



GATE-2019
Full Length Test
Mechanical Engineering

Name:

Test ID:ME-FLT-2019

Duration: 3 hours

Maximum marks : 100

Please read the following instructions carefully

General Instructions

1. Total duration of examination is 180 minutes (3 hours).
2. The clock will be set at the server. The countdown timer in the top right corner of screen will display the remaining time available for you to complete the examination. When the timer reaches zero, the examination will end by itself. You will not be required to end or submit your examination.
3. The Question Palette displayed on the right side of screen will show the status of each question using one of the following:
 - a. You have not visited the question yet.
 - b. You have not answered the question.
 - c. You have answered the question.
 - d. You have NOT answered the question, but have marked the question for review.
 - e. You have answered the question, but marked it for review.

The **Marked for Review** status for a question simply indicates that you would like to look at that question again. If a question is answered and **Marked for Review**, your answer for that question will be considered in the evaluation.

Navigating to a Question

4. To answer a question, do the following:
 - a. Click on the question number in the Question Palette to go to that question directly.
 - b. Select an answer for a multiple choice type question by clicking on the bubble placed before the 4 choices namely A, B, C, D. Use the virtual numeric keypad to enter a number as answer for a numerical type question.
 - c. Click on **Save and Next** to save your answer for the current question and then go to the next question.
 - d. Click on **Mark for Review and Next** to save your answer for the current question, and also mark it for review, and then go to the next question.
 - e. **Caution:** Note that your answer for the current question will not be saved, if you navigate to another question directly by clicking on its question number without saving the answer to the previous questions.
 - f. You can view all the questions by clicking on the **Question Paper** button. This feature is provided, so that if you want you can just see the entire question paper at a glance.

Answering a Question

5. Procedure for answering a multiple choice (MCQ) type question:
 - a. To select your answer, click on the bubble button of one of the options
 - b. To deselect your chosen answer, click on the bubble button of the chosen option again or click on the clear response button
 - c. To change your chosen answer, click on the bubble button of another option
 - d. To save your answer, you **MUST** click on the **Save and Next button**.
 - e. To mark the question for review, click on the **Mark for Review and Next** button. If an answer is selected for a question that is Marked for Review, that answer will be considered in the evaluation.

6. Procedure for answering a numerical answer type question:

- a. To enter a number as your answer, use the virtual numerical keypad
 - b. A fraction (eg. -0.3 or $-.3$) can be entered as an answer with or without '0' before the decimal point. As many as four decimal points, e.g. 12.5435 or 0.003 or -932.6711 or 12.82 can be entered.
 - c. To clear your answer, click on the Clear Response button
 - d. To save your answer, you MUST click on the **Save and Next** button
 - e. To mark a question for review, click on the **Mark for Review and Next** button. If an answer is selected (for MCQ) or entered (for numerical answer type) for a question that is Marked for Review, that answer will be considered in the evaluation.
7. To change your answer to a question that has already been answered, first select that question for answering and then follow the procedure for answering that type of question.
8. Note that ONLY Questions for which answers are saved or marked for review after answering will be considered for evaluation.

Paper Specific Instructions:

9. There are a total of 65 questions carrying 100 marks. Questions are of multiple choice type or numerical answer type. A multiple choice type question will have four choices for the answer with only one correct choice. For numerical answer type questions, the answer is a number and no choices will be given. A number as the answer should be entered using the virtual keyboard on the monitor.
10. Questions Q.1 – Q.25 carry 1mark each. Questions Q.26 – Q.55 carry 2marks each.
11. Questions Q.56 – Q.65 belong to General Aptitude (GA) section and carry a total of 15 marks. Questions Q.56 – Q.60 carry 1mark each, and questions Q.61 – Q.65 carry 2marks each.
12. Questions not attempted will result in zero mark. Wrong answers for multiple choice type questions will result in NEGATIVE marks. For all 1 mark questions, $\frac{1}{3}$ mark will be deducted for each wrong answer. For all 2 marks questions, $\frac{2}{3}$ mark will be deducted for each wrong answer. There is no negative marking for questions of numerical answer type.
13. Physical calculator is NOT allowed. All candidates will be provided with an online scientific calculator which has to be used to answer the questions.

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Full Length Test Mechanical Engineering

Q.1 - Q.25 Carry One Mark each.

