ANSWER KEY

1.	(A)	13.	(C)	25.	(A)	37.	(D)	49.	(295 to 305)	61.	(B)
2.	(D)	14.	(C)	26.	(D)	38.	(B)	50.	(268 to 274)	62.	(A)
3.	(C)	15.	(B)	27.	(4000 to 4000)	39.	(D)	51.	(3 to 3)	63.	(C)
4.	(A)	16.	(B)	28.	(0.68 to 0.71)	40.	(–18)	52.	(A)	64.	(D)
5.	(C)	17.	(C)	29.	(6 to 6)	41.	(166.67)	53.	(A)	65.	(A)
6.	(C)	18.	(D)	30.	(2298 to 2310)	42.	(B)	54.	(B)		
7.	(D)	19.	(D)	31.	(D)	43.	(B)	55.	(D)		
8.	(125 to 125)	20.	(C)	32.	(2.9 to 3.1)	44.	(17.77)	56.	(B)		
9.	(C)	21.	(A)	33.	(128 to 130)	45.	(B)	57.	(D)		
10.	(4 to 4)	22.	(B)	34.	(C)	46.	(C)	58.	(B)		
11.	(C)	23.	(D)	35.	(11 to 13)	47.	(B)	59.	(C)		
12.	(C)	24.	(D)	36.	(4.9 to 5.1)	48.	(8 to 8)	60.	(B)		

SOLUTIONS

1. (A)

We gave $y + \frac{dy}{dx} = \frac{1}{4}\int y\,dx$

Differentiating, we have $\frac{dy}{dx} + \frac{d^2y}{dx^2} = \frac{1}{4} y dx$

Differential equation is of order 2 and degree 1

2. (D)

$E = 2G(1+\mu)$ $\qquad$ $E = 3K(1-2\mu)$

$= 2G\left(1+\frac{1}{3}\right)$ $\qquad$ $= 3K\left(1-\frac{2}{3}\right)$

$E = \frac{8G}{3}$ $\qquad$ $= 3K\left(\frac{1}{3}\right)$

$\therefore \frac{E}{G} = \frac{8}{3}$ $\qquad$ $E = K$

$E:K:G = 1:1:3/8$

3. (C)

When, $\frac{Gr}{\text{Re}^2} \approx 1 \Rightarrow$ Mixed convection

$\frac{Gr}{\text{Re}^2} >> 1 \Rightarrow$ Free convection

$\frac{Gr}{\text{Re}^2} << 1 \Rightarrow$ Forced convection

4. (A)

In a simple gear train:

- If odd number of idler gears are used, then driving and driven gears will have same sense of rotation.
- If even number of idler gears are used, then driving and driven gears will have opposite sense of rotation.

5. (C)

For an isochronous governor radius of rotation is same irrespective of speed.

6. (C)

Given $n = 8$; constrained mechanism

So, mobility $m = 1$

Maximum number of revolute pairs on one of the links $= i = \frac{n}{2} = 4$

7. (D)

Primary unbalanced force $F_P = mr\omega^2 \cos\theta$

Secondary unbalanced force

$F_S = mr\omega^2 \frac{\cos 2\theta}{n} \quad where\, n = \frac{l}{r}$

$F_s \propto \frac{1}{n}$; as n increases; F_s decreases

8. (125 [125 to 125])

$T = 50N \cdot mm,$
$M = 120N \cdot mm,$

Equivalent bending moment,

$M_e = \frac{1}{2}\left(M + \sqrt{M^2 + T^2}\right)$

$= \frac{1}{2}\left(120 + \sqrt{(120)^2 + (50)^2}\right)$

$= 125N \cdot mm$

9. (C)

Given

$6x + 8y = 14$

$3x + 4y = 7$

The given two linear equations are proportional i.e. the given system will represent one equation in two variables.

$\therefore$ The given system has infinitely many solutions.

10. (4)

$\text{Div}\,\vec{V} = 2xy = 2(1)(2) = 4$

11. (C)

12. (C)

$T_4 = T_2$

Because, heat conduction is taking place only in one direction.

