Professor Academy

POLYTECHNIC TRB

PRODUCTION ENGINEERING



www.professoracademy.com | 707070 1005 | 707070 1005 | Follow us on

Module Name : Production Engineering-E

Exam Date : 08-Dec-2021; Batch : 14:00-17:00

PART-A

1. The value of $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix}$ **is :**

A) $(b + c)^2(c + a)^2(a + b)^2$

B) $a^2\ b^2c^2(a + b + c)$

C) $2abc(a + b + c)^3$ – **(Correct Answer)**

D) $a^3\ b^3c^3(a + b + c)$

2. The eigen values of the matrix $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$ **is :**

A) $\lambda = 1,2,3$

B) $\lambda = 2,3,1$

C) $\lambda = 2,3,4$

D) $\lambda = -2,3,6$ - **(Correct Answer)**

3. $\iint_s$ **(x dy dz + y dz dx + z dx dy) over the surface of a sphere of radius a is :**

A) $2\pi a^3$

B) $3\pi a^2$

C) $4\pi a^3$ — **(Correct Answer)**

D) πa^2

4. The solution of the differential equation $y'' - 6y' + 8 = 0, y(0) = 2, y'(0) = 2$ **is :**

A) $3e^{-2x} - e^{4x}$

B) $e^{2x} - 3e^{4x}$

C) $e^{2x} + 3e^{-4x}$

D) $3e^{2x} - e^{4x}$ – **(Correct Answer)**

5. The inverse Laplace transform of $F(s) = \frac{e^{-2s}}{(2s-3)^3}$ **is :**

Professor Academy

A) $\frac{1}{16} \cdot e^{\frac{3}{2}(t-2)} \cdot U_2(t)$

B) $\frac{1}{16} e^{\frac{3}{2}(t-2)} (t-1)^2 \cdot u_2(t)$

C) $\frac{1}{16} e^{(t-2)} \cdot (t-2)^2 \cdot u_1(t)$

D) $\frac{1}{16} \cdot e^{\frac{3}{2}(t-2)} (t-2)^2 \cdot u_2(t)$ - **(Correct Answer)**

6. If war breaks out on the average once in 25 years, find the probability than 50 years at a stretch, there will be no war :

A) $\left(\frac{24}{25}\right)^{50}$ – **(Correct Answer)**

B) $\left(\frac{24}{25}\right)^{40}$

C) $\left(\frac{10}{11}\right)^{50}$

D) $\left(\frac{2}{3}\right)^{40}$

7. The residue at $z = 0$ of $z\cos\left(\frac{1}{z}\right)$ is :

A) $\frac{1}{2}$

B) $\frac{-1}{2}$-**(Correct Answer)**

C) 0

D) 1

8. The mean marks obtained by the student is 50 and the variance is 25. If a student gets 60 marks, his standard score is :