1. Consider the function $y = x^2 - 6x + 9$. The maximum value of y obtained when x varies over the interval 2 to 5 will be at _____

2. For the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ one of the Eigenvalue is 5 and the corresponding Eigenvector is $\begin{pmatrix} -1 \\ -2 \\ 1 \end{pmatrix}$ then one of Eigenvector of A^4 is

(A) $\begin{bmatrix} -1 \\ -2 \\ 1 \end{bmatrix}$

(C) $\begin{bmatrix} -4 \\ -8 \\ 4 \end{bmatrix}$

(B) $\begin{bmatrix} 1 \\ 16 \\ 1 \end{bmatrix}$

(D) $\begin{bmatrix} -1/4 \\ -1/2 \\ 1/4 \end{bmatrix}$

3. Let P, Q, R, S be $m \times m$ matrices each with non-zero determinant
If PQRS = I, then R^{-1} is

(A) SPQ

(C) PQS

(B) $Q^{-1} P^{-1} S^{-1}$

(D) $S^{-1} P^{-1} Q^{-1}$

4. Green's theorem is used to convert
(A) Line integral to surface integral
(B) Surface integral to volume integral
(C) Line integral to volume integral
(D) None of these

5. Evaluate

$$S = \sum_{r=0}^{n-1} \frac{1}{\sqrt{4n^2 - r^2}} \text{ as } n \rightarrow \infty$$

(A) $\pi/6$

(C) $\pi/2$

(B) $\pi/3$

(D) π

6. Strain energy U in the case of axially loaded bar is expressed as (where P is axial load, L is the length of the bar, A is the cross-sectional area of the bar, E is the young's modulus of the bar, σ is axial stress, δL is elongation due to axial load)

(A) $\frac{P^2 L}{4AE}$

(B) $\frac{1}{2} \times \sigma \times \frac{\delta L}{L}$

(C) Area under stress versus strain diagram of axially loaded bar.

(D) None of these

7. The bob of a simple pendulum of length 1m and has mass 100 grams and a speed of 1.4 m/s at its lowest point in its path. Tension in the string at this lowest point is _____

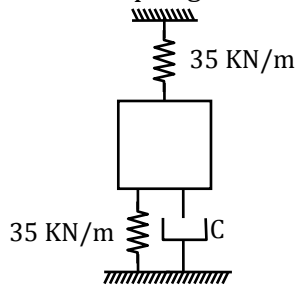
(A) Zero

(C) 1.17 N

(B) 0.98 N

(D) Need more information

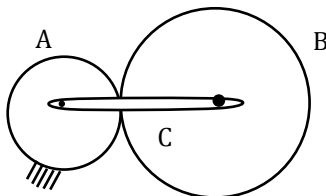
8. Consider spring mass damper system shown below



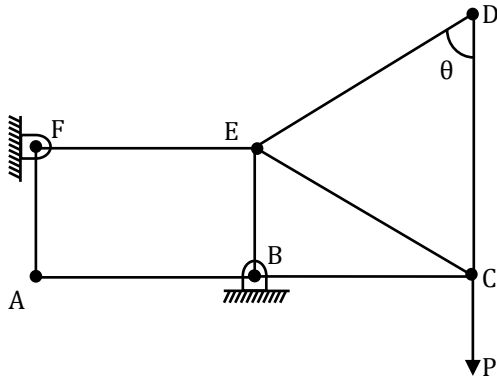
The value of viscous damping coefficient C is _____ (KNs/m) for which system shown is critically damped.

9. A flywheel of mass moment of inertia 9.8 kg m^2 , fluctuates by 30 rpm for a fluctuation of energy of 1936 Joules. The mean speed of the flywheel is _____ rpm

10. In a epicyclic gear train shown, Gear A with 20 teeth fixed to the frame and gear wheel B [40 teeth] revolves around the wheel A, arm C has speed of 10 rpm. Speed of gear B is _____ rpm.