13. (C)

$$\text{Pr} = \frac{\mu \cdot C_p}{k}$$

at critical temperature $(C_p)_{\text{water}} = \infty$

$\therefore \text{Pr} = \infty$

14. (C)

In relative equilibrium

$$\tan\alpha = \frac{a_x}{g}$$

$\alpha = 45°$ (given)

$$\tan 45° = \frac{a_x}{g} \text{ or } a_x = g$$

15. (B)

The shear strain rate is

$$\gamma_{xy} = \frac{1}{2}\left(\frac{\partial v}{\partial x} + \frac{\partial u}{\partial y}\right) = \frac{1}{2}(0+0) = 0$$

16. (B)

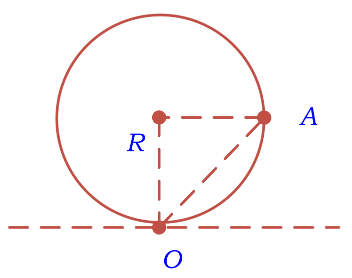
We know that $K = -\dfrac{\Delta P}{\frac{\Delta\forall}{\forall}}$;

Given $K = 5\times10^6\,kPa$ and $\dfrac{\Delta\forall}{\forall} = -0.02$

Thus,

$$\Delta P = -K\frac{\Delta\forall}{\forall} = 5\times10^6 \times 0.02 = 10^5\,kPa = 100\,MPa$$

17. (C)



Point O is instantaneous centre of rotation

$$\omega = \frac{V_0}{R}$$

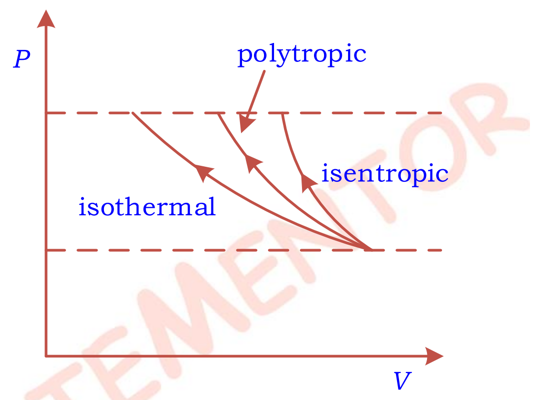
Distance of point A from $O = \sqrt{R^2 + R^2} = \sqrt{2}R$

Speed of point $A = \theta\sqrt{2}R = \sqrt{2}V_0$

Speed of point $B = V_0$

Speed of point $C = \omega \times 2R = 2V_0$

18. (D)



Flow work, $W = -\int v\,dP$

In the figure shown above area under the curve for isothermal process is minimum and maximum for isentropic process.

$\therefore W_{\text{isothermal}} < W_{\text{polytropic}} < W_{\text{isentropic}}$

19. (D)

Earing $\rightarrow$ Deep drawing

Bamboo defect $\rightarrow$ Extrusion

Alligatoring $\rightarrow$ Rolling

Cold shut $\rightarrow$ Forging

20. (C)

For a soap bubble

$$\Delta P = \frac{4\sigma_s}{R} = \frac{4\times0.025}{1\times10^{-2}} = 4\times2.5 = 10\,Pa$$

21. (A)

$$P(B\,|\,A) = \frac{P(A\cap B)}{P(A)} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{2}$$

22. (B)

$$\oint\left(\frac{\delta Q}{\delta T}\right) = \frac{2000}{1000} - \frac{300}{300} - \frac{250}{200}$$

$$\oint\left(\frac{\delta Q}{\delta T}\right) < 0$$

So, it is an irreversible cycle.

23. (D)

in perfectly rigid plastic, Strain = zero

Elastic modulus$=\dfrac{\text{stress}}{\text{strain}}=$ infinity

24. (D)

Maximum shear srain, $\dfrac{\gamma_{max}}{2}=\dfrac{\varepsilon_{max}-\varepsilon_{min}}{2}$

$\therefore \gamma_{max}=\left(1000\times10^{-6}\right)-\left(-600\times10^{-6}\right)=1600\times10^{-6}$

25. (A)

If the relative motion between two links is pure sliding, the relative instantaneous centre lies at infinity on a line perpendicular to the direction of sliding.

