



ACE

Engineering Academy



Hyderabad | New Delhi | Bhopal | Bengaluru | Bhubaneswar | Vijayawada | Visakhapatnam | Tirupati | Pune | Chennai

H.O: 204, II Floor, Rahman Plaza, Opp. Methodist School, Abids, Hyderabad-500001,

Ph: 040-24750242 , 040-24750263, 040-24752469 , 040-24750437

GATE - 2015 - Mechanical Engineering (ME)

(Questions Based on Memory of Students)

SET - 1 (31st January Evening Session)

01. Match the following where V is velocity vector.

List - I

P. $\nabla \times V = 0$

Q. $\nabla \cdot V = 0$

R. $\frac{DV}{Dt} = 0$

S. $\frac{\partial V}{\partial t} = 0$

List - II

I. Incompressible

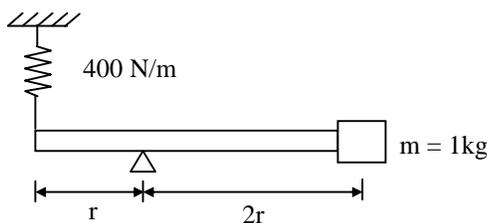
II. Steady flow

III. Irrotational

IV. Total acceleration is zero

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

02. A machine element can be express as shown consider lever as massless



Natural frequency of system is _____

(A) $\sqrt{\frac{400}{1}}$ (B) $\sqrt{\frac{400}{2}}$

(C) $\sqrt{\frac{400}{3}}$ (D) $\sqrt{\frac{400}{4}}$

03. A fair dice is thrown 4 times. Probability of getting at least two 'SIX' is

(A) $\frac{125}{432}$ (B) $\frac{16}{19}$ (C) $\frac{125}{430}$ (D) $\frac{400}{432}$

04. A current carrying wire of 10 mm diameter is insulated with 2 mm thickness of insulator of thermal conducting 0.08 W/mK. Heat transfer coefficient of surface is 10 W/m²K. Then correct statement for further addition of insulation is

- (A) Heat transfer increases
 (B) Heat transfer decreases
 (C) Heat transfer increases to maximum then decreases
 (D) Heat transfer decreases to minimum then increases



05. Find the value of $\lim_{x \rightarrow 0} \frac{1 - \cos x^2}{2x^4}$

(A) $\frac{1}{4}$ (B) 0 (C) (D) indefinite

06. Solve the differential equation $\frac{d^2y}{dx^2} = y$ which passes through origin and $(\ln 2, 3/4)$. The solution is _____

(A) $y = \frac{1}{2}(e^x - e^{-x})$ (B) $y = \frac{1}{2}(e^x + e^{-x})$

(C) $y = \frac{1}{2}e^x - e^{-x}$ (D) $y = \frac{1}{2}e^x + e^{-x}$

07. Velocity vector is defined by

$$V = (a_1x + b_1y + c_1z)i + (a_2x + b_2y + c_2z)j + (a_3x + b_3y + c_3z)k$$

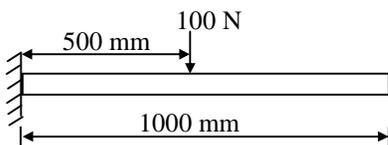
Where $a_1 = 2$, $c_3 = -4$ then value of b_2 for incompressible flow is _____

08. Two complex number $z_1 = 5 + \frac{5}{\sqrt{3}}i$ and

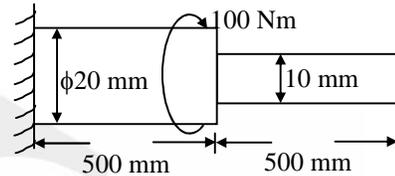
$z_2 = \frac{2}{\sqrt{3}} + 2i$ then argument of $\frac{z_1}{z_2}$ is

(A) 0 (B) 30 (C) 60 (D) 90

09. A cantilever of flexural rigidity 200 Nm^2 is loaded as shown in figure, the deflection at tip in mm is _____

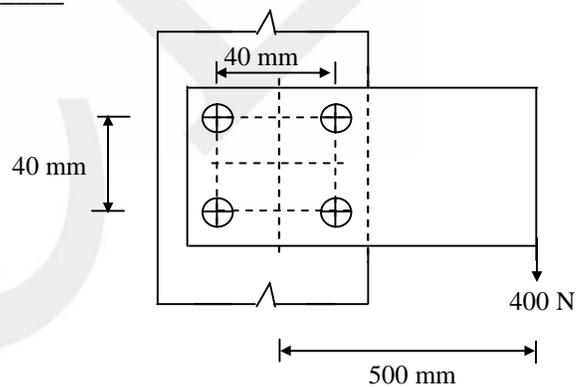


10. A stepped torsional bar is subjected to a torque of 100 Nm as shown in figure below. Modulus of rigidity of material is 90 GPa then angle of twist at end in degree is _____



(A) 0 (B) (C) (D)