A) 1

B) 2 - **(Correct Answer)**

C) 3

D) 4

9. Given that the joint pdf of (x, y) is $f(x,y) = e^{-y}, x > 0, y > x$
$= 0$, **else where.**

What is value of $(x > 1/y < 5)$ **?**

A) $\frac{e^4-5}{e^2-4}$

Professor Academy

B) $\frac{e^4-2}{e^5-1}$

C) $\frac{e^5-5}{e^4-4}$

D) $(e^4 - 5)/(e^5 - 6)$ — **(Correct Answer)**

10. The first iterative values the following system of equations in Jacobi method

$$x + 5y + z = 14;$$
$$4x + y + 3z = 17;$$
$$2x - y + 8z = 12$$

A) 14, 17, 1.5

B) $\frac{17}{4}, \frac{14}{5}, \frac{3}{2}-$ **(Correct Answer)**

C) 14, 17, 12

D) $\frac{4}{17}, \frac{5}{14}, \frac{3}{2}$

11. What is the bonding energy of NaCl in kJ/mol ?

A) 600

B) 640 - **(Correct Answer)**

C) 700

D) 750

12. The number of Bravais space lattices with two lattice points is :

A) 2

B) 3

C) 4

D) 5 - **(Correct Answer)**

13. Thermal expansion of materials arises from :

A) strong bonds

B) weak bonds

C) thermal vibrations

D) asymmetry of potential energy curve - **(Correct Answer)**

14. The number of tetrahedral voids in HCP unit cell (hexagonal prism) is :

A) 4

B) 6

Professor Academy

C) 8

D) 12 - **(Correct Answer)**

15. The hardness of martensite in a steel is a function of :

A) C content - **(Correct Answer)**

B) cooling rate

C) Ni content

D) nose location

16. For copper, the yield stress σ_y and the brittle fracture stress σ_f are related as :

A) $\sigma_y > \sigma_f$

B) $\sigma_f > \sigma_y$ - **(Correct Answer)**

C) $\sigma_f \ll \sigma_y$

D) $\sigma_y = \sigma_f$

17. The force exerted by the lift on the foot of a person is more than his own weight, the lift is :

A) going up and slowing down

B) going up and speeding up - **(Correct Answer)**

C) going down and slowing down

D) going down and speeding up

18. The maximum possible theoretical value of the Poisson's ratio is :

A) 0.25

B) 0.35

C) 0.5 - **(Correct Answer)**

D) 1.0

19. The strength of a beam depends upon :

A) modulus of elasticity

B) bending moment

C) section modulus - **(Correct Answer)**

D) radius of curvature

Professor Academy

20. The ratio of equivalent length of a column to its least radius of gyration is known as :

A) Factor of safety

B) Poisson's ratio

C) Slenderness ratio - **(Correct Answer)**

D) Moment of inertia

21. The relation between Number of pairs (P) forming a Kinematic chain and Number of Links (l) is :

A) $1 = 2P - 2$

B) $1 = 2P - 3$

C) $1 = 2P - 4$ - **(Correct Answer)**

D) $1 = 2P - 5$

22. The cam follower generally used in automobile engines is :

A) knife edge follower

B) flat face follower - **(Correct Answer)**

C) spherical faced follower

D) roller follower

23. The cross-section of the flywheel arms is usually :

A) elliptical - **(Correct Answer)**

B) rectangular

C) I - section

D) L - section

24. The eye bolts are used for :

A) transmission of power

B) locking devices

C) lifting and transporting heavy machines - **(Correct Answer)**

D) absorbing shocks and vibrations

25. A transmission shaft subjected to bending loads must be designed on the basis of :

A) maximum normal stress theory - **(Correct Answer)**

Professor Academy

B) maximum shear stress theory

C) maximum shear stress and maximum normal stress theories

D) fatigue strength

26. The size of gears is usually specified by :

A) circular pitch

B) outside diameter

C) pitch circle diameter - **(Correct Answer)**

D) inside diameter

27. The problem of hunting in a centrifugal governor increases if it becomes :

A) less stable

B) highly stable

C) less sensitive

D) highly sensitive - **(Correct Answer)**

28. The effort of a governor is the force exerted by the governor on the :

A) balls

B) sleeve - **(Correct Answer)**

C) upper links

D) lower links

29. In the case of centrifugal clutch, the force required for the shoes to press the drum (i.e. actuating force) is :

A) the sum of centrifugal force and spring force

B) the difference between centrifugal force and spring force - **(Correct Answer)**

C) equal to centrifugal force minus $(1/3)^{rd}$ of spring force

D) equal to spring force minus $(1/3)^{rd}$ of centrifugal force

30. Efficiency of the riveted joint is ratio of ___ to the tensile strength of unriveted plate.

A) tensile strength of perforated plate

B) shear or crushing strength of rivets

C) minimum of tensile strength of perforated plates and shear or crushing strength of rivets - **(Correct Answer)**

Professor Academy

D) maximum of tensile strength of perforated plates and shear or crushing strength of rivets

31. In the polytropic process, $pV^n = C$, if " n " is infinitely large, then the process is termed as :

A) Isochoric process - **(Correct Answer)**

B) Isobaric process

C) Isothermal process

D) Isotropic process

32. Rankine efficiency of a steam power plant :

A) Improves in summer as compared to that in winter

B) Remains unchanged by climatic conditions

C) Improves in winter as compared to that in summer - **(Correct Answer)**

D) Improves when moisture content in atmosphere is less

33. In a dual combustion cycle, state 2-3 is addition of heat during constant volume, the term explosion ratio is equal to :

A) $\frac{T_2}{T_3}$

B) $\frac{T_3}{T_2}\frac{T_3}{T_2}$ – **(Correct Answer)**

C) $\frac{P_2}{P_3}$

D) $\frac{S_2}{S_3}$

34. The knocking tendency in CI engine increases with :

A) Increase in compression ratio

B) Increase in temperature of inlet air

C) Decrease in compression ratio - **(Correct Answer)**

D) Decrease in temperature of inlet air

35. The purpose of super charging is to increase :

A) Thermal efficiency

B) Mechanical efficiency

C) Overall efficiency

D) Volumetric efficiency - **(Correct Answer)**

Professor Academy

36. The conduction through hollow, radial, one dimensional heat transfer is :

A) $Q = \frac{2\pi L(T_1 - T_2)K}{\ln\left(\frac{r_2}{r_1}\right)}$ –(**Correct Answer**)

B) $Q = \frac{2\pi L(T_1 - T_2)}{K(r_2 - r_1)}$

C) $Q = \frac{2\pi L \ln\left(\frac{T_1}{T_2}\right)}{K(r_2 - r_1)}$

D) $Q = \frac{2\pi L(T_1 - T_2)K}{\ln\left(\frac{r_1}{r_2}\right)}$

37. Among which one of the following, is independent of convection heat transfer co-efficient.

A) Nature of fluid flow

B) Geometry of the surface

C) Thermodynamic property

D) Surface condition of the Geometry - **(Correct Answer)**

38. Irrotational flow means :

A) The fluid does not rotated while moving

B) The fluid moves along straight line

C) Net rotation of fluid particles about their mass centre is finite

D) Net rotation of fluid particles about their mass centre is zero - **(Correct Answer)**

39. Loss of head due to sudden contraction of a pipe is equal to:
Note : Where,

V_2 **- Velocity of flow after contraction**
A_2 **- Area of flow after contraction**
A_C **- Area of flow at contraction**
$C_C = \frac{A_C}{A_2}$