11. Consider the following truss



Number of zero force members in the above truss system is _____

12. A copper wire of diameter 2mm is kept in an environment, with $h = 4500 \text{ W/m}^2\text{°C}$ and $T_\infty = 100^\circ\text{C}$. If the center temperature is 150°C , the current, in A, flowing through the wire is _____ A [Take $R_{\text{copper}} = 0.099 \Omega$]
13. A reversible heat engine delivers 0.65 KW power and rejects energy at the rate of 0.4 KJ/s to a reservoir at 27°C . Temperature at which energy is absorbed by the engine is _____ K
14. A steel ball of 50 cm diameter is initially at a uniform temperature of 450°C . It is then placed in an environment maintained at 100°C . The convective heat transfer coefficient is $10 \text{ W/m}^2\text{°C}$. After 1.7 hour has elapsed, the total heat transfer from the ball to the surrounding is _____ MJ
[Take, $\rho = 8000 \text{ kg/m}^3$, $C = 0.46 \text{ kJ/kg } ^\circ\text{C}$, $K = 35 \text{ W/m } ^\circ\text{C}$, for steel]
15. While analyzing a control volume problem the governing laws are
(A) Conservation of Mass (C) Conservation of Energy and Mass
(B) Conservation of Momentum (D) Both B & C
16. An apple is cooled from a temperature of 25°C to a temperature of 5°C in a refrigerator. If the mass of apple is 0.25 kg and $C = 1.76 \text{ kJ/kg } ^\circ\text{C}$, the change in entropy of apple is _____ J/K
17. The following is observed in the operation of an actual refrigeration
i. Enthalpy of refrigerant Leaving evaporator = 185 kJ/kg
ii. Enthalpy of refrigerant Leaving compressor = 229 kJ/kg
iii. Enthalpy of refrigerant leaving condenser = 74.5 kJ/kg
If isentropic efficiency of the compressor is 80%, the maximum possible COP of the refrigerator is _____
18. A product can be produced by two alternative methods one method has fixed overheads of ₹ 200 and variable overheads of ₹ 20. While the other method has the same of ₹ 150 and ₹ 30 respectively the break-even quantity between the two alternatives is _____

19. An industrialist produces both interior and exterior paints from two raw materials, R_1 and R_2 . The following table provides the data of the problem. A market survey indicates that the daily demand for interior paint cannot exceed that for exterior paint by more than 1 ton. Also, the maximum daily demand for interior paint is 2 tons. The industrialist wants to determine the optimum (best) product mix of interior and exterior paints that maximizes the total daily profit which is obtained at

Tons of raw material per ton of			
	Exterior paint	Interior paint	Maximum daily availability (tons)
Raw material, R_1	6	4	24
Raw material, R_2	1	2	6
Profit per ton (₹1000)	5	4	

- (A) $x_1 = 1, x_2 = 2$ (C) $x_1 = 3, x_2 = 1.5$
 (B) $x_1 = 3, x_2 = 1$ (D) $x_1 = 2, x_2 = 1$
20. A 75 mm shaft rotates in a bearing. The tolerance for both shaft and bearing is 0.075 mm. And the required allowance is 0.10 mm. Determine the lower dimension of the shaft with the basic hole standard.
21. Orthogonal operation is carried out at 20m/min cutting speed using cutting tool of rake angle 15° . Chip thickness 0.4 mm and uncut chip thickness is 0.2 mm. Calculate shear angle?
22. In welding, relative plate thickness factor for thin plate is
 (A) Equal to 0.75 (C) Less than 0.75
 (B) Greater than 0.75 (D) None of the above.
23. The force requirement in a blanking operation of low carbon steel sheet is 6 kN. The thickness of the sheet is 't' and diameter of the blanked part is 'd'. For the same work material, if the diameter of blanked part is increased to 2d and thickness is reduced to 0.6 t, the new blanking force is _____ kN.
24. Calculate value of diameter under the wire, if
 (i) Micrometer reading over standard cylinder with two wires of diameter 15.64 mm.
 (ii) Micrometer reading over the gauge with two wire as 15.26 mm.
 Wire of standard cylinder 18 mm.
25. Let $n = 0.5$ and $C = 90$ in the Taylor equation for tool wear. What is the percentage increase in tool life, if cutting speed is reduced by 75 %?
 (A) 1000 (C) 1500
 (B) 1200 (D) 1600

Q.26 - Q.55 Carry Two Mark each.

26. In a class 60% are boys and rest is girls. 50% of boys and 25% of girls knows cricket. If a student is selected at random and given that the selected student is a cricketer. The probability that the selected student is a girl is _____

27. The analytic solution corresponding to the real part is given by

$$u = e^{-x}\{(x^2 - y^2) \cos y + 2xy \sin y\}$$

(A) $z^2 e^{-z}$

(C) $(z^2 + 2)e^{-z}$

(B) $(z^2 - 2)e^{-z}$

(D) $z^2 e^z$

28. 'x' is the matrix $x = \begin{bmatrix} b^2 & 1 \\ (b^2 + b - 1) & (1 - b) \end{bmatrix}$ and $x^2 - x + I = 0$

I: Identity matrix

0: Zero matrix

Then, which of the following denotes the inverse of x?