26. (D)

View factors that need to be evaluated directly for 'n' surfaces $= {}^nC_2 = {}^9C_2 = 36$

Note : Total possible view factors are 81 (9× 9). Out of 81 unknowns, 9 unknowns can be determined using summation rule for each surfaces. Half of the remaining 72 unknowns can be determined by applying reciprocity theorem between each pair of surfaces. Thus only 36 view factors must be known initially to calculate all remaining view factors.

27. (4000[4000 to 4000])

$$\frac{1}{U_0}=\frac{1}{U_i}+F$$

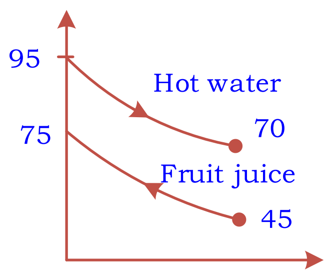
$$F=\frac{1}{800}-\frac{1}{1000}=2.5\times10^{-4}m^2-K/W$$

Film coefficient

$$=\frac{1}{2.5\times10^{-4}}W/m^2K=4000W/m^2K$$

28. (0.6927 [0.68 to 0.71])

The heat exchanger is counter flow heat exchanger because exit temperature of cold fluid is greater than the exit temperature of hot fluid.



$$\text{LMTD}=\frac{(95-75)-(70-45)}{\ln\left(\frac{95-75}{70-45}\right)}=22.40°C$$

Actual heat transfer:–

$U\cdot A(\Delta T)_m$ = heat received by cold fluid

$$U\cdot A(\Delta T)_m=\left(\dot m\cdot C_p\Delta T\cdot\right)_{\text{fruit juice}}$$

$$1122\times12.75\times(\Delta T)_m=2\times3700\times(75-45)$$

$$(\Delta T)_m=15.5185$$

Where $(\Delta T)_m$ is the actual LMTD

$$\text{Correction factor}=\frac{(\text{LMTD})_{\text{actual}}}{(\text{LMTD})_{\text{ideal}}}$$

$$=\frac{15.5185}{22.40}=0.6927$$

29. (6 [6 to 6])

$$\frac{T_i-T_\infty}{T-T_\infty}=e^{\left(\frac{hA}{\rho VC_p}\times\tau\right)}$$

For both the cases, the ratio of temperature difference in the LHS of the above equal is constant.

$$\therefore e^{\left(\frac{hA}{\rho VC_p}\times\tau\right)}=\text{constant}$$

$$\left(\frac{hA}{\rho VC_p}\times\tau\right)=\text{constant}$$

A,ρ,V,C_p = constant (because same casting)

Only variable is h

$h_1\tau_1=h_2\tau_2$

$h_2=5h_1$ (given)

$h_1\times30=5h_1\times\tau_2$

$\Rightarrow\tau_2=6\,\text{min}$

30. (2305.31 [2298 to 2310])

Given:

Number of moles of the gas,

$n=2$ moles

The system's volume is constant for lines bc and da. Therefore,

$\Delta V=0$

Thus, work done for paths da and bc is zero.

$\Rightarrow W_{da}=W_{bc}=1$

Since the process is cycle, ΔU is equal to zero

Using the first law, we get

$\Delta W=\Delta Q$

$\Delta W=\Delta W_{ab}+\Delta W_{cd}$

Since the temperature is kept constant during lines ab and cd, these are isothermal process.

Work done during an isothermal process is given by

$$W = nRT\ln\frac{V_f}{V_i}$$

If V_f and V_i are the initial and final volumes during the isothermal process, then

$$W = nRT_1\ln\left(\frac{2V_0}{V_0}\right) + nRT_2\ln\left(\frac{V_0}{2V_0}\right)$$

$$W = 2\times 8.314\times 0.693\times 200$$

$$W = 2305.31J$$

31. (D)

During cooling process of drinking water, entropy decrease of water takes place.

