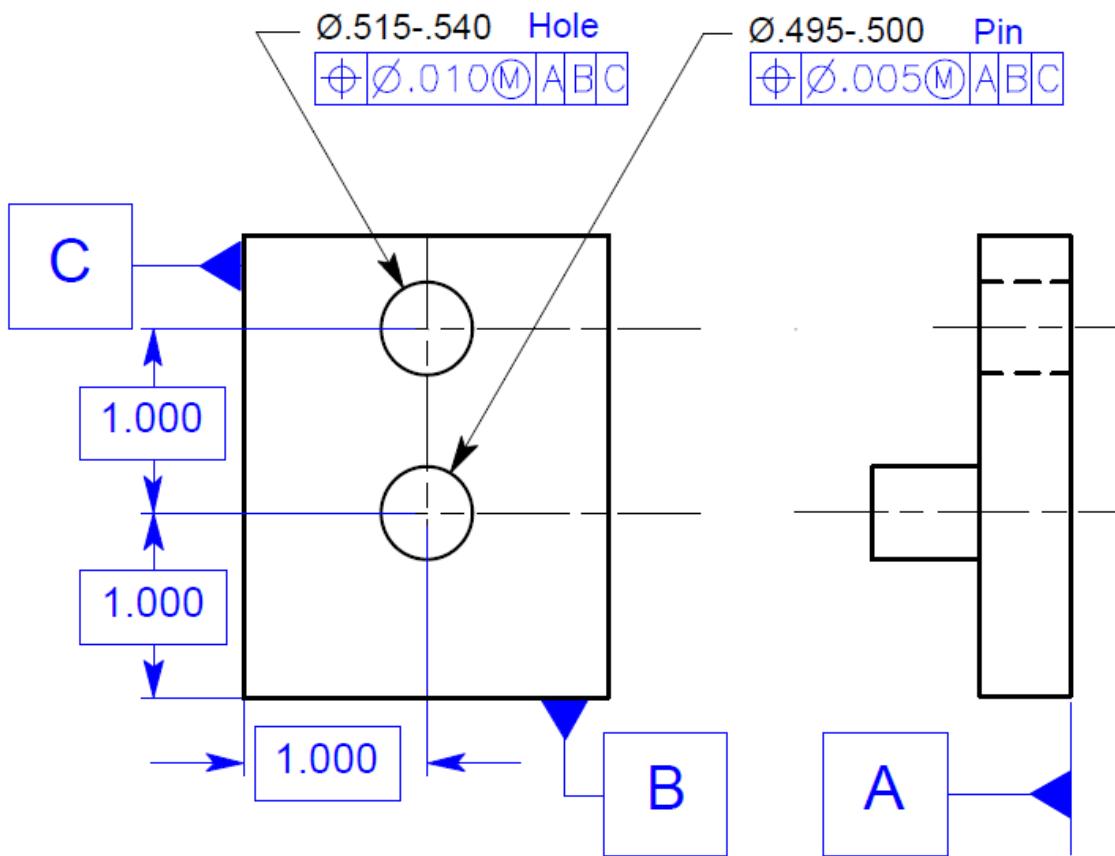
What is Maximum Material Condition for Hole _____ and Pin _____?

1016.