(A) $\begin{bmatrix} -b & (b^2 - 1) \\ (b - 1) & 1 \end{bmatrix}$

(C) $\begin{bmatrix} (b - 1) & b^2 \\ b^2 & (-b^2 + b - 1) \end{bmatrix}$

(B) $\begin{bmatrix} (1 - b) & (b^2 - 1) \\ b^2 & b \end{bmatrix}$

(D) $\begin{bmatrix} (1 - b^2) & -1 \\ (1 - b - b^2) & b \end{bmatrix}$

29. A 6 faced unbiased dice is rolled once. It is known that

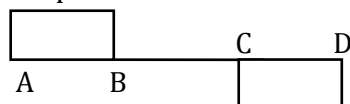
1. $P(\text{even}) = 0.5 P(\text{odd})$

2. $P(2) = P(4) = P(6) = P(1)$

3. $P(\text{even} / x > 3) = 0.8$, where x is random variable denoting the value of face

Then $P(3) =$ _____

30. The given figure shows the shear force diagram for the beam ABCD. Bending moment in the portion BC of the beam



(A) is a non-zero constant

(C) varies linearly from B to C

(B) is zero

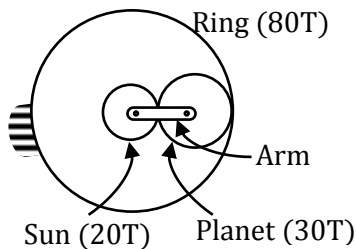
(D) Varies parabolically from B to C.

31. A thin walled (thickness \ll radius), hollow shaft of length 1 m and mean radius $R = 5$ cm has to be designed such that it can transmit a torque $T = 7$ kN m. A survey of different commercially available material was made and following data was obtained from suppliers ($E =$ young's modulus, $\tau_y =$ yield stress in shear, $\rho =$ density)

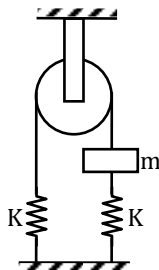
Material	E (GPa)	τ_y (MPa)	ρ (kg/m ³)
X	200	550	7700
Y	70	225	2700
Z	110	375	4875

If we assume a factor of safety of 2, what would be approximate thickness of such a shaft using material Y

- (A) 0.5 mm (C) 2 mm
(B) 1 mm (D) 4 mm
32. In the epicyclic gear train shown, sun gear is driver clockwise at 100 rpm. The ring gear is held stationary. For the number of teeth shown on the gears the arm rotates at _____ rpm

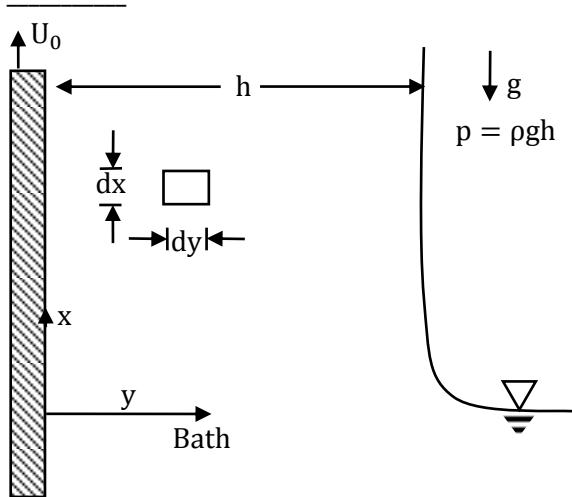


33. A string, spring and pulley shown in figure are light. Find the natural frequency (rad /sec) of mass m .



- (A) $\sqrt{\frac{K}{m}}$ (C) $\sqrt{\frac{2K}{m}}$
(B) $\sqrt{\frac{K}{2m}}$ (D) $\sqrt{\frac{4K}{m}}$

34. A continuous belt is shown in figure passing upward through a chemical bath at velocity U_0 picks up a liquid film of thickness h , density ρ and velocity μ . Gravity tends to make the liquid drain down, but the movement of the belt keeps the fluid from running off completely. Assume that the flow is fully developed and that the atmosphere produces no shear at the outer surface of the film. Stated clearly that the boundary conditions to be satisfied by velocity at $y = 0$ and $y = h$. Obtain an expression for the velocity profile is