$$\Delta S_1 = mC_p\ln\left(\frac{T_H}{T_L}\right)$$

And heat removed from the water,

$$Q_L = mC_p(T_H - T_L)$$

Heat supplied to the atmosphere,

$$Q_H = W_{in} + Q_L$$

$$Q_H = W_{in} + mC_p(T_H - T_L)$$

The entropy increase of atmosphere

$$= \frac{W_{in} + mC_p(T_H - T_L)}{T_H}$$

$$S_{gen} = \Delta S_{System} + \Delta S_{Surrounding}$$

$$S_{gen} \geq 0$$

$$\therefore \frac{W_{in} + mC_p(T_H - T_L)}{T_H} mC_p\ln\left(\frac{T_H}{T_L}\right) \geq 0 \ldots\ldots (1)$$

$$C_p = 4.187kJ/kgK,\ m = 2kg,\ T_L = 275k$$

putting these values in eq(1), we get $W_{in} \geq 7.833kJ$

So, $W_{min} = 7.833kJ$

32. (3 [2.9 to 3.1])

Given, $h_3 = 78kJ/kg$

$$h_1' = 182kJ/kg$$

$$h_2 = 230kJ/kg$$

$$h_3' = 68kJ/kg$$

In heat exchanger

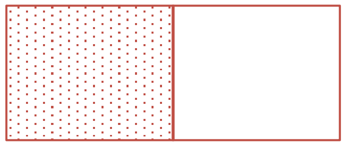
Heat loss = heat gain

$$h_3 - h_3^1 = h_1 - h_1'$$

$$h_1 = 192kJ/kg$$

$$COP = \frac{h_1 - h_3}{h_2 - h_1} = \frac{182 - 68}{230 - 192} = 3$$

33. (129 [128 to 130])



Since it is free expansion process to temperature remains constant

$$S_f - S_i = C_p\ln\frac{T_f}{T_i} - R\ln\frac{P_t}{P_i} = -R\ln\frac{V_i}{V_f} = R\ln\frac{V_f}{V_i}$$

$$S_{gen} = \Delta S_{System} + \Delta S_{Surrounding}$$

$$S_{gen} = m\times R\times\ln\frac{2V}{V} \qquad (\because \Delta S_{Syrrounding} = 0)$$

$$= 3\times\frac{8.314}{39.98}\times\ln 2 = 0.432kj/kg$$

$$X_{destroyed} = T_0\times S_{gen} = 129kJ$$

34. (C)

The balancing mass required,

$$B = 2kg + \frac{1}{2}\times 1 = 2.5kg$$

35. (12 [11 to 13])

$$\omega_n = \sqrt{\frac{9\times 10^3}{10}} = 30rad/\sec$$

$$\therefore \left|\frac{x}{x_{static}}\right| = \frac{1}{2\xi} = 25$$

$$\xi = \frac{1}{50} = 0.02$$

$$\therefore c = \xi\times 2\sqrt{km} = 0.02\times 2\times\sqrt{9\times 90^3\times 10}$$

$$= 12N\cdot s/m$$

36. (5 [4.9 to 5.1])

The equation of motion is

$$mL^2\ddot{\theta} + (ka^2 + mgL)\theta = 0$$

$$m = 10kg, L = 1, k = 950N/m, a = 0, 0.4m$$

$$\omega_n = \sqrt{\frac{k_{eq}}{m_{eq}}} = \sqrt{\frac{(950\times 0.4^2) + (10\times 9.81\times 1)}{10\times 1^2}}$$

$$\therefore \omega_n = \sqrt{\frac{250\times 1}{10}} = 5rad/s$$

37. (D)

Given

$m = 4kg; a = b$

at $r_2 = 25cm; F_2 = 1800N$

$r_1 = 20cm; F_1 = 100N$

$$k = 2\left(\frac{b}{a}\right)^2\left(\frac{F_2 - F_1}{r_2 - r_1}\right)$$

$$k = 2\left(\frac{b}{a}\right)^2\left(\frac{F_2 - F_1}{r_2 - r_1}\right)$$

$$= 2 \times \frac{1700}{5} = 680N / cm$$

38. (B)