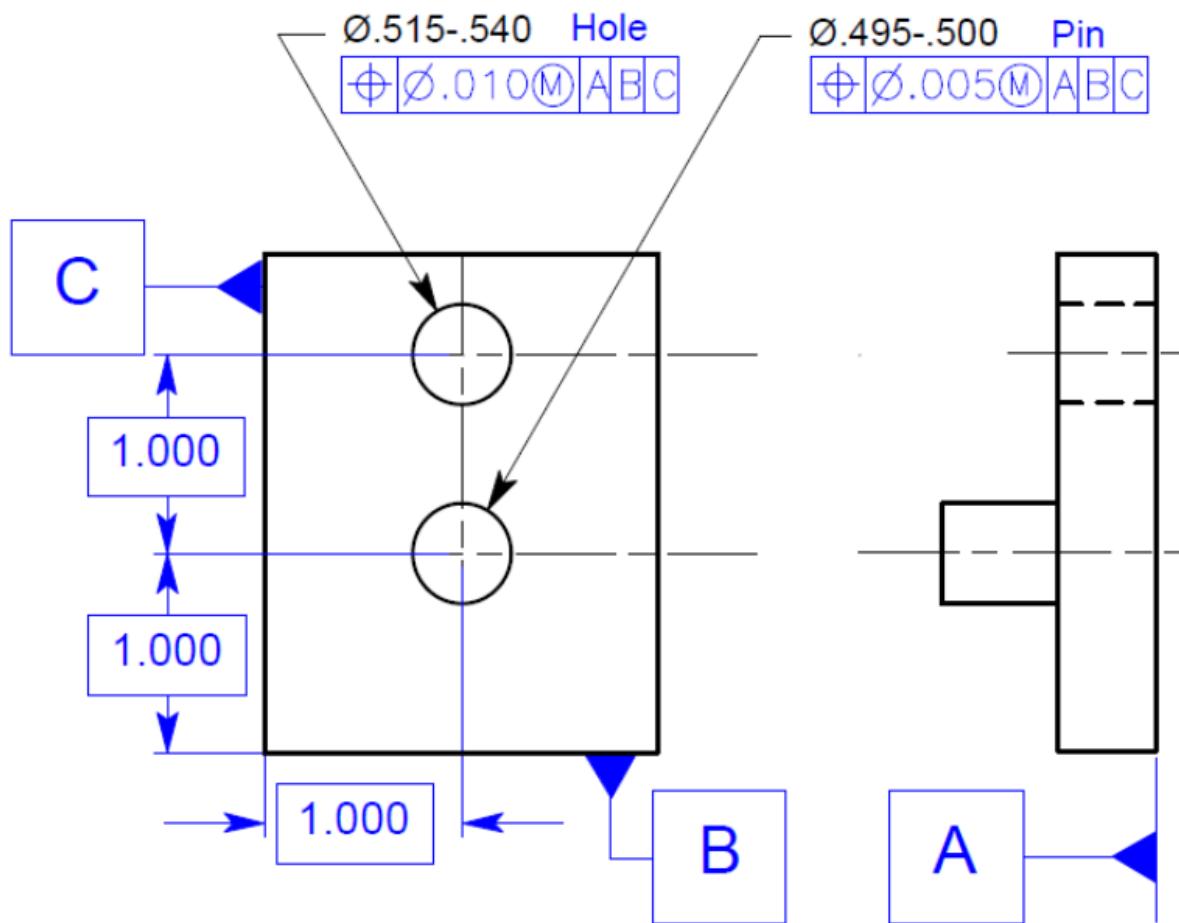
What is the LMC for Hole____ and Pin____?

1017.



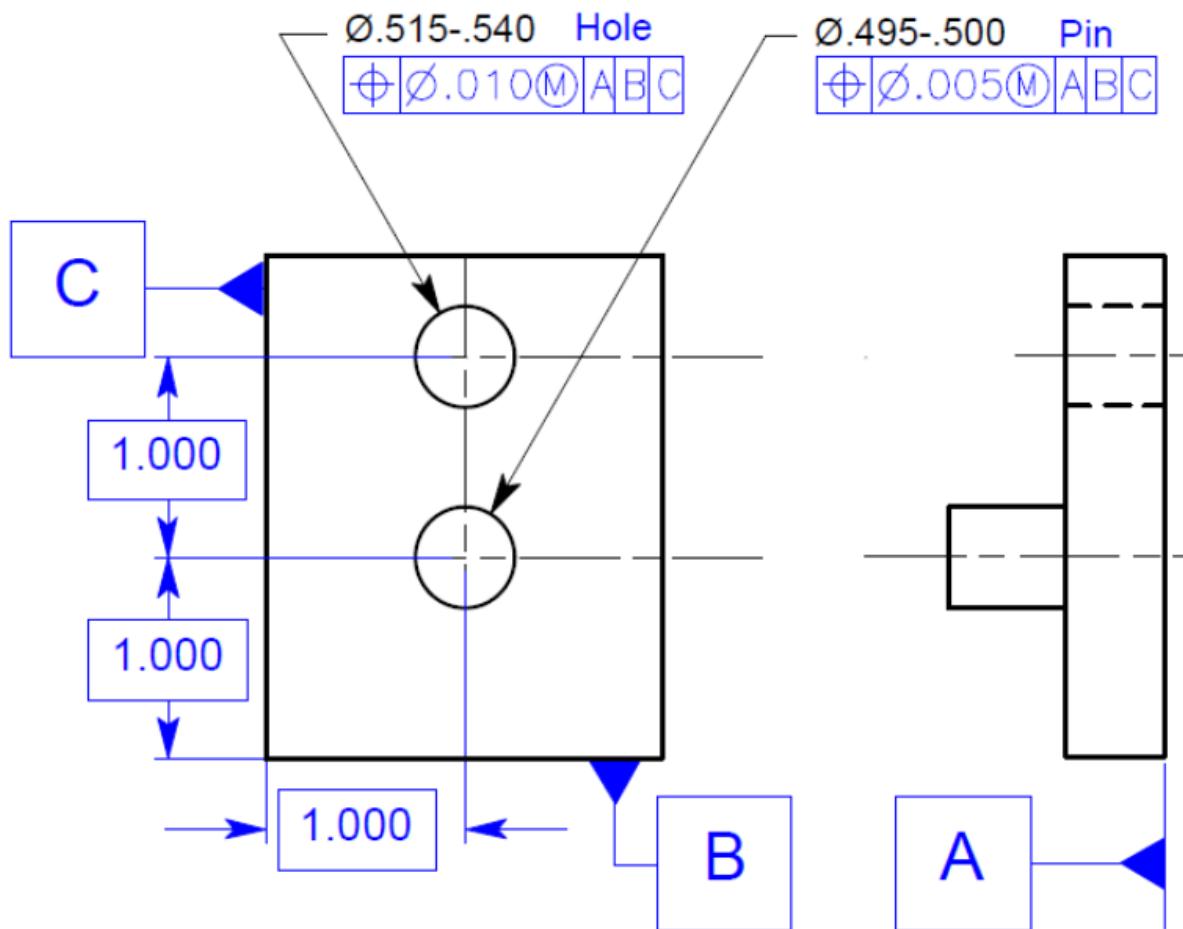
What is the geometric tolerance for Hole ____ and Pin ____?