A) $\frac{1}{c_C}\left(1 - \frac{v_2^2}{2g}\right)^2$

B) $\frac{v_2^2}{2g}\left(\frac{1}{c_c} - 1\right)^2$ **(Correct Answer)**

C :$\frac{1}{c_C}\left(\frac{v_2^2}{2g} + 1\right)^2$

Professor Academy

D) $\frac{v_2^2}{2g}\left(1+\frac{1}{C_C}\right)^2$

40. The valve closure is said to be gradual if the time required to close the valve :

Where, T - Time in second required to close the valve L - Length of the pipe C - Velocity of pressure wave

A) $T > \frac{2L}{C}-$ **(Correct Answer)**

B) $T < \frac{2\,L}{C}$

C) $T > \frac{2C}{L}$

D) $T < \frac{2C}{L}$

41. Which type of material has the least shrinkage ?

A) Cast iron - **(Correct Answer)**

B) Aluminium

C) Copper

D) Bronze

42. Misrun is a casting defect which occurs due to :

A) High pouring temperature of the molten metal

B) Absorption of gases by the liquid metal

C) Inadequate metal supply - **(Correct Answer)**

D) Improper alignment of the mould flasks

43. Which type of riser is entirely enclosed within the mould ?

A) side riser

B) top riser

C) open riser

D) blind riser - **(Correct Answer)**

44. Tuyers in cupola are used to :

A) collect the molten metal

B) feed the charge

C) allow the passage of air - **(Correct Answer)**

Professor Academy

D) arrest the spark

45. A network of small voids distributed throughout the casting is named as :

A) Hot tearing

B) Hot cracking

C) Microporosity - **(Correct Answer)**

D) Shrinkage cavity

46. Typical machining allowances, for sand castings, range between :

A) 0.5 mm and 1 mm

B) 1.5 mm and 3 mm - **(Correct Answer)**

C : 0.5μ m and 1μ m

D : 1.5μ m and 3μ m

47. Which of the following are bulk deformation processes ?

a) bending

b) deep drawing

c) extrusion

d) forging

e) rolling

f) shearing

A) (a), (b) and (c)

B) (b), (c) and (d)

C) (c), (d) and (e) - **(Correct Answer)**

D) (d), (e) and (f)

48. The instantaneous value of stress required to continue deforming the material is known as ___ .

A) Bulk stress

B) Bulk strain

C) Flow strain

D) Flow stress — **(Correct Answer)**

Professor Academy

49. Rolling is a deformation process in which the thickness of work is reduced by ___ force.

B) Tangential

C) Axial

D) Compressive - **(Correct Answer)**

50. In sheet-metal working, the clearance allowance value for cold-rolled steel is ___ .

A) 7.5

B) 0.75

C) 0.075 — **(Correct Answer)**

D) 0.0075

51. Too low welding current in Shielded metal are welding would result in :

A) excessive pilling up of weld metal, poor penetration, wasted electrodes. - **(Correct Answer)**

B) excessive spatter, under cutting along edges, irregular deposits, wasted electrodes.

C) Too small bead, weak weld and wasted electrodes

D) Good weld joint

52. Which of these welding processes is a non-consumable welding process ?

A) Plasma arc welding - **(Correct Answer)**

B) Shielded metal arc welding

C) Gas metal arc welding

D) Flux cored arc welding

53. Projection welding is ___ .

A) Multi-spot welding process - **(Correct Answer)**

B) Continuous Spot welding process

C) used to form mesh

D) used to make cantilevers

54. In reverse polarity welding.

Professor Academy

A) electrode holder is connected to the negative and work to positive

B) electrode holder is connected to the positive and work to negative - **(Correct Answer)**

C) work is positive and holder is earthed

D) holder is positive and work is earthed

55. Distortion in welding occurs due to :

A) Use of excessive current

B) Improper Clamping methods - **(Correct Answer)**

C) Use of wrong electrodes

D) Improper Composition of parent material

56. Tungsten welding is best suited for welding.

A) Mild steel

B) Stainless steel

C) Carbon steel

D) Aluminium - **(Correct Answer)**

57. In an arc welding process, the voltage and current are 25 V and 300 A respectively. The arc heat transfer efficiency is 0.9 and welding speed is 0 mm/sec. The net heat (in /mm) is :

A) 64

B) 675 - **(Correct Answer)**

C) 1103

D) 79700

58. In oxy-acetylene welding the flame temperature is in the range of :

A) 1600-1700 °C

B) 2000-2100 °C

C) 2500-2600 °C

D) 3200-3300 °C - **(Correct Answer)**

59. Too high welding current in SMAW welding would result in ___ .

A) excessive pilling up of weld metal, poor penetration, wasted electrodes

Professor Academy

B) excessive spatter, under cutting along edges, irregular deposits, wasted electrodes - **(Correct Answer)**

C) Too small bead, weak weld and wasted electrodes

D) poor fit up joint

60. In laser beam welding, source of heat input is from :

A) radiant energy - **(Correct Answer)**

B) Electric arc

C) Gas mixture

D) Chemical reaction

61. Size of a shaper is generally specified by :

A) The area of machined surface per hour

B) Maximum travel of cutting tool - **(Correct Answer)**

C) Length, breadth and height of machine

D) Quick return ratio

62. If a drill breaks when working on a soft and tough material, the likely cause could be :

A) Flutes of drill obstructed by chips - **(Correct Answer)**

B) Insufficient supply of coolant

C) Low spindle speed

D) Cutting edge blunt

63. If a cutting tool is designated as $0^o - 10^o - 6^o - 6^o - 8^o - 75^o - 1$ mm. What is the side cutting edge angle of the tool ?