$T_s = 48, T_p = 24$

$r_A = r_s + 2r_p$

$$\frac{mT_A}{2} = \frac{mT_s}{2} + \frac{2mT_p}{2}$$

$T_A = T_s + 2T_p = 48 + 2 \times 24 = 96$

$$\frac{N_s - N_a}{N_A - N_a} = -\frac{T_p}{T_s} \times \frac{T_A}{T_p}$$

$N_s = 0$

$$\frac{N_a}{N_A - N_a} = \frac{T_A}{T_s}$$

$$\frac{N_A - N_a}{N_a} = \frac{T_s}{T_A} = \frac{48}{96} = \frac{1}{2}$$

$$\frac{N_A}{N_a} - 1 = \frac{1}{2}$$

$$\frac{N_A}{N_a} = 1.5$$

39. (D)

$\sum A = 0$

$2.2 - 0.8 + 1.4 - a = 0$

$\therefore a = 2.8$

$2.2 - 0.8 + 1.4 - a = 0$

$\therefore a = 2.8$

$E_A = E$

$E_B = 2.2 + E$

$E_C = E + 2.2 - 0.8 = E + 1.4$

$E_D = E + 1.4 + 1.4 = E + 2.8$

$E_E = 0$

$\therefore E_{max} = E + 2.8$

$E_{min} = E$

$\therefore \Delta E = 2.8$

Scale $1cm^2 = 100N - m$

$\Delta E = 280N - m$

40. (–18)

Stress invariant,

$$I_1 = \frac{\sigma_x + \sigma_y}{2} = \frac{\sigma_1 + \sigma_2}{2}$$

$\therefore \sigma_2 = \sigma_x + \sigma_y - \sigma_1$

$= 32 - 10 - 40 = -18MN / m^2$

41. (166.67)

Given data:

$L = 5$ days

$$d = \frac{10000}{300} = 33.3 \text{ units per day}$$

$ROP = d \times L$

= (33.3 units per day) (5 days) = 166.7 units

Thus, the reorder point is 167 units

42. (B)

$P(A) = 0.15, P(B) = 0.05, P(C) = 0.1$

E = Equipment fail before the end of the year

$P(E) = 1 - P(\bar{E}) = 1 - P(A^C B^C C^C)$

$= 1 - [0.85 \times 0.95 \times 0.90] = 0.2732$

43. (B)

$$[A/B] = \begin{bmatrix} 1 & 2 & 3 & 14 \\ 1 & 4 & 7 & 30 \\ 1 & 1 & 1 & \lambda \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 3 & 14 \\ 0 & 2 & 4 & 16 \\ 0 & 0 & 0 & 2\lambda - 12 \end{bmatrix}$$

To be consistent Rank of augmented matrix $\left(\rho\left(\frac{A}{B}\right)\right)$ and Rank of

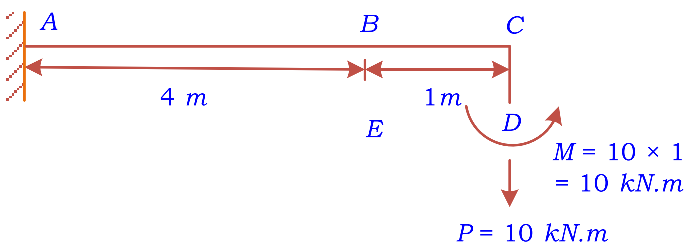
$$\rho\left(\frac{A}{B}\right) = \rho(A) = 2\lambda - 12 = 0 \Rightarrow \lambda = 6$$

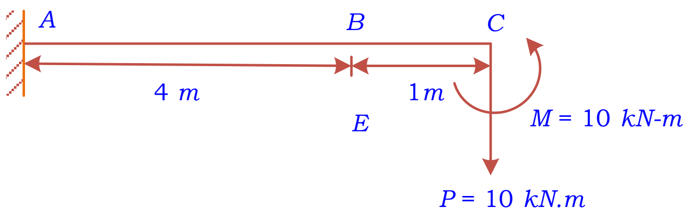
44. (17.77)

Given data:

$d = 300mm, b = 150mm, P = 10kN$

The given force $P = 10kN$ can be transfer to point 'C' as shown in the given figure below:





