ISRO

1 The concept of ----------derived from the "ZEROTH LAW OF THERMODYNAMICS". **TEMPERATURE**

2 The concept of ---------- derived from the "SECOND LAW OF THERMODYNAMICS". **ENTROPY**

3 The expression for isentropic index [γ] in terms of number of degrees of freedom (n) -- **1+ [2 / n]**

4 The critical Reynolds no upto which the viscous flow exists in pipe ---------- **2000**

5 Two forces of equal magnitude P acts at right angles to each other and having same directions. Find out the expression for their resultant [R]---------- **[2]½ P**

6 The angular frequency of handdock---------- **Π/30 rad/s**

7 The equation for free torsional vibration----------**[1/2Π] [q/I]½**

8 A thin cylinder is subjected to longitudinal stress σ0 and internal pressure P , findout the maximum shearstress developed in it [q max] ----------**0.5 σ0**

9 Rate of moment of momentum is equal to the ---------- **Torque applied by the body**

10 The expression for loss of energy [he] due to sudden enlargement of the pipe------- **he =[v1-v2]²/2g**

11 A spring of stiffness K is divided into "n" number of springs. Each spring having stiffness --------- **nK**

12 The non-dimensional number corresponds to [inertia force\compressibility force]½----- **Euler number**

13 Equation for forced vortex flow---------- **v/r = constant**

14 The causes of cavitation **Metallic surfaces are damaged Noise & vibrations**

15 How to increase the thermal efficiency in Carnot cycle by------ **Decreasing low temperature**

16 The slenderness ratio in columns can be obtained from the ---------- **Least radius of gyration**

17 50:1 gear reduction ratio possible in---------- **worm gear**

18 Wire drawing property named as ---------- **ductility**

19 One man is standing in the elevator and the elevator is moving in the upward direction. What type of reading regarding the weight of man will we get from gauge----------

The weight of man shown by the gauge will more the actual weight of the man.

20 LMTD for counterflow heat exchanger is compared to parallel to heat exchanger----- ***More***

21 The free damping equation $2y^{oo} + 3y^{o} + 8y = 0$. Calculate damping factor (D.F)------- **3/8**

22 The discharges for the two parallel pipes of same lengths are Q1 & Q2 respectively and their diameters are 200 mm & 800 mm respectively. Calculate the ratio of discharge of smaller pipe to larger pipe. **1/32**

23 A compressor is used to compress the air from 5 bar to 10 bar .Calculate its critical pressure [P^*]---**2.64 bar**

24 Equivalent twisting moment----**$Te = [T^2 + M^2]^{½}$**

25 The shear stress distribution in pipe flow --- **Centre is zero and linearly varying from the center to the wall**

26 The irrational component in x-y is---------- **$\delta v/\delta x = \delta u/\delta y$**

27 The ratio kinetic viscosity/thermal diffusivity is ---------- **Nusselt Number**

28 The cylinder is subjected to insulations K & 2K at the outside surface to avoid heat transfer. In order to arrest heat transfer effectively , which insulation should be provided first at the outer surface? **2K & K respectively**

29 The wall having conductivities **K1** **K2** Findout the equivalent conductivity of the material----------?

29 The maximum amplitude in this vibration equation y = 6 sinωt --------**6**

30 The thermal boundary layer in an ideal fluid flow is ----------**0**

31 What does tend to stagnation point ---------- **The velocity is 0 at the stagnation point due to the increase in pressure energy from the conversion of K.E into P.E.**

32 Match the following:

i. subsonic nozzle : figure

ii. Supersonic nozzle : figure

iii. Subsonic diffuser : figure

iv. Centrifugal compressor : figure

33 The factor of safety subjected to number of cycles related to **Endurance limit**

34 In composite beam , width is directly proportional to ----- **α M** if the depth of the beam is kept constant

35 The heat transfer rate of hollow cylinder is inversly proportional to the following---- **r2/r1**

36 A material at 300ºC is immersed in water at 30ºC such that it will take 170 seconds to become 150ºC .

A same material at 300ºC is put in air at 30ºC but it will take 200 seconds to become 150ºC. What is the reason behind it ? **K of water is more compared to air**