(A) $u = \frac{\rho g}{\mu} \left(\frac{y^2}{4} - hy \right) U_0$

(B) $u = \frac{\rho g}{\mu} \left(\frac{y^2}{2} - hy \right) U_0$

(C) $u = \frac{\rho g}{\mu} \left(y^2 - \frac{hy}{4} \right) U_0$

(D) $u = \frac{\rho g}{\mu} \left(y^2 + \frac{hy}{4} \right) U_0$

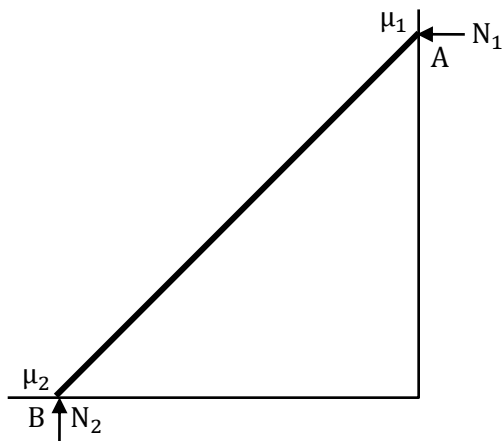
35. In the figure a ladder of mass 'm' is shown leaning against a wall. It is in static equilibrium making an angle θ with the horizontal floor. The coefficient of friction between the wall and ladder is μ_1 and that between floor and ladder is μ_2 . The normal reaction of the wall on the ladder is N_1 and that of the floor is N_2 . If the ladder is about to slip which of the following conditions are true?

P: $\mu_1 = 0, \mu_2 \neq 0$ and $N_2 \tan \theta = mg/2$

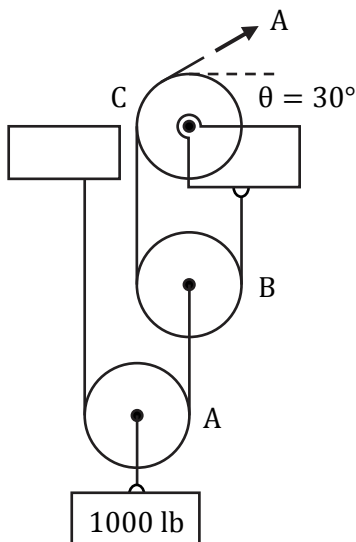
Q: $\mu_1 \neq 0, \mu_2 = 0$ and $N_1 \tan \theta = mg/2$

R: $\mu_1 \neq 0, \mu_2 \neq 0$ and $N_2 = \frac{mg}{1 + \mu_1 \mu_2}$

S: $\mu_1 = 0, \mu_2 \neq 0$ and $N_1 \tan \theta = \frac{mg}{2}$

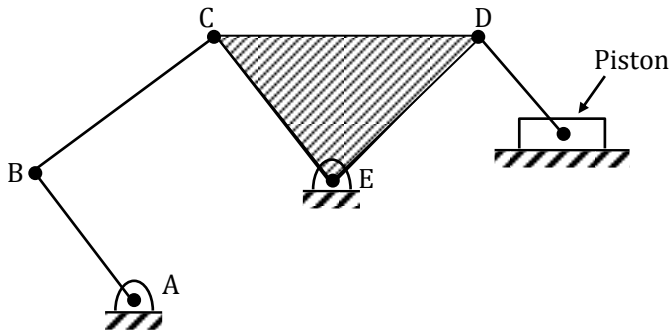


- (A) P, Q
(B) Q, R
(C) R, S
(D) P, Q, S
36. Calculate the tension T in the cable which supports the 1000-lb load with the pulley arrangement shown. Each pulley is free to rotate about its bearing, and the weights of all parts are small compared with the load. The magnitude of the total force on the bearing of pulley C is