Maximum bending moment at point 'A' is given by,

$M_A = P \times (4 + 1) - M = 10 \times (5) - 10 = 40kN \cdot m$

Maximum bending stress,

$$\sigma_b = \frac{M_A \cdot y}{I} = \frac{40\times10^6 \times\left(\frac{300}{2}\right)}{\frac{150\times(300)^3}{12}} = 17.78MPa$$

45. (B)

Since height of centre of mass $= \frac{1}{2}m$ (from O)

So Potential energy $mg\times\frac{1}{2}$

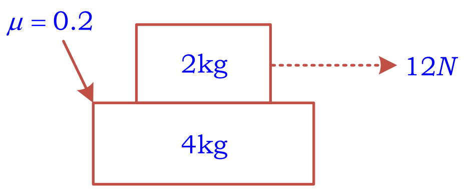
Using conservation of mechanical energy

$$mg\times\frac{1}{2} = \frac{1}{2}I\omega^2$$

$$I = \frac{m\times1^2}{3}, \text{ About } O$$

Solving we get $\omega = 5.4 rad/s$

46. (C)



Assume that both the blocks move together.

Common acceleration $a = \frac{12}{6} = 2m/s^2$

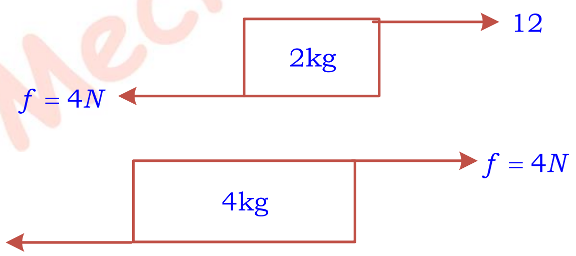
The only force acting on $4kg$ block is friction and maximum magnitude of friction force $= \mu N$

$= 0.2\times2\times10 = 4N$

For producing $2m/s^2$ acceleration force needed $= 4\times2 = 8N$

So both the blocks can't move together.

F.B.D. of both blocks are given below



Acceleration of $2kg = \frac{12-4}{2} = 4m/s^2$

Acceleration of $4kg = \frac{4}{4} = 1m/s^2$

47. (B)

The force of water on the curved bottom is only the vertical component of the resultant hydrostatic force which is equal to = weight of volume of water supported by hemispherical bottom

$= \rho\cdot g$ [Volume of cylinder – volume of hemisphere]

$$= 1000\times9.81\left[\pi\cdot r^2\times H - \frac{1}{2}\times\frac{4}{3}\pi r^3\right]$$

$$= 1000\times9.81\left[\pi\times1.5^2\times8 - \frac{1}{2}\times\frac{4}{3}\pi\times1.5^3\right]$$

$= 9810\times49.48 = 485.4kN$

48. (8 [8 to 8])

From the given flow field,

$u = 0,\ v = \frac{8}{t} + 5;$ and $w = 0$

Thus, $a_x = 0$ and

$$a_y = \frac{\partial v}{\partial t} + u\frac{\partial v}{\partial x} + v\frac{\partial v}{\partial y}$$

$$= -\frac{8}{t^2} + 0 + 0$$

$$a_y\big|_{t=1s} = -8m/s^2$$

$$a_y\big|_{t=1s} = \sqrt{a_x^2 + a_y^2} = 8m/s^2$$

49. (300 [295 to 305])

The normal force on the block $= \rho AV^2$

Taking the moment at the base of the bloc, we have

$$\rho AV^2\times0.04 = 6\times\frac{0.015}{2}$$

or $\rho A\cdot\frac{Q^2}{A^2}\times0.04 = 0.015$

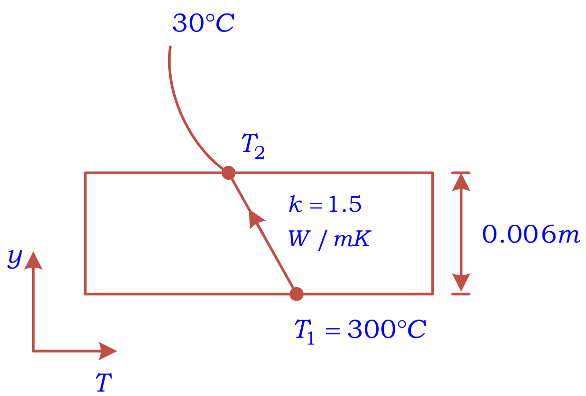
or $\frac{10^3\times Q^2\times0.04}{8\times10^{-5}} = 3\times0.15$