37 Radiation is ---------- wave phenomenon **Electromagnetic without medium**

38 The compression ratio[r] of petrol engine ranges from --------- **6 to 10**

39 ∫δQ/T =0 and Δs=0 corresponds to ---- **irreversible & adiabatic**

40 Cold working of metal increases ---------- **Tensile strength**

41 The power absorbed in belt drive depends on----------

Tension in tight side, Tension in slack side, coefficient of friction & Radius of pulley.

42 The temperature loss related ---------- **hysteresis loss**

43 The convergent pipe having entry and exit diameters are 100 and 50 mm respectively, find out their velocity ratio from entry to exit.....**1/4**

44 They had given one composite circular pipe having 4 varying cross sections . They are 2D, 1.5D, 4D & D respectively. The water is entering at velocity V at section 1 and leaving at section 4. Find pressure decreasing order **P4>P2>P1>P3**

45 The bulb having weight 150N supported by two ropes and attached to the walls having angles 45º & 60º. Findout the reaction forces in the ropes ? **This is related to Lamis theorem**

46 A hollow sphere of radius r . A particle is moving with coefficient of friction 1/[3]½ inside the sphere from wall . which height will it become rest?

47 The disc is resting on the rough wall by a rope tied at the center . The rope makes angle with the wall around 30º. The tension in the string is ---------than the weight of the disc. **more**

48 A railway wagon containing partially full of water. Which angle----------

49 Findout the graph between discharge [Q] in the x-axis and head [H] in the y-axis---------

50 In welding pitch dimension is limited to----------

51 The composition of inconel alloy----------

52 There is a heat transfer between two walls having thickness and conductivities k1 & K2 respectively. The linear temperature profile of first wall is more steeper than the second wall . Findout the ratio K1/K2 ----------

a) >0 b) <0 c)=0 d) the given data is insufficient

53 The max shear stress developed in solid circular shaet is 100 MPa . Calculate the max normal stress developed in it?

54 This question related to welding ----------

55 Bearing liner---------- a) Babbit metal b) Gun metal

56 Electrical resistance material ----------**Nichrome**

57 This question related to radiation

58 A sun emits 1150K at 0.5µ. A furnace emits 300k from small door ----------

59 In the simple pendulum , the maximum amplitude depends on ---------- **increase in length**

60 The fuel flow increases if---------- a) exhaust valve burnt b) filter choke c) silencer choke

61 The jet propulsion depends on---------- a) jet velocity b) weight ratio

62 What is the condition for perfect frame----------

63 Depth of cut can be increased by----------

64 The workpiece can be held in----------

65 This is related toNucleate boiling

66 What is the expression for Reynolds number in terms of diameter of the pipe.....Re =**ρVD/µ**

67 Air conditioning means-------- a) cooling & heating b)dehumidifying c) removing impurities from air d)all

68 Fibrous fracture occurs in ---------- a)brittle fracture b) ductile fracture c)shear fracture d)none

69 In laser beam machining , the workpiece should be---------- a)absorbed by all the rays b) reflected by all the rays

70 Foam and coke are good insulators. Why?---------- **a)less density**

71 Gold property---------- a)good conductor b)good insulator

72 In lathe , the workpiece can be held in ---------- a) live center b)steady rest c)3-way chuck d)4-way chuck.

73. Vander wal's equation (We have to pick up the right answer from four choices)
74. To a heat engine a constant heat is supplied at 300kJ at 290 C and heat is rejected at 8.5 C. What is the heat rejected? **Ans : 150kJ**

75. What is shrinkage allowance?
The dimensional allowance which must be made in molds to compensate for shrinkage of the plastic compound on cooling