A) 10^0

B) 6°

C) 8^o

D) 75° - **(Correct Answer)**

64. Which is the second element of the tool signature ?

A) Side rake angle - **(Correct Answer)**

B) Side relief angle

C) Side cutting edge angle

Professor Academy

D) Back rake angle

65. Which of the following cutting conditions greatly affects the tool wear ?

A) Cutting speed - **(Correct Answer)**

B) Feed

C) Depth of cut

D) Both cutting speed and feed

66. Which of the following methods cannot be used for producing external threads ?

A) By Lathe

B) By dies

C) By tap - **(Correct Answer)**

D) By rolling

67. Which of the following processes have interior surface finish as compared to the remaining processes ?

A) USM

B) PAM

C) EDM

D) EBM

Correct Answer:- *

68. Internal gears and splines used in automobile industry are manufactured by :

A) Casting

B) Milling

C) Broaching - **(Correct Answer)**

D) Gear hobbing

69. In tool signature, the nose radius is indicated :

A) In the first position

B) In the last position - **(Correct Answer)**

C) Second position from beginning

D) Second position from the end

Professor Academy

70. Which bond is commonly used in grinding wheel ?

A) Vitrified bond - **(Correct Answer)**

B) Silicate bond

C) Shellac bond

D) Resinoid bond

71. Micrometer measuring faces are tipped with ___ to prevent rapid wear.

A) aluminium

B) tungsten carbide - **(Correct Answer)**

C) chromium

D) molybdenum oxide

72. Among the following comparators, which is best suited for inspection of small gears and screws ?

A) Profile projector - **(Correct Answer)**

B) Autocollimator

C) Zeiss ultra-optimeter

D) Johansson mikrokator

73. In a bifilar reticle, precise settings can be made because ___ .

A) the reticle has cross-wires at an angle 45°

B) parallel lines spaced slightly wider than the scale lines are used - **(Correct Answer)**

C) thick cross-wires are used

D) broken lines are used for cross-wires

74. In wire methods, the diameter of the wire selected should be such that it makes contact with the screw along the ___ .

A) axis of the screw

B) pitch cylinder — **(Correct Answer)**

C) outer diameter

D) root diameter

75. ___ is the best analogy for the trace of a stylus instrument.

Professor Academy

A) A topograph

B) A phonograph - **(Correct Answer)**

C) A pin-ball machine

D) A rolling ball

76. ___ has two highly finished surfaces, which are perpendicular to each other with a high degree of accuracy and are

used as an accessory for testing squareness.

A) A standard square - **(Correct Answer)**

B) A set square

C) An optical square

D) A slip gauge

77. Which of the following represents the type of fit for a hole and shaft pair, given that hole $= 50^{+0.02}$ mm and shaft $= 50^{+0.008}$ mm ?

A) Interference fit - **(Correct Answer)**

B) Loose fit

C) Clearance fit

D) Transition fit

78. Which of the following statements with reference to a micrometer is false ?

A) It has no parallax error when compared with vernier calliper

B) It has a shorter measuring range compared to a vernier calliper

C) It is not as precise as a vernier calliper - **(Correct Answer)**

D) It can be used for end measurement only

79. Which type of test is done on the main spindle of a machine?

A) Alignment

B) Levelling

C) True running - **(Correct Answer)**

D) Flatness

80. _____ is the direction of the predominant surface pattern, ordinarily determined by the production process used for manufacturing the component.