$Q = 3\times10^{-4}m^3/s$

$3\times10^{-4}\times10^6 cm^3/s$

$= 300cm^3/s$

50. (271.07 [268 to 274])



$h = 30W/m^2 - K$

$k = 1.5 W/m-K$

$T_\infty = 30°C$

Heat flux,

$$q = \frac{T_1 - T_\infty}{\frac{0.006}{1.5} + \frac{1}{30}} = \frac{(T_2 - T_\infty)}{\frac{1}{30}}$$

$$\frac{300-30}{\frac{0.006}{1.5} + \frac{1}{30}} = \frac{T_2 - 30}{\left(\frac{1}{30}\right)}$$

$T_2 = 271.07°C$

51. (3 [3 to 3])

Given than $|A^4| = 625$

$\Rightarrow |A^4| = 5^4$

$\Rightarrow |A| = 5$

$\Rightarrow x^2 - 4 = 5$

$\Rightarrow x^2 - 9 = 0$

$\Rightarrow x = 3, -3$

$\therefore x = 3 \qquad (\because x > 0)$

52. (A)

Given $x^4 \frac{dy}{dx} + x^3 y = -\sec(xy)$ ...(1)

Let $xy = z$ ...(2)

Then $x\frac{dy}{dx} + y = \frac{dz}{dx}$ ...(3)

Put (2) & (3) in (1), we get

$$x^4\left(\frac{dz}{dx} - y\right)\cdot\frac{1}{x} + x^3 y = -\sec(z)$$

$$\Rightarrow x^3\frac{dz}{dx} - x^3 y + x^3 y = -\sec(z)$$

$$\Rightarrow \frac{1}{\sec(z)}dz = -\frac{1}{x^3}dx$$

$$\Rightarrow \int \cos(z)\,dz = -\int \frac{1}{x^3}dx + C$$

$$\Rightarrow \sin(z) = -\left(\frac{1}{-2x^2}\right) + C$$

But $z = xy$

$\therefore \sin(xy) = \frac{1}{2x^2} + C$ is the general solution of (1)

53. (A)

Let $x =$ Number of defective items

$$P(x=0) = \frac{6C_3}{8C_3} = \frac{20}{56}$$

$$P(X=1) = \frac{2C_1 \times 6C_2}{8C_3} = \frac{30}{56}$$

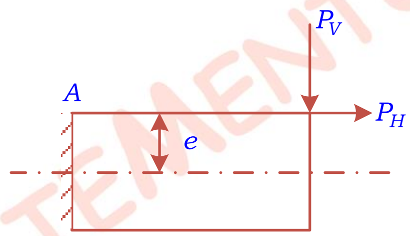
$$P(X=2) = \frac{6C_1 \times 2C_2}{8C_3} = \frac{6}{56}$$

X	0	1	2
$P(X)$	$\frac{20}{56}$	$\frac{30}{56}$	$\frac{6}{56}$

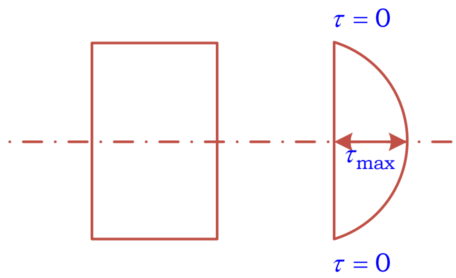
$$\therefore E(X) = \frac{30}{56} + \frac{12}{56} = \frac{42}{56} = \frac{3}{4}$$

54. (B)

After resolving the force 'P',



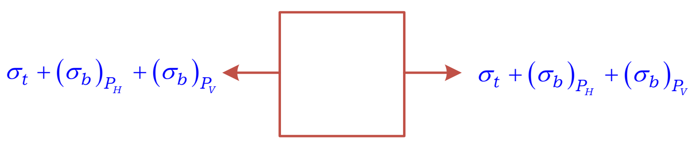
Due to transverse load P_V, bending moment (clockwise) will induce at point P which will produce the bending stress ($(\sigma_b)_{P_V}$, tensile for top fiber). Also the shear stress will induce due to load P_V but the shear stress distribution in beam due to transverse load P_V will be as shown in the figure below. So, there will be zero shear stress at top fiber.