11. A horizontal member is attached to vertical member by means of rivet joint as shown in figure. The total load of worst loaded rivet is _____



12. Maximum reduction in thickness for one pass in rolling process is Δh_{\max} that can be expressed by $\Delta h_{\max} = \mu^2 R$ where μ is coefficient friction between contact surfaces and R is roller radius. Then angle subtended by the deformation zone for $\mu = 0.1$ is _____

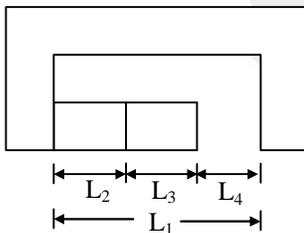


22. A flow over flat plate has same temperature that of flat then thermal boundary layer is
 (A) Thinner than hydrolic boundary layer
 (B) Thicker than hydrolic boundary layer
 (C) Equal to hydrolic boundary layer
 (D) a lot formed

23. A fluid flow with mean speed 2 m/s flow over plate of 2.5 m length has kinematic viscosity $2 \times 10^{-5} \text{ m}^2/\text{s}$. Use the relation $C_{fx} = \frac{1.328}{\sqrt{Re_x}}$, for Drag force per limit width of plate is ____

24. A Carnot engine (CE1) working between two reservoir A and B, which have temperature $T_A = 100 \text{ K}$ and $T_B = 500 \text{ K}$. Another Carnot engine (CE2) works between two reservoir B and C, $T_C = 300 \text{ K}$. Heat rejected by CE1 to reservoir B is completely transferred to CE2 and heat transferred to CE1 from reservoir A is 150 MJ then heat transferred to reservoir C is ____

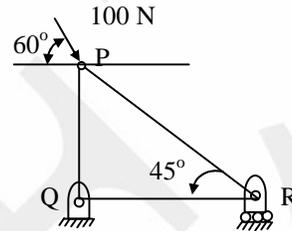
25. If $L_1 = 22 \pm 0.01 \text{ mm}$
 $L_2 = L_3 = 10 \pm 0.005 \text{ mm}$ then L_4 is ____



- (A) 2 ± 0.02 (B) 2 ± 0.05
 (C) 2 ± 0.002 (D) 2 ± 0.005

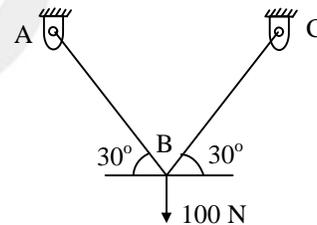
26. For hole size $25^{+0.04}_{+0.02}$ fits with pin size $25^{+0.05}_{+0.05}$ the fitting has minimum clearance of in mm

27. The truss is loaded as shown in figure then load carried by member PR and reaction at R are ____



- (A) 70.71 N, 50 N (B) 70.71, 150 N
 (C) 150 N, 50 N (D)

28. Load on member AB for truss as shown in figure is ____



29. An ant crawling on a path $(x-2)^2 + y^2 = 4$. At point P(4,0) has constant speed 1.57 m/s. Then time taken to reach point Q(2,2) in sec is ____



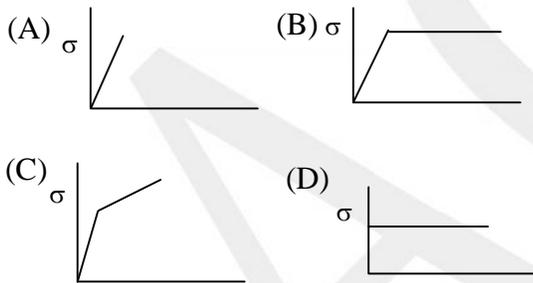
30.

Activity	Duration
1 - 2	3
2 - 3	2
4 - 3	3
1 - 4	3
2 - 5	2
3 - 5	2
4 - 5	4

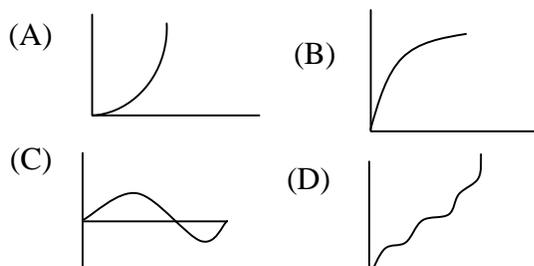
A project has following activity and activity duration. Then critical path is _____

- (A) 1 - 4 - 3 - 5 (B) 1 - 2 - 3 - 5
(C) 1 - 2 - 3 - 4 (D) 1 - 2 - 5

31. stress-strain diagram for brittle materials is



32. For a crank-slider mechanism of non zero masses, crank transmitting constant torque τ , rotating in counter clock wise friction as shown in figure correct lot for crank angle with time is



33. A venturimeter is attached to pipe of 80 mm diameter has throat of 40 mm diameter. It is found that pressure in the pipe and at throat is 400 kPa and 130 kPa respectively velocity of the flow in the pipe is _____

