

National Testing Agency

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Mechanical Engineering

Group Number : 1
Group Id : 17807045
Group Maximum Duration : 0
Group Minimum Duration : 90
Show Attended Group? : No
Edit Attended Group? : No
Break time : 0
Group Marks : 300

Mechanical Engineering

Section Id : 17807045
Section Number : 1
Section type : Online
Mandatory or Optional : Mandatory
Number of Questions : 75
Number of Questions to be attempted : 75
Section Marks : 300
Maximum Instruction Time : 0
Sub-Section Number : 1
Sub-Section Id : 17807089
Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 1780703341 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

If $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ satisfies the matrix polynomial equation $A^2 - 4 + kI_2 = 0$, then determine the value of k.

1. 2
2. 1
3. 3
4. 0

Options :

17807013201. 1
17807013202. 2
17807013203. 3
17807013204. 4

Question Number : 2 Question Id : 1780703342 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

What are the absolute maximum value and the absolute minimum value of a function $f(x) = \sin x + \cos x$ in the interval $[0, \pi]$

1. $\sqrt{2}$ and 1
2. $\sqrt{2}$ and -1
3. 2 and 1
4. $\sqrt{2}$ and 0

Options :

17807013205. 1
17807013206. 2
17807013207. 3
17807013208. 4

Question Number : 3 Question Id : 1780703343 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A can hit a target 3 times in 5 shots, B 2 times in 5 shot and C three times in 4 shots. All of them fire one shot each simultaneously at the target. What is the probability that atleast two shots hit?

1. $\frac{63}{100}$
2. $\frac{9}{20}$
3. $\frac{98}{20825}$
4. $\frac{398}{10825}$

Options :

17807013209. 1
17807013210. 2
17807013211. 3
17807013212. 4

Question Number : 4 Question Id : 1780703344 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Using Poisson distribution, the probability that the ace of spades will be drawn from the pack of well shuffled cards at least once in 104 consecutive trials is:

1. 0.765
2. 0.894
3. 0.675
4. 0.865

Options :

17807013213. 1
17807013214. 2

17807013215. 3

17807013216. 4

Question Number : 5 Question Id : 1780703345 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $y = e^{x+e^x+e^{x+\dots\text{to } \infty}}$, what is value of $\frac{dy}{dx}$.

1. $\frac{dy}{dx} = \frac{y}{1-y}$

2. $\frac{dy}{dx} = \frac{y}{1+y}$

3. $\frac{dy}{dx} = \frac{1-y}{1+y}$

4. $\frac{dy}{dx} = \frac{1+y}{1-y}$

Options :

17807013217. 1

17807013218. 2

17807013219. 3

17807013220. 4

Question Number : 6 Question Id : 1780703346 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $\frac{dy}{dx} = y \sin 2x$ and $y(0) = 1$, then what is required solution?

1. $y = e^{\cos x}$

2. $y = e^{\cos 2x}$

3. $y = e^{\sin^2 x}$

4. $y = 4 \sin x e^{\cos x}$

Options :

17807013221. 1

17807013222. 2

17807013223. 3

17807013224. 4

Question Number : 7 Question Id : 1780703347 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A population grows at the rate of 8% per year. How long does it take for the population to double?

1. $10 \log 2$ years
2. $\frac{25}{2} \log 2$ years
3. 10 years
4. 12.5 years

Options :

17807013225. 1
17807013226. 2
17807013227. 3
17807013228. 4

Question Number : 8 Question Id : 1780703348 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of the integral $\int_C \frac{3z^2+z}{z^2-1} dz$, where C is the circle $|z-1| = 1$, is

1. $2\pi i$
2. $4\pi i$
3. $8\pi i$
4. $-4\pi i$

Options :

17807013229. 1
17807013230. 2
17807013231. 3
17807013232. 4

Question Number : 9 Question Id : 1780703349 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Using method of Regula Falsi a root of the equation $x^3 + x^2 - 3x - 3 = 0$ lying between 1 and 2 is

1. 1.627
2. 1.728
3. 1.023
4. 1.975

Options :

17807013233. 1
17807013234. 2
17807013235. 3
17807013236. 4

Question Number : 10 Question Id : 1780703350 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A slider sliding at 15 m/s on a link which is rotating at 30 r.p.m., is subjected to Coriolis' acceleration of magnitude.