1018.



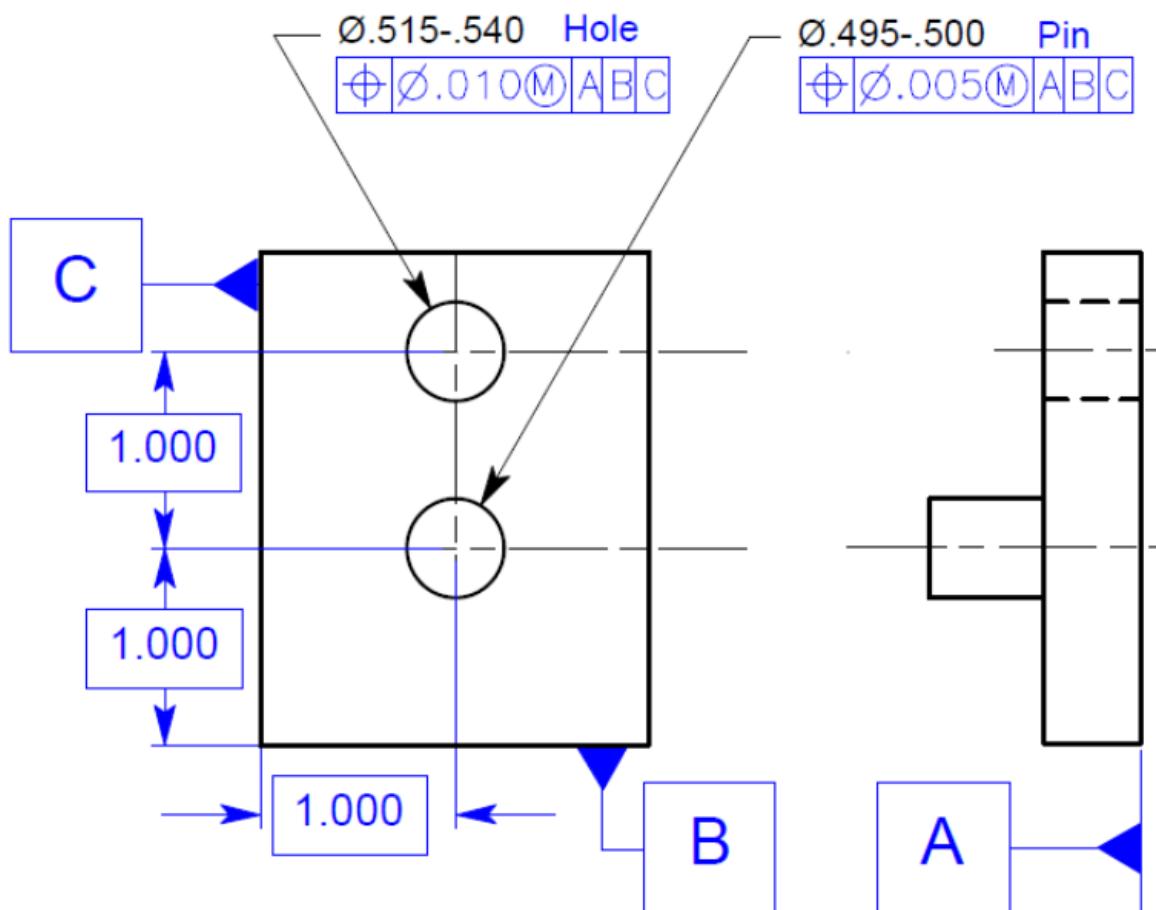
What material condition modifier is specified in the above figure for Hole____ and Pin____?