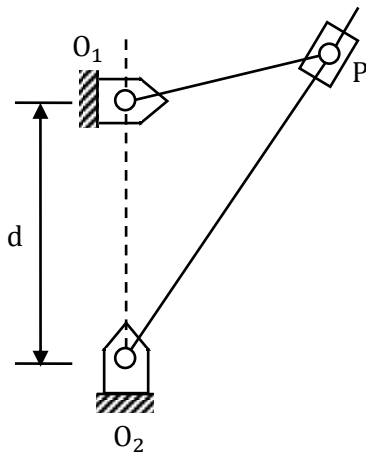


- (A) 250
(B) 217
(C) 125
(D) 300

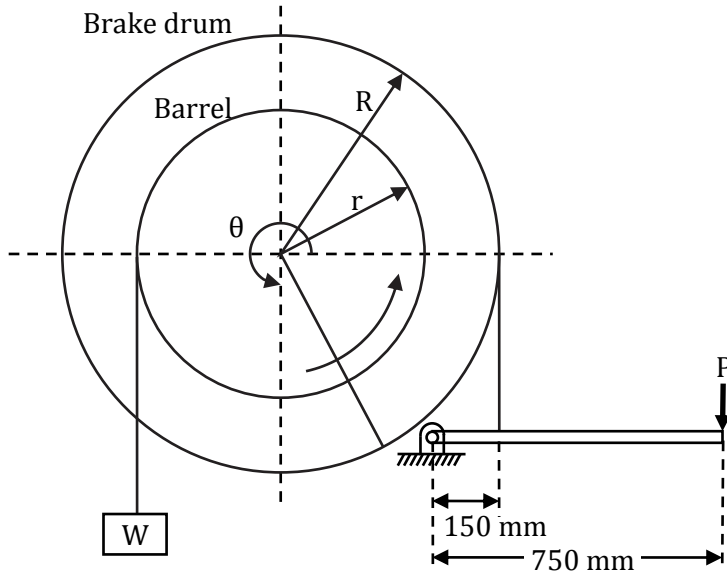
37. Degree of Freedom of mechanism shown below is _____
We have all rigid links connected by pin joint as shown. Link CDE behaves as one body.



38. A simple quick return mechanism is shown in the figure. The forward to return ratio of the quick return mechanism is 2:1. If the radius of crank $O_1 P$ is 125 mm, then the distance 'd' lever pivot centre point should be

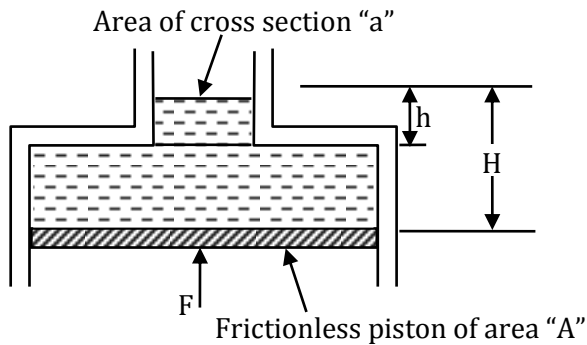


39. A crane is required to support a load 1200 kg on the rope wound around its barrel of 400 mm diameter. The brake drum which is keyed to the same shaft as the barrel has a diameter of 600 mm. The angle of contact of the band brake is 275° and the coefficient of friction is 0.22. The force (P) required at the end of the lever to support the load is



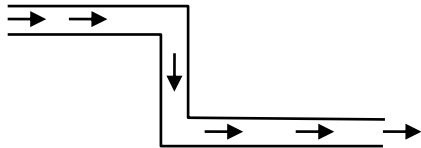
- (A) 2333 N
(B) 2372 N
(C) 2406 N
(D) 2448 N
40. Two axial bars have a gap of 1 mm at room temperature.
-
- Co-efficient of thermal expansion of steel and Al is 12×10^{-6} m/mk and 24×10^{-6} m/mk. We heat the system uniformly. Assume that parts expand horizontally. If parts just touch each other without any stress, _____ degree is the temperature rise to the nearest integer.
41. An insulated rigid tank is divided into two equal parts by a partition. Initially one part contain 6 kg of an ideal gas at 800 kPa and 50°C . The other part is vacuum. The partition is then removed and the gas fills the rigid tank completely. The final pressure in the tank is _____ kPa
42. Water enter a counter flow heat exchanger at 38°C at a rate of 0.75 kg/s and oil ($C_p = 1.884$ kJ/kg K) enter at a rate of 1.5 kg/s. The oil enter at 116°C . If the effectiveness of the heat exchanger is 0.62, the total heat transfer from the exchanger is _____ kW