1. $3\pi \text{ m/s}^2$
2. $30\pi \text{ m/s}^2$
3. $4\pi \text{ m/s}^2$
4. $40\pi \text{ m/s}^2$

Options :

17807013237. 1
17807013238. 2
17807013239. 3
17807013240. 4

Question Number : 11 Question Id : 1780703351 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A vertical double acting steam engine develops 75 kW at 250 r.p.m. The maximum fluctuation of energy is 30 percent of the work done per stroke. The maximum and minimum speeds are not to vary more than 1 percent on either side of the mean speed. What is the approximate mass of the flywheel required? If the radius of gyration is 0.6 m.

1. 347 kg
2. 447 kg
3. 547 kg
4. 647 kg

Options :

17807013241. 1
17807013242. 2
17807013243. 3
17807013244. 4

Question Number : 12 Question Id : 1780703352 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The height of a Watt's governor is expressed as

1. $h = g/\omega$
2. $h = 2g/\omega^2$
3. $h = g/(2\omega^2)$
4. $h = g/\omega^2$

Options :

17807013245. 1
17807013246. 2

17807013247. 3

17807013248. 4

Question Number : 13 Question Id : 1780703353 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The maximum frictional force which comes into play when a body just begins to slide over another surface is called

1. Sliding frictional force
2. Rolling frictional force
3. Kinetic frictional force
4. Limiting frictional force

Options :

17807013249. 1

17807013250. 2

17807013251. 3

17807013252. 4

Question Number : 14 Question Id : 1780703354 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The strain energy stored in a body due to a suddenly applied load compared to when it is applied gradually is -

1. Two times
2. Three times
3. Four times
4. No Change

Options :

17807013253. 1

17807013254. 2

17807013255. 3

17807013256. 4

Question Number : 15 Question Id : 1780703355 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The following conditions to be satisfied for a perfect truss (m = number of members, j = number of joints)

1. $j = (m+3)/2$
2. $j = (m-3)/2$
3. $j = (2m+3)/2$
4. $j = (2m-3)/2$

Options :

17807013257. 1

17807013258. 2

17807013259. 3

17807013260. 4

Question Number : 16 Question Id : 1780703356 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Structural steel forms neck before it breaks. Neck formation starts

1. before limit of proportionality
2. after yield strength
3. before ultimate strength
4. at ultimate strength

Options :

17807013261. 1

17807013262. 2

17807013263. 3

17807013264. 4

Question Number : 17 Question Id : 1780703357 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A principal plane is a plane of

1. minimum tensile stress
2. maximum tensile stress
3. zero shear stress
4. maximum shear stress

Options :

17807013265. 1

17807013266. 2

17807013267. 3

17807013268. 4

Question Number : 18 Question Id : 1780703358 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

At a point on the beam where shear force changes signs, the bending moment at that point is

1. zero
2. decreasing
3. maximum
4. increasing

Options :

17807013269. 1

17807013270. 2

17807013271. 3

17807013272. 4

Question Number : 19 Question Id : 1780703359 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The polar section modulus for a circular shaft of diameter "d" is :

1. $\frac{\pi d^3}{16}$

2. $\frac{\pi d^3}{32}$

3. $\frac{\pi d^3}{64}$

4. $\frac{\pi d^3}{128}$

Options :

17807013273. 1

17807013274. 2

17807013275. 3

17807013276. 4

**Question Number : 20 Question Id : 1780703360 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

The critical speed of a rotating shaft depends upon

1. mass

2. stiffness

3. mass and stiffness

4. mass, stiffness and eccentricity

Options :

17807013277. 1

17807013278. 2

17807013279. 3

17807013280. 4

**Question Number : 21 Question Id : 1780703361 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

All the failure theories give nearly the same results.