76. Where spining operation is done? **Lathe**
77. What is the maximum height of a siphon?
78. Time bound varying material is called?
79. There are two bodies, one with high mass another with low mass. Both are having same kinetic energy. Their momentum will be?
    a) Both the momumtum will be equal b) Body of large mass will have high momentum. c)b) Body of low mass will have high momentum d)It depends uopn the velocities
80. Ratio of kinetic energies of two bodies is 1 : 4, The what is the ratio of their momentum?
81. What is the notch angle of izod impact test?
82. For a given nozzle angle and number of rows in the turbine, what is the optimum blade speed ratio?
83. A question on manometer with diagram
84. Two reservoirs are connected by a pipe of diameter D. Due to the chemical deposition the diameter is reduced by 20%. Neglect the frictional losses. How will the discharge will vary?
85. Around 10 questions on very basics of Matrices, Eigen values, Laplace.
86. A question on the position of metacenter
87. Match the following on Reynolds, weber, prandtl no
88. Problem on bulk modulus
89. What is the total volume change in a cylinderical vessel if strain e1 acts along longitudinal and stain e2 acts al ong tangential direction?
90. A question on belt friction
91. A turbine of periperal velocity V is designed for 100m head. what will be the periperal velocity of a turbine if the head is 800m?

No question was asked from Refrigeration and airconditioning

Tata motors

1. what is the poison's ratio?

2. when boiler bursts, whom u would inform?

3. modular ratio?

4. envelope of damped free vibration?

5. a ball with a mass M is falling on to the ground with some velocity V1 and raising with velocity V2. find the impulse?

6. Contd.. for 5th problem. When time of contact is given then force exerted on the ground.

7. two masses are connecting with string on to pulley coefficient of friction of mass m1 is given and also m1 and m2 are given. Find the relation b/n m1 and m2, to make m2 move downwards

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8. In a damped free excitation system maximum amplitude occurs

1. before resonance b. after resonance

9. Questions on set screws?

10. A four bar link mechanism is given with moment m acting on crank and also a force given at crank end. Find the reaction at hinged end of crank.

11. Deflection due to self weight of a uniform rod of diameter D and unit density and length is given .

12. The type of key used in wrist watch?

13. Bending stress is proportional to...? Ans). Section modulus

14. The hypoid gears are ... Ans). Non intersecting non parallel gears.

15. Hollow cylinder of outer D0 is given find the diameter of solid cylinder for the same material and same torsional strength.?

16. principle plane is ?

17. Two masses are resting on a indined plane with 30 degree angle and the two masses are welded with weightless rod and coefficients of friction is given. Find the common acceleration of a two masses.

18. two masses are of different weights smaller one is placed on the bigger mass. If the force is force is acting on bigger mass given find the acceleration of smaller mass.

19. Stress on minor diameter of bolt when bolt is subjected to longitudinal force.

20. no of independent elastic constants required for isotropic material?

21. pitch of the bolt of 30 mm metric thread dia meter is?

22. the ratio of natural frequency on earth to moon?

23. upper portion of set screw is given fig shown and asked which type of set screw is ?

24. Efficiency of screw jack formula?

25. which of the parts given is harder one? Ans a). inner case b)outer case like that?

26. Max efficiency of screw jack formula?

27. Given some c/s of diffirent types which is having more torsional strength ?

28. Max principle stress theory is valid for which material?

29. efficiency of reveted joints of different types has given which is having max efficiency ?

30. if the roots are real then which type of vibrations will occur in damped systems ?

31. problem on transmissibility ?

32. when the disc is rotating on which on man is standing at the edge then what is the possibility of increase in speed of the disc? A).man moves towards centre b)out ward? Like that

33. what is the principle behind the collisions of ball ?which is related to Q.7 ? ans constant linear momentum.