A) Flaws

Professor Academy

B) Surface texture

C) Lay - **(Correct Answer)**

D) Waviness

81. Which of the following method is used to make powder for brittle metals for powder metallurgy ?

A) Mechanical pulverisation - **(Correct Answer)**

B) Electrolytic process

C) Chemical reduction

D) Atomisation

82. Sintering temperature and time for stainless steel powder is :

A) 1100°C – 1300°C and 60 minutes - **(Correct Answer)**

B) 1550°C - 1700°C and 30 minutes

C) 500°C - 650°C and 200 minutes

D) 350°C - 550°C and 200 minutes

83. In mechanical machining material removal by :

A) Erosion - **(Correct Answer)**

B) Corrosion

C) Vapourisation

D) Melting

84. In Electron Beam Machining (EBM), as electron strikes the workpiece :

A) They get scattered

B) Mechanical erosion in workpiece

C) Electro-chemical etching

D) Their kinetic energy is converted into heat - **(Correct Answer)**

85. Which of the following process is based Faraday's law of electrolysis?

A) Electron beam machining

B) Electric discharge machining

C) Ion beam machining

D) Electrochemical machining - **(Correct Answer)**

Professor Academy

86. In Ultrasonic machining, the function of transducer is to :

A) Convert electrical energy into mechanical vibration - **(Correct Answer)**

B) Convert mechanical energy into electrical energy

C) Convert electrical energy into heat

D) Convert mechanical energy into heat

87. For Electrochemical machining (ECM) of steel which is used as electrolyte ?

A) Ethanol

B) Sodium chloride - **(Correct Answer)**

C) Deionised water

D) Nitric acid

88. Material removal rate in Abrasive jet machining of sodium silicate glass is around :

A) 0.1 mm^3/min

B) 15 mm^3/min - **(Correct Answer)**

C) 15 mm^3/sec

D) 100 mm^3/min

89. Ultrasonic machining can be classified as the following non-traditional machining :

A) Electrochemical

B) Thermal

C) Mechanical - **(Correct Answer)**

D) Chemical

90. The mechanism of removal of material using chemical machining process :

A) Material vapourisation

B) Material erosion

C) Chemical dissolution - **(Correct Answer)**

D) Mechanical abration

91. The charts that gives an idea about the spread/dispersion of an observation is :

Professor Academy

A) np - chart

B) R - chart - **(Correct Answer)**

C) U - chart

D) C - chart

92. Which of the following is not an attribute control chart ?

A) P - chart

B) C - chart

C) U - chart

D) R - chart - **(Correct Answer)**

93. The primary means of quality control is :

A) Detection

B) Correction

C) Prevention

D) Inspection - **(Correct Answer)**

94. The important output devices used in CAD are :

A) Printers and Keyboard

B) Printers and Mouse

C) Printers and Digitizers

D) Printers and Plotters - **(Correct Answer)**

95. The models that show only the edge geometry of an object is called :

A) Wire frame model - **(Correct Answer)**

B) Edge geometry model

C) Surface model

D) Solid model

96. Cellular manufacturing is a modern manufacturing system incorporating :

A) Computer technology

B) Production technology

C) Group technology - **(Correct Answer)**

D) Manufacturing technology

Professor Academy

97. The programs were transferred to the memory of the NC machines through :

A) Paper tapes - **(Correct Answer)**

B) Keyboards

C) Joy sticks

D) Hard disks

98. The attributes taken into consideration for classification into part families in G.T are :

A) Design and Geometric attributes

B) Design and size attributes

C) Design and manufacturing attributes - **(Correct Answer)**

D) Shape and size attributes

99. The major classes of robots include :

A) Rotary and Sliding robots

B) Fixed arm and Mobile robots - **(Correct Answer)**

C) Revolute and Prismatic robots

D) Cartesian and Gantry robots

100. The 3 basic components of FMS are :

A) Workcell, Machining centers, Assembly stations

B) Workstations, Automated handling system, Computer control system - **(Correct Answer)**

C) Work center, Machining center, Assembly center

D) Production center, Process center, Assembly center

101. If the simple interest on a certain sum of money at 6% p.a. for $4\frac{1}{2}$ years is Rs. 81 then the sum of money will be :

A) Rs. 325

B) Rs. 225

C) Rs. 300 - **(Correct Answer)**

D) Rs. 340

102. Who is called as Sudanthrananda ?

Professor Academy

A) V.O. Chidambaram Pillai

B) Vanchinathan

C) Subramaniya Siva - **(Correct Answer)**

D) A. Subramaniya Ayyar

103. When you move to a higher altitude from the surface of Earth, the value of ' g ' ___ . A) same $(9.81\ ms^{-2})$

B) reduces - **(Correct Answer)**

C) increases

D) none of these

104. Who introduced Tamil as the medium of Instruction in Schools all over the Madras Presidency ?

A) Rukmani Lakshmipathi

B) Subbulakshmi Reddy

C) Avinashillingam Chettiar - **(Correct Answer)**

D) P. Rangaiah Naidu

105. Who was regarded as the "Father of modern Tamil Short Story" during the days of freedom struggle ?

A) Subramaniya Bharathi

B) V.V.S. Iyer - **(Correct Answer)**

C) Bharathidasan

D) P. Anandacharlu

106. Name the oral vaccine given against the Poliomyelitis.

A) FMD vaccine

B) Salk vaccine - **(Correct Answer)**

C) Sabin vaccine

D) DPT vaccine

107. ___ served as Minister of Public and Health of Madras Presidency in the T. Prakasam Cabinet.

A) Rukmani Lakshmipathi - **(Correct Answer)**

B) Subbulakshmi Reddy

Professor Academy

C) Avinashillingam Chettiar

D) P. Rangaiah Naidu

108. The school which was started by Anderson and Braidwood, later it was called as ___ .

A) Loyola college

B) Presidency college

C) Madras Christian college — **(Correct Answer)**

D) Scott Christian college

109. Depletion of ozonosphere would result :

A) in the rise of surface temperature - **(Correct Answer)**

B) in the rise of rainfall amount

C) in the rise of agriculture production

D) in the rise of population growth

110. 'Sundari' is a type of tree extensively found in :

A) Western Ghats

B) Eastern Ghats

C) Deccan Plateau

D) Sundarbans - **(Correct Answer)**

Professor Academy

PART-B

1. The nature of the stationary point $(1, 1)$ of the function $f(x, y)$ if $f_{xx} = 6xy^3, f_{xy} = 9x^2y^2$ and $f_{yy} = 6x^3y$ is :