43. Force F required to support liquid of density ' d ' and vessel on top is



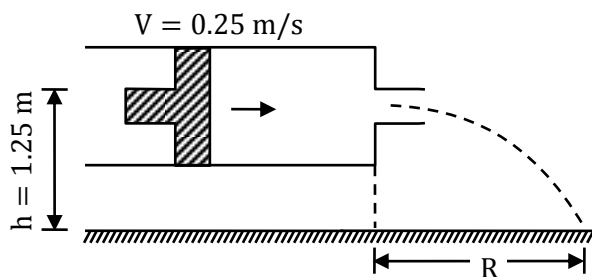
- (A) $gd [ha - (H - h)A]$ (C) $Gd Ha$
(B) $gd HA$ (D) $gd(H - h) A$

44. Liquid flows through a constant diameter tube at a constant speed in direction shown by arrows

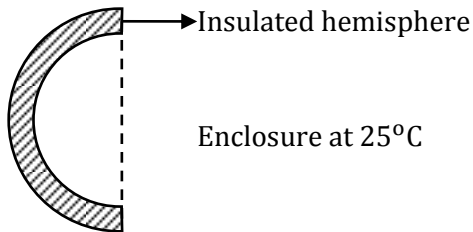


The liquid exerts on the tube

- (A) Net force to right (C) Clockwise torque
(B) Net force to left (D) Anticlockwise torque
45. A syringe of diameter $D = 8\text{mm}$ and having a nozzle of diameter $d = 2\text{mm}$ is placed horizontally at a height of 1.25 m as shown in figure. An incompressible and non-viscous liquid is filled in syringe and the piston is moved at a speed of 0.25 m/s . The range R of the liquid jet on the ground is _____ m



46. Consider an insulated hemisphere of diameter 0.3m maintained at a constant temperature of 700°C. Its emissivity is 0.4. The opening exchanger radiant energy with a large enclosure at 25°C. The net rate of heat transfer is _____W



- (A) 2462 W (C) 3413 W
(B) 2035 W (D) 3089 W
47. An air standard Diesel cycle has a compression ratio of 18.2. Air enter at 27°C, 101.325 kPa at the beginning of the compression stroke. Its temperature at the end of the heat addition process is 1394°C. The cut off ratio of the engines is _____
48. A well-sealed room contain 60 kg of air at 200 KPa and 25°C. Now solar energy enters at an average rate of 0.8 KJ/sec, while a 120W fan is turned ON to circulate the air in the room of heat transfer through the walls is negligible, the air temperature in the room is 30 minutes will be _____°C
(A) 25.6°C (C) 49.8°C
(B) 52.5°C (D) 62.4°C
49. In Rankine cycle steam enters at 4 MPa, 370°C and exits at a pressure of 15 KPa. The adiabatic efficiency of the turbine is 90%

State	h(KJ/kg)		S(KJ/kg-k)		V(m ³ /kg)	
Steam 4 MPa (370°C)	3092.5		6.5821		0.06645	
Water 15 KPa	h_f	h_g	s_f	s_g	v_f	v_g
	225.94	2599.1	0.7549	8.0085	0.001014	10.02

Efficiency of rankine cycle is _____

50. A company can produce 3000 units of a product per quarter. The annual demand of 12000 units is distributed in accordance with the quarterly indexes $Q_1 = 0.80, Q_2 = 1.00, Q_3 = 0.80, Q_4 = 1.40$. Inventories are used up during periods of strong demand to supply the total demand. To fulfill total annual demand, the inventories on hand at the beginning of the first quarter should be at least _____
(A) 1200 units (C) 0 units
(B) 2400 units (D) 4200 units
51. In a drawing process 30% reduction in area on a 12 mm diameter copper wire is to be obtained. The following data is given $\sigma_0 = 240 \text{ N/mm}^2, 2\alpha = 12^\circ, \mu = 0.10$. If the drawing speed is 2.3 m/s, the power of the electric motor is _____kW.[Efficiency of the motor as 0.98.]

52. The voltage current characteristic for a DC source for arc welding is linear with open circuit voltage of 40 V and short circuit current of 400 A. The maximum power of the source will be
- (A) 16 kW (C) 4 kW
(B) 48 kW (D) 24 kW
53. A material has a true stress-strain curve gives by $\sigma = 100000(\epsilon)^{0.5}$ Psi. Calculate engineering UTS of the material?
- (A) 70710 Psi (C) 42850 Psi
(B) 100000 Psi (D) 20290 Psi
54. A single point cutting tool with 12 rake angle is used for orthogonal machining of a ductile material. The shear plane angle for the theoretically minimum possible shear a strain to occur is _____
55. 3 pieces being cast have the same volume but different shapes, one is a sphere, second one is a cube and third is cylinder with its height equal to its diameter. Which piece solidifies first?
- (A) Sphere (C) Cylinder
(B) Cube (D) All solidifies at same time