34. Find the elongation of the bar due to self weight

35. Problem on the cantilever deflection

36. Problem on the two blocks connected by string one is on table and on is hanging from the pulley..mechanics' problem

37. Ratio of the tension of the band block breaks

38. max and normal efficiency of the power scew

39. what is monel metal

40. for which material max normal stress theory is used

41. efficiency of the riveted joints

42. coefficient of friction for the greased ball bearing

43. which key is used in wrist watch

44. bending stress is proportional to 1. directly/inversely proportional to section modulus

45. find the width of the strongest beam that can be cut of cylindrical log of wood whose dia is 'd'

46. if the phi is friction angle then which of the following can not be the value of the tan(phi) a) 0 b) 1.5 mu etc. ans is 0

47. problem on the transmissibility ..to calculate dynamic amplitude

BHEL

1. The ratio of two specific heats of air is equal to. = 1.41

2. A perfect gas at 270C is heated at constant pressure till its volume is double. The final temperature is = 3270C

3. An engine operates between temperature of 9000K and T2 and another engine between T2 and 8000K. For both to do equal work, value of T2 will be. = 6500K

4. Internal energy of a substance depends on = Temperature

5. Work done in compressing 1kg of gas adiabatically from p1,V1,T1 to p2, V2, T2 is equal to = Cv(T2-T1)

6. The unit of entropy is = J/kg 0K

7. Indicated power of a 4-stroke engine is equal to = pLAN/2

8. Which of the following is not an internal combustion engine : a) 2 stroke petrol engine b)4 stroke petrol engine c) Diesel engine d) steam engine e) Gas turbine. = (d)

9. If one cylinder of a diesel engine receives more fuel than the others, then for that cylinder the: a) exhaust will be smoky b) piston rings would stick into piston grooves c) exhaust temperature will be high d) engine starts overheating e) all of the above. = (e)

10. The spark plug gap is normally maintained at: = 0.45 to 0.6mm

11. A distributor in spark ignition engines performs the function of : = Providing the correct firing order in engine

12. Which of the following does not relate to C.I. engine:: a) fuel pump b) fuel injector c) governor d) carburetor e) flywheel = (d)

13. Air fuel ratio in a jet engine is = 60:1

14. What is the value of Prandtl No.?

15. In domestic refrigerator, the tubes at the back of the refrigerator are: a) evaporator b) condenser c) capillary tubes d).....

16. Which refrigerants has the highest critical point temperature. = Freon-11

17. Wet bulb temperature is. = indication of amount of moisture in air

18. On psychrometric chart, dry bulb temperature lines are. = Vertical

19. Surface tension has the units. = newtons/m

20. The line of action of the buoyant force acts through the. =centroid of the displaced volume of fluid

21. A pressure of 25m of head of water is equal to. =245kN/m2

22. For a submerged body to be in stable equilibrium, the centre of gravity should be. =Below the centre of buoyancy.

23. The actual velocity at vena contracta for flow through an orifice from a reservoir of height H=?. =Cvv2gH

24. A body weighing 2kg in air weights 2.5kg when submerged in water. Its specific gravity is. = 6

25. In a free vortex motion: = each particle moves in a circular path with a speed varying inversely as the distance from the centre.

26. A centrifugal pump has speed-1000rpm, Flow-1200l.p.m, Head-20m, Power-5H.P. If its speed is increased to 1500rpm, new flow will be.: = 1800l.p.m

27. Runaway speed of a hydraulic turbine is: = the speed if the turbine runner is allowed to revolve freely without load and with the wicket gates wide open.

28. 10m of water column is equal to = 100kN/m2

29. M.I. of a circular area about an axis perpendicular to the area is: = pr4/2

30. A projectile is fired at an angle ? to the vertical. Its horizontal range will be maximum when ? is . =450

31. An elevator weighing 1000kg attains an upward velocity of 4m/sec in two seconds with uniform acceleration. The tension in the supporting cables will be = 1200kg.