34. In CNC machine interpolator controls

- (A) Spindle speed
(B) Feed to tool
(C)
(D)

35. In machining operation if velocity doubled then the tool life reduced to (1/16 th) of initial value. Taylor's tool life index (n) for the a machining operation is _____

36. A column of length 1 m is hinged at both ends has cross section $10 \times 20 \text{ mm}^2$. Young's modulus of elasticity of 200 GPa. The maximum permissible axial compressive load that can apply is _____

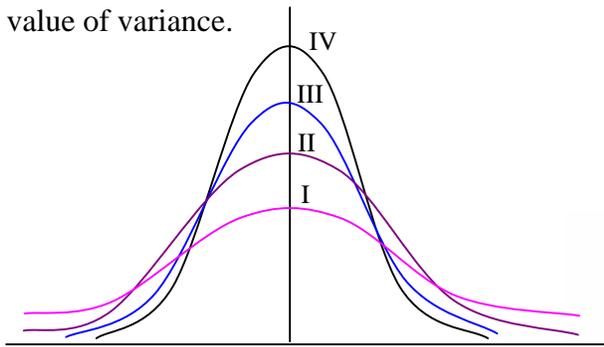
37. Arc welding has linear power characteristic open circuit voltage 80 V and short circuit current 300A. For maximum power current must set to _____ in A.

38. In arc welding process heat input per unit length is inversely proportional to

- (A) Voltage (B) Current
(C) Welding velocity
(D) Cycle duty time



39. Four different normal distributions curve is shown in figure below which one has least value of variance.



- (A) I (B) II (C) III (D) IV

41. A ball of mass 1 kg height 1 m fall freely on surface and 20 of velocity loot due to impact. After bounce back weight _____

42. In a pipe with constant flow rate, if diameter of pipe is halted and length of pipe is doubled then the head loss due to friction will be increased to by when amount of initial value.

- (A) 4 (B) 16 (C) 64 (D) 32

43. Using Simson's 1/3rd rule the value of

$$\int_0^1 \left(\frac{x^2}{2} + \frac{9}{5} \right) dx \text{ with minimum number of steps,}$$

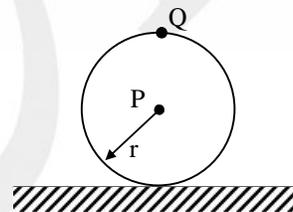
is _____

44. In insulated turbine, expansion takes place isentropically from state 1 and 20% of mass bleed at 20 kPa and remaining expanded to state 3, 9 kPa. At state 1, $m = 100 \text{ kg/s}$ $h_1 = \text{--- kJ/kg}$ state 2, steam is dry saturated with $h_2 = \text{--- kJ/kg}$ and state 3, $P = 9 \text{ kPa}$, h_f , h_g , s_f , s_g total work output of turbine is _____ (in MW).

45. It inlet of diesel engine density of air is 1.2 kg/m^3 and mass flow rate is --- kg/s compression ratio of 16 air standard efficiency of cycle is _____

49. A vibrating system transmit 50% of vibrating force to the support, system has a small mass --- kg place on pad, vibrates at frequency 60 rad/s. Natural frequency of vibration is so small. The stiffness of the spring that should added to the pad is _____ (N/m)

50. A disc is rolling on horizontal plan without slipping as shown. Point P has linear velocity 1 m/s then linear velocity of point Q is _____



51. If $a^2 + b^2 + c^2 = 1$, then $ab + bc + ca$ lies in which interval



General Aptitude

01. Closely same meaning to word 'Awkward'

- (A) Incet (B) Dreadful
(C) (D)

02. Ram and Ramesh attends interview for two vacancies in same department, Ram has probability of selection of $\frac{1}{6}$ and Ramesh has $\frac{1}{8}$, The probability of selection of either of them in interview is _____

03. Consider the following statements and conclusions given below

Statement:

- (I) All film stars are playback singers
(II) All directors are film stars

Conclusion:

- (I) All directors are playback singer
(II) Some of film stars are directors

Correct explanation is _____

- (A) Only conclusion (I) follows
(B) Only conclusion II follows
(C) both conclusion follows

(D) None of them follows

04. A tiger is followings a deer, when tiger takes 5 leaps, dear takes 4 leaps. Tiger is 50 leaps of own behind to dear. Tiger's leap is 8 m and deer's one leap is 5 m. The distance travelled by the tiger before catching the deer (in m) is _____

05. A man travel along the steam in 5 hours and take 10 hours to travel same distance in opposite direction to stream. The velocity of man in steady stream is _____

06. Fill in the blanks

Dhoni as well as his team member _____ present at occasion.

- (A) was (B) were
(C) has (D) have

NOTE: We don't claim the questions to be exact as given in GATE – 2015. The questions are based on memory of the students who appeared for the GATE – 2015 Exam.

***** Key will be uploaded very soon...*****