Shear cross section   Shear stress distribution

Now because of load P_H at electricity 'e', it will also induce the bending moment (clockwise) and subsequently bending stress ($(\sigma_b)_{P_H}$ tensile for top fiber) along with the direct axial stress (σ_t, tensile).

So the state of stress at point A will be



55. (D)

Job	Process Time (t_i)	Completion Time (C_i)	Due Time (D_i)	$C_i - D_i$	
				Positive	Negative
1	8	8	10	–	–2
2	6	14	12	2	
4	3	17	18	–	–1
3	15	32	20	12	
5	12	44	22	22	
			$\sum C_i - D_i$	**36**	**–3**

Mean earliness $= \frac{3}{5} = 0.6$

Mean tardiness $= \frac{36}{5} = 7.2$

56. (B)

57. (D)

UNTOWARD means unfavorable, inimical. Its opposite is favourable.

58. (B)

In the given figures we observe that adjacent to face 1 are 2, 4 , 5, 6. We know that, adjacent faces are not opposite faces. Therefore, x remaining face (i.e.,) 3 is the opposite face to the face having number 1.

59. (C)

Let 'X' total agricultural yield of Tenlangana.

Yield of maize $= \frac{120}{360} \times X$

Yield of potatoes $= \frac{80}{360} \times X$

Percentage increase $= \frac{120-80}{80} \times 100 = 50\%$

60. (B)

Total number of outcomes $n(s) = 6^2 = 36$ and event of getting a total score of 5

= {(1, 4), (2, 3), (3, 2), (4, 1)} = 4

$\therefore$ Favourable outcomes $n(E) = 4$

$\therefore$ Required probability $= \frac{n(E)}{n(S)} = \frac{4}{36} = \frac{1}{9}$

61. (B)

Steps covered by first person $= \frac{2 \times 120}{(2+3)} = 48$

Steps covered by second person $= \frac{3 \times 120}{(3+5)} = 45$

62. (A)

Time taken for one revolution by each whee is $\frac{60}{60}, \frac{60}{36}$ and $\frac{60}{24}$ (i.e.,) $1, \frac{5}{3}, \frac{5}{2} s$ respectively

L.C.M. of $1, \frac{5}{3}, \frac{5}{2} = \frac{5}{1} = 5s$

63. (C)

Ratio of speeds

Saral	:	Vijay	:	Himanshu
200	:	180	:	170
20	:	18	:	17

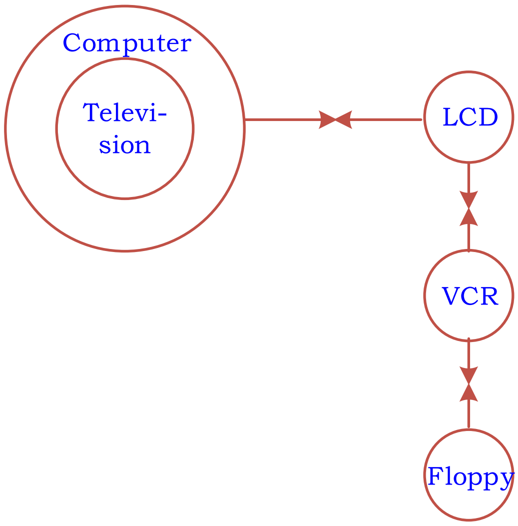
Here Vijay covers $3600m$

Himanshu can cover $= \frac{3600 \times 17}{18} = 200 \times 3400m$

So, Vijay can beam Himanshu by $200m$

64. (D)

65. (A)



Only conclusion 1 follows because relation between LCD and Floppy (or) television and VCR (or) computer and VCR's is not given.