32. A 13m ladder is placed against a smooth vertical wall with its lower end 5m from the wall. What should be the co-efficient of friction between ladder and floor so that it remains in equilibrium. = 0.21

33. A car is moving with a velocity of 60km/hr and possesses energy of 5x105 joules. The mass of the car will be. =3000kg

34. If l is the span of a light suspension bridge whose each cable carries total weight (w) and the central diop is y, the horizontal pull at each support is: = wl/y OR

35. A beam of length l, having uniform load w kg/unit length is supported freely at the ends. The moments at mid span will be: = wl2/8.//www.ChetanaS.org

36. A boiler shell 200cm dia and plate thickness 1.5cm is subjected to internal pressure of 1.5MN/m2, then the hoop stress will be. = 100N/m2

37. 100KW is to be transmitted by each of two separate shafts. A is turning at 250rpm and B at 300rpm. Which shaft must have greater diameter.: = B

38. Two identical leaf springs of spring constant k are arranged like cantilevers in parallel and attached at free end by a spring of spring constant k. The equivalent spring constant of combination is; = 1.5k.

39. Automobile steering gear is an example of: = lower pair.

40. The type of coupling used to join two shafts whose axes are neither in same straight line nor parallel, but intersect is. = Universal coupling.

41. To transmit power from one rotation shaft to another whose axes are neither parallel nor intersecting, use: = Spiral gear.

42. A gear having 100 teeth is fixed and another gear having 25 teeth revolves around it, the centre lines of both gears being joined by an arm. How many revolutions will be made by gear of 25 teeth for one revolution of arm. = 5 rev.

43. The secondary critical speed of a shaft occurs at: = twice the speed of primary critical speed.

44. Brittle coating technique is used for: = experimental stress analysis.

45. Factor of safety is the ratio of: = yield stress/working stress.

46. Type of gear used for non-intersection perpendicular shafts: = Hypoid gears.

47. Corrosion resistance of steel is increased by adding: = Chromium & Nickel

48. The product of Cupola is called: = cast iron

49. Brinell tester uses a hardness steel ball of size: = 10mm

50. Sintered and tungsten carbides can be machined by: = EDM

51. What kind of abrasive cut off wheel should be used to cut concrete, stone and masonry? =Diamond grit.

52. In break-even analysis, total cost consists of: = Fixed cost + Variable cost.

53. The amount deducted from the salary of workers towards employees provident fund is : =deposited in the account of worker with Provident Fund Commissioner.

54. PERT is: = event oriented technique

55. Bar charts are suitable for: = minor works.

56. ? on a PERT/CPM chart represents: = a significant event representing some mile-stone

57. Electron volt is the unit of : = Energy.

58. Seamless tubes are made by?

59. Reheating in gas turbine results in: = increase of work ratio and decrease of thermal efficiency.

60. Why DC current is not used in transformer?

61. What is the purpose of draft tube in hydraulic turbines: = to convert the kinetic energy into pressure energy.

62. A mass of 100kg is falling from a height of 1m and penetrates the sand to 1m. what is the resistance force of the sand?

63. Two cars travel in the same direction at 40km/hr at a regular distance. A car comes in the opposite direction at 60km/hr. It meets each car in a gap of 8 seconds. What is the distance between the two cars?

INTERVIEW PATTERN

I. Project Explanation

II. Fluid Mechanics:

i. Define laminar flow & Turbulent flow ii. What is the value of Reynolds no in pipe flow

iii. What is the significance of Reynolds no vi. What is the variation of δ in laminar & turbulent flow

v. Define boundary layer in pipe flow & thickness of boundary layer iv. Head losses in pipe

III. Strength of materials:

i. Draw the figure for spring damper system ii. Differential equation for spring damper system

iii. Find out the deflection of spring damper system iv. Define stiffness and unit of stiffness

IV. Material Science

i. Ferrous materials ii. Non-ferrous materials iii. Define fatigue

iv. Define fatigue resistance? v. Curve for fatigue vi. Fatigue limit