A) Maximum

B) Minimum

C) Saddle point - **(Correct Answer)**

D) Inconclusive

2. The temperature at one end of a bar 20 cm long and with insulated sides is kept at 0°C and that at the other end is kept at 60°C until steady state conditions prevail. The steady state temperature distribution of the rod is :

A) 3x - **(Correct Answer)**

B) 3x + 3

C) 0

D) 3x - 3

3. The value of $\int_{-3}^{3} x^4 dx$ using Trapezoidal rule by taking $h = 1$ is :

A) 115 - **(Correct Answer)**

B) 98

C) 1100

D) 81

4. X is discrete random variable, the distribution is given by $P(X = x) = q^x p, x = 0, 1, 2, \ldots \infty, p + q = 1$ then mean and standard deviation are :

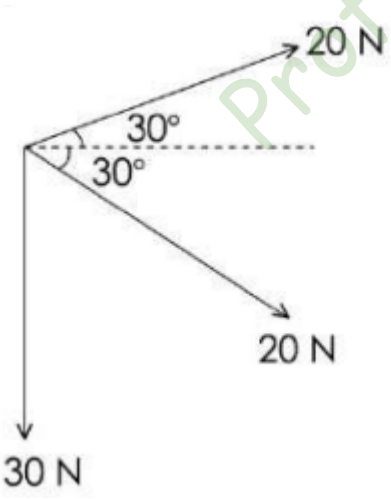
A) $\frac{q}{p}, \frac{q}{p^2}$

B) $\frac{p}{q}, \frac{q}{p^2}$

C) $\frac{q}{p}, \frac{\sqrt{q}}{p}$ – **(Correct Answer)**

D) $\frac{p}{q}, \frac{\sqrt{p}}{q}$

5. Determine the single force equivalent to maintain the equilibrium of the following system :



A) 30 N (↑) - **(Correct Answer)**

B) 30 N (↓)

C) 20 N ↑

Professor Academy

D) 20 N↓

6. A steel bar 40×40 mm, 3000 mm long is subjected to an axial pull of 128 kN . Taking $E = 2 \times 10^5$ N/mm^2 and poisson's ratio 0.3 , what will be the change in length and sides of the bar ?

A) $+1.2$ mm; $+4.8 \times 10^{-3}$ mm

B) + 1.2 mm; -4.8×10^{-3} mm - **(Correct Answer)**

C) + 4.8 mm; $+1.2 \times 10^{-3}$ mm

D) + 4.8 mm; -1.2×10^{-3} mm

7. Match the following :

Material

(p) Tungsten Carbide

(q) Silicon Nitride

(r) Aluminium Oxide

(s) Silicon Carbide

Applications

(u) Abrasive wheel

(v) Heating element

(w) Pipes for conveying Liquid metal

(x) Drawing dies

A) (p)-(x), (q)-(w), (r)-(u), (s)-(v) - **(Correct Answer)**

B) (p)-(v), (q)-(u), (r)-(x), (s)-(w)

C) (p) − (w), (q) − (x), (r) − (v), (s) − (u)

D) (p) − (u), (q) − (v), (r) − (x), (s) − (w)

8. Which of the following statements are true for annealing process for steel ?

i) Steels are heated in the range of 500°C to 700°C.

ii) Cooling is done slowly and steadily.

iii) Internal stresses are relieved.

iv) Ductility enhanced.

A) (ii), (iii) and (iv) - **(Correct Answer)**

Professor Academy

B) (i), (iii) and (iv)

C) (i), (ii) and (iv)

D) (i), (ii) and (iii)

9. The Kutzbach criterion for the mobility of a planar mechanism is ___ . [l = number of links, j = number of binary joints and h = number of higher pairs]

A) $3(l-2)-2j-h$

B) $3(l-1)-j-2\,h$

C) $3(l-1)-2j-h-$ (**Correct Answer**)

D) $3(l-1)+2j+h$

10. A cam follower rises by 4 cm during 90° rotation of the cam with simple harmonic motion. The cam is rotating at an angular velocity of 25.14 rad/s. The maximum velocity of follower will be ___ .

A) 1 mm/s

B) 10 mm/s

C) 1 m/s - **(Correct Answer)**

D) 10 m/s

11. A point in a body is subjected to a tensile stress of 30 MPa and a shear stress of 20 MPa . If the material has a yield strength of 100 MPa , the factor of safety according to maximum Shear stress theory will be ___ .

A) 1

B) 1.5

C) 2 - **(Correct Answer)**

D) 2.5

12. Two mating spur gears have 40 and 120 teeth. The pinion rotates at 1200 rpm and transmits a torque of 40 Nm. The torque transmitted by gear is ___ .

A) 120 N.m - **(Correct Answer)**

B) 60 N.m

C) 40 N.m

D) 240 N.m

13. Which of the following are incorrect ?

i) An isentropic process is always adiabatic only.

Professor Academy

ii) Actual heat transfer occurs during polytropic process.

iii) Internal energy of a perfect gas depends on temperature, specific heat and enthalpy.

iv) If all the variables of a stream are independent of time, then the system is said to be in steady flow.