1019.



What datum feature(s) control(s) perpendicularity for Hole _____ and Pin _____?

1020.



What datum feature(s) control(s) location for Hole ____ and Pin ____?

1021.

Conventional representation of Aluminium and its alloys are illustrated as



Steel, Cast Iron, Copper and its
Alloys, Aluminium and its Alloys,
etc.

1022.

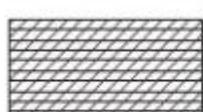
Conventional representation of Lead, Zinc, Tin are illustrated as



Lead, Zinc, Tin, White-metal, etc.

1023.

Conventional representation of cork, linoleum are illustrated as



Asbestos, Fibre, Felt, Synthetic
resin products, Paper, Cork,
Linoleum, Rubber, Leather, Wax,
Insulating and Filling materials, etc.

1024.

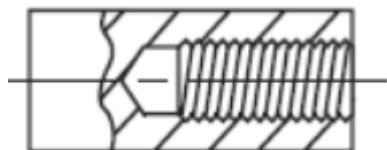
Conventional representation of a mixture of cement, sand and gravel is illustrated as



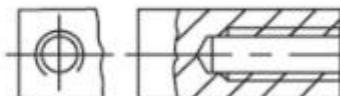
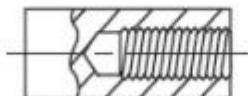
A mixture of Cement, Sand and Gravel

1025.

What is the conventional representation of the figure shown in figure below.



Internal
screw
threads
(Detail)



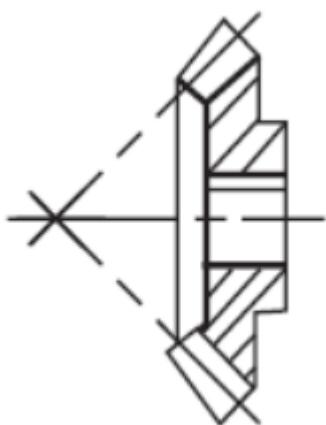
1026.

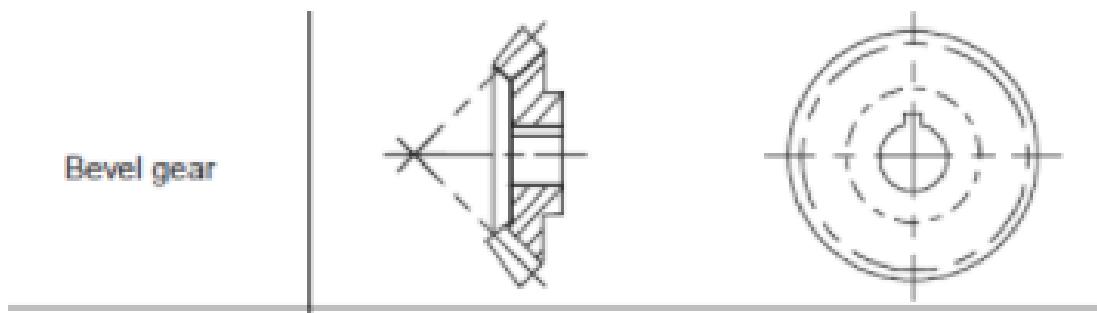
What is the conventional representation of the figure shown in figure below



1027.

What is the conventional representation of the figure shown in figure below





1028.

What is the conventional representation of the figure shown in figure below



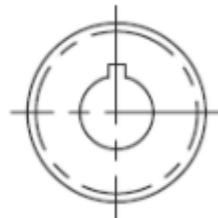
Worm



1029.

What is the conventional representation of spur gear?

Spur gear



1030.

This type of section is limited by a break line:

A. Removed section

B. Revolved section

C. Broken-out section

D. Half section

1031.

If a client of yours is having difficulty visualizing a design, what type of drawing would be the easiest to understand?

- A)** axonometric
- B)** three-view orthographic
- C)** one-view orthographic
- D)** bimetric

1032.

Which of the following is not a pictorial drawing?

- A)** isometric
- B)** multiview
- C)** perspective
- D)** axonometric