General Aptitude One Marks Question Q. 56 to Q. 60

56. Three bells chime at an interval of 18, 24 and 32 minutes respectively. At a certain time they begin to chime together. What length of time will elapse before they chime together again?
- (A) 2 hours 24 minutes (C) 1 hour 36 minutes
(B) 1 hour 12 minutes (D) 4 hours 48 minutes
57. In a one day cricket match, the total runs made by a team were 200. Out of these 160 runs were made by spinners.
Conclusion I: 80% of the team consists of spinners.
Conclusion II: The opening batsmen were spinners.
- (A) Only conclusion I follows (C) Either I or II follows
(B) Only conclusion II follows (D) Neither I nor II follows
58. In a car race of 12km, a participant covers a distance of the first 3 km in 6 minutes. He then increases his speed and covers twice the distance already covered in 6 minutes. He covers the rest of the distance in 12 minutes. Find his average speed.
- (A) 9.23m/s (C) 6.20m/s
(B) 7.44m/s (D) 8.33m/s

Directions for Q. No. 59: Choose the option which is FARTHEST to the word mentioned in Question

59. **MOROSE**

- (A) Exuberant (C) Mortified
(B) Moron (D) Crestfallen

60. A team of five is to be selected from amongst five boys A, B, C, D and E and four girls P, Q, R and S. Some criteria for selection are as follows

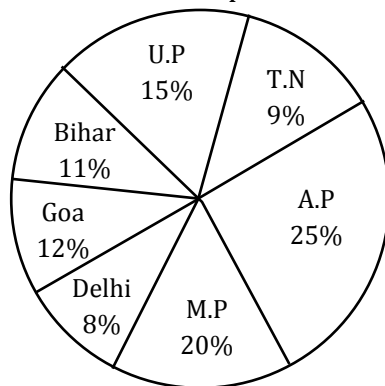
C and P have to be together, Q cannot go with R. E cannot go with S. B and D have to be together. Q cannot go with A. Unless stated otherwise, these criteria apply to all the following questions.

If two of the members have to be boys, the team will consist of

- (A) CEPQS (C) ACPRS
(B) AEPQS (D) BDPRS

General Aptitude Two Marks Question Q. 61 to Q. 65

Direction for Q. No 61: Data of different states regarding population of states in the year 1998 is shown in pie chart study the graph and answer the question that follows.



Total population of given states = 32,76,000

Following table shows that sex & literacy wise population ratio

States	Sex		Literacy	
	Male	Female	Literate	Illiterate
Andhra Pradesh	5	3	2	7
Madhya Pradesh	3	1	1	4
Delhi	2	3	2	1
Goa	3	5	3	2
Bihar	3	4	4	1
Uttar Pradesh	3	2	7	2
Tamil Nadu	3	4	9	4

61. What will be the total percentage of total number of males in U.P, M.P & Goa together to the total population of all given states ?

- (A) 28.5% (C) 23%
(B) 18.5% (D) 32%

62. A cube is coloured red on one of the face, green on the opposite face, yellow on another face and blue on a face adjacent to the yellow face. The other two faces are left uncolored. It is then cut into 125 smaller cubes of equal size. How many cubes uncolored on the all the faces?
- (A) 27 (C) 48
(B) 36 (D) 64

63. NOVICE: SEASONED
- (A) Opulent: Grand (C) Affluent: Impecunious
(B) Nefarious : Wicked (D) Filthy: Disgusting

Direction for Q. No 64: Consider the information in the statements to be true. On the basis read the following questions and mark:

64. The Minister said that the teachers are still not familiarised with the need, importance and meaning of population education in the higher education system. They are not even clearly aware about their role and responsibilities in the population education programme.
- I. Population education programme should be included in the college curriculum.
II. Orientation programme should be conducted for teachers on population education
- (A) If only I follows (C) If neither I nor II follows
(B) If only II follows (D) If both I and II follow
65. The question is followed by two statements I and II. Mark the answer.
What is the value of the ratio $(a + c) : c$?
- I. The ratio of $a : b = 1 : 5$.
II. The ratio of $b : c = 3 : 2$.
- (A) If the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.
(B) If the question can be answered by using either statement alone.
(C) If the question can be answered by using both statements together, but cannot be answered using either statement alone.
(D) If the question cannot be answered even by using both statements together