A) (i) and (ii)

B) (i) and (iii)

C) (ii) and (iii) - **(Correct Answer)**

D) (ii) and (iv)

14. A four cylinder four stroke petrol engine develops 14.7 kW at 1000 rpm. The mean effective pressure is 5.5 bar. Find the bore of the engine if the length of stroke is 1.5 times the bore :

A) 93 mm

B) 73 mm

C) 78 mm

D) 88 mm - **(Correct Answer)**

15. Two large parallel planes with emissivities 0.3 and 0.8 exchange heat. Find the heat flow between the plates. If a polished aluminium shield of emissivity 0.04 is placed in between them, what will be the heat flow ?

A) $\frac{\sigma(T_1^4-T_2^4)}{27.33}; \frac{\sigma(T_1^4-T_3^4)}{3.58}$

B) $\frac{\sigma(T_1^4-T_2^4)}{16.82}; \frac{\sigma(T_1^4-T_3^4)}{2.69}$

C) $\frac{\sigma(T_1^4-T_2^4)}{3.58}; \frac{\sigma(T_1^4-T_3^4)}{27.33}$ - **(Correct Answer)**

D) $\frac{\sigma(T_1^4-T_2^4)}{2.69}; \frac{\sigma(T_1^4-T_3^4)}{16.82}$

16. A caisson for closing the entrance to a dry dock is of trapezoidal form 16 m wide at the top and 10 m wide at bottom and 6 m deep. Find the total force on the caisson of the water on the outside is just level with the top and dock is empty.

A) 2.12 MN - **(Correct Answer)**

B) 2.02 MN

C) 2.12 kN

Professor Academy

D) 2.02 kN

17. A sand core has a volume of 1875 cm^3 and is located inside a sand mold cavity. Determine the buoyancy force tending to lift the core during pouring of molten lead into the mold. Assume density of sand core and lead as 1.6 g/cm^3 and 11.3 g/cm^3 respectively :

A) 168.4 N

B) 178.4 N - **(Correct Answer)**

C) 188.4 N

D) 198.4 N

18. Pressurized helium gases or specially scented gases with detectors are used to test ___ type of casting defects.

A) Misruns

B) Leaktightness - **(Correct Answer)**

C) Microporosity

D) Cold shuts

19. A solid cylinder of diameter 100 mm and height 50 mm is forged between two frictionless flat dies to a height of 25 mm. The percentage change in diameter is :

A) 0

B) 2.07

C) 20.7

D) 41.7 - **(Correct Answer)**

20. A power shears is used to cut soft cold-rolled steel that is 5 mm thick. At what clearance should the shears be set to yield an optimum cut ?

A) 0.225 mm

B) 0.3 mm - **(Correct Answer)**

C) 0.375 mm

D) 3.75 mm

21. Match the following :

Work material

(p) Aluminium

Professor Academy

(q) Die steel

(r) Copper wire

(s) Titanium sheet

Type of Joining

(1) Submerged Arc Welding

(2) Soldering

(3) Thermit Welding

(4) Atomic Hydrogen Welding

(5) Gas Tungsten Arc Welding

(6) Laser Beam Welding

$A: (p) - (2), (q) - (5), (r) - (1), (s) - (3)$
$B: (p) - (6), (q) - (3), (r) - (4), (s) - (4)$
$C: (p) - (4), (q) - (1), (r) - (6), (s) - (2)$
$D: (p) - (5), (q) - (4), (r) - (2), (s) - (6) -$ (Correct Alternative)

22. Match the following :

Power Density	**Welding Process**
(a) 10^2 W/mm²	(1) Electro slag welding
(b) 10^3 W/mm²	(2) Electron beam
(c) 10^5 W/mm²	(3) Air/fuel gas flame
(d) 10^6 W/mm²	(4) Resistance welding

A) (a) - (3), (b) - (1), (c) - (4), (d) - (2) — **(Correct Answer)**

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

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

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

23. Which of the following welding processes consists of minimum Heat Affected Zone (HAZ) ?

A) Metal Inert Gas Welding

Professor Academy

B) Ultrasonic Welding

C) Laser Beam Welding - **(Correct Answer)**

D) Arc Welding

24. Which two of the following joining processes are autogenous ?

i) Diffusion welding

ii) Electro slag welding

iii) Tungsten inert gas welding

iv) Friction welding

A) (i) and (iv) - **(Correct Answer)**

B) (ii) and (iii)

C) (ii) and (iv)

D) (i) and (iii)

25. Consider the following parameters :

1) Grinding wheel diameter

2) Regulating wheel diameter

3) Speed of grinding wheel

4) Speed of the regulating wheel

5) Angle between the axes of grinding and regulating wheels

Among these parameters, those which influence the axial feed rate in centreless grinding would include :

A) (2), (4) and (5) - **(Correct Answer)**

B) (1), (2) and (3)

C) (1), (4) and (5)

D) (3), (4) and (5)

26. Consider the following statements.

In up-milling process :

1) The cutter starts the cut from the machine surface and proceeds upwards.

2) The cutter starts the cut from the top surface and proceeds downwards.

3) The job is fed in a direction opposite to that of cutter rotation.

Professor Academy

4) The job is fed in the same direction as that of cutter rotation.

Of these statements :

A) (1) and (3) are correct - **(Correct Answer)**

B) (1) and (4) are correct

C) (2) and (3) are correct

D) (2) and (4) are correct

27. In a shaping machine, if d is the depth of cut in mm, f is the feed in mm/ stroke, N is the number of strokes/min and L is the length of stroke in mm, then material Removal Rate is calculated by : Here $m = \frac{\text{return stroke time}}{\text{cutting stroke time}}$

A) MRR $= \text{fdNLmm}^3/\text{min}$

$B: MRR = fd^2N^2L^2(1+m)\text{mm}^3/\text{min}$

C) MRR $= \text{fdNL}(1+\text{m})\text{mm}^3/\text{min}$ – **(Correct Answer)**

D) MRR $= \text{fd}^{1/2}\ \text{N}^{1/2}\ \text{L}^{1/2}(1+\text{m})\text{mm}^3/\text{min}$

28. Find out the wrong statement regarding the rules of clamping for Jigs.

A) Clamps should always contact the work at its most rigid point.

B) Clamps should be positioned such that they do not interfere with the operation of machine/tool.

C) Tool forces generated by cutting action should not help in holding the workpiece. - **(Correct Answer)**

D) If the clamping force at any point could bend the part, it must be supported suitably at that point.

29. A hole is designated as $30^{\pm 0.05}$ mm, then the maximum material limit of the hole is ___ .

A) 29.95 mm - **(Correct Answer)**

B) 30 mm

C) 30.05 mm

D) 30.10 mm

30. A 200 mm sine bar is used to measure the angle of an inclined plane. The height of the slip gauges combination is 100 mm. Find the angle of theplane :

A) 45°

B) 75°

Professor Academy

C) 60°

D) 30° - **(Correct Answer)**

31. In screw thread lead = n-x pitch where, n represents

A) Number of starts - **(Correct Answer)**

B) Number of threads

C) Nominal diameter of thread

D) Depth of the thread

32. The permissible error in true running of taper socket at main spindle is :

A) 0.01 mm - **(Correct Answer)**

B) 0.05 mm

C) 0.005 mm

D) 0.001 mm

33. Which of the following methods converts metal oxides into metallic form ?

A) Electrolytic deposition method

B) Reduction method - **(Correct Answer)**

C) Atomization

D) Sintering

34. Etch factor is equal to which of the following :

Where $C =$ specific removal rate
$d =$ depth of cut
$I =$ current
$t =$ time and $u =$ undercut

A) CIt

B) d/u - **(Correct Answer)**

C) u/d

D) C I/t

35. Match and select the correct answer :

(a) USM	(i) Kerosene
(b) EDM	(ii) Abrasive slurry
(c) ECM	(iii) Vacuum

Professor Academy

(d) EBM (iv) Salt solution

A) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

B) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii) - **(Correct Answer)**

C) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

36. Abrasive flow machining is a kind of finishing process in which a small quantity of material is removed by flowing ___ over the surface to be finished.

A) Abrasive grain entrained in a liquid vehicle

B) Bonded abrasives

C) Magnetic abrasives

D) Semisolid abrasive media composed of viscoelastic carrier and abrasive grits - **(Correct Answer)**

37. Measurements were taken and following dimension (in mm) were observeD) 32.2, 32.8, 32.3, 32.4, 32.5, 32.6, 32.3, 32.7, 32.4 and 32.8. Determine the mean (or the most probable value) and standard deviation respectively.

A) 32.5, 0.60

B) 32.0, 0.65

C) 32.5, 0.65 - **(Correct Answer)**

D) 32.0, 0.60

38. The population standard deviation of a process has been determined to be 0.12; and it is required to determine the sample size to assure with 95% confidence that the average quality will lie within ±0.10 of the mean of determination. What will be the sample size ?

A) 6 - **(Correct Answer)**

B) 5

C) 4

D) 3

39. Control charts for $\overline{X}$ and R are maintained for control of an important dimension of a component. The sub-group size is settled as 5. The values of $\bar{X}$ and R are computed for each sub-group and the values of $\Sigma\bar{X}$ and ΣR are computed for each sub-group and the value of $\Sigma\bar{X}$ and ΣR after 25 sub-groups

Professor Academy

are found to be 614.8 and 120.0 respectively. Compute the value of $LCL_{\bar{X}}$ (for 3-sigma limits) for $\bar{X}$ chart. Assume $\overline{R} = 2.326\sigma'$.

A) 24.592

B) 27.336

C) 21.818 - **(Correct Answer)**

D) 33.568

40. The triangle is given with co-ordinates $C(2, 1), E(4, 1)$ and $D(1, 4)$. Calculate the new position of the triangle when scaled by 2 units with respect to point C.

A) C(2, 1), E(6, 1) and D(0, 7) - **(Correct Answer)**

B) C(2, 1), E(4,1) and D(1,4)

C) C(2, 1), E(6, 1) and D(1, 4)

D) C(2, 1), E(1, 6) and D(4, 1)

Professor Academy

ANOTHER BIG ACHIEVEMENT!

2025 TRB EXAMS

2768+

ACHIEVERS

FOR COURSE ENQUIRY | CONTACT US

www.professoracademy.com | 707070 1005 | 707070 1005 | Follow us on