(A). When one of the principal stresses at a point is large in comparison to the other.

(B). When shear stress act

(C). When both the principal stresses are numerically equal.

Choose the **correct** answer from the options given below:

1. (A), and (B) only
2. (B) only
3. (C) only
4. (A) only

Options :

17807013281. 1
17807013282. 2
17807013283. 3
17807013284. 4

Question Number : 22 Question Id : 1780703362 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

For insulated tip, fin efficiency is given by

1. $\frac{\cosh(ml)}{ml}$
2. $\frac{\sinh(ml)}{ml}$
3. $\frac{\tanh(ml)}{l}$
4. $\frac{\tanh(ml)}{ml}$

Options :

17807013285. 1
17807013286. 2
17807013287. 3
17807013288. 4

Question Number : 23 Question Id : 1780703363 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

After expansion from a gas turbine, the hot exhaust gases are used to heat the compressed air from a compressor with the help of a cross flow compact heat exchanger of 0.8 effectiveness. What is the number of transfer units of the heat exchanger?

1. 2
2. 4
3. 6
4. 8

Options :

17807013289. 1
17807013290. 2
17807013291. 3
17807013292. 4

Question Number : 24 Question Id : 1780703364 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The ratio of $\frac{E_{\lambda,b2}}{E_{\lambda,b1}}$ is given as

1. $\left[T_2/T_1\right]^5$
2. $\left[T_2/T_1\right]^4$
3. $\left[T_2/T_1\right]^3$
4. $\left[T_2/T_1\right]^2$

Options :

17807013293. 1
17807013294. 2
17807013295. 3
17807013296. 4

Question Number : 25 Question Id : 1780703365 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A newtonian fluid is defined as the fluid which

1. is incompressible and non-viscous
2. obeys Newtons law of viscosity
3. is highly viscous
4. is compressible and non-viscous

Options :

17807013297. 1
17807013298. 2

17807013299. 3

17807013300. 4

Question Number : 26 Question Id : 1780703366 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Bernoulli's theorem deals with the law of conservation of

1. Mass
2. Momentum
3. Energy
4. Pressure

Options :

17807013301. 1

17807013302. 2

17807013303. 3

17807013304. 4

Question Number : 27 Question Id : 1780703367 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
Dimensionless Numbers	Relationship
(A). Froude's Number	(I). $\frac{\text{Pressure Force}}{\text{Inertia Force}}$
(B). Mach's Number	(II). $\sqrt{\frac{\text{Inertia force}}{\text{Gravity force}}}$
(C). Euler's Number	(III). $\frac{\text{Inertia Force}}{\text{Surface Tension Force}}$
(D). Weber's Number	(IV). $\sqrt{\frac{\text{Inertia force}}{\text{Elastic Force}}}$

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options :

17807013305. 1

17807013306. 2

17807013307. 3

17807013308. 4

Question Number : 28 Question Id : 1780703368 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Pascal's Law state that pressure at a point is equal in all directions

1. in a moving fluid
2. in a fluid at rest
3. in a laminar flow
4. in a turbulent flow

Options :

17807013309. 1
17807013310. 2
17807013311. 3
17807013312. 4

Question Number : 29 Question Id : 1780703369 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An aeroplane is flying at a height of 15 km, where the temperature is -50°C . Assuming $k= 1.4$ and $R= 287 \text{ J/kg K}$, the approximate speed of the plane corresponding to $M= 2.0$ will be ?

1. 1955 km/hour
2. 2055 km/hour
3. 2155 km/hour
4. 2255 km/hour

Options :

17807013313. 1
17807013314. 2
17807013315. 3
17807013316. 4

Question Number : 30 Question Id : 1780703370 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The thickness of a laminar boundary layer at a distance x from the leading edge over a flat plate varies as

1. $x^{\frac{2}{3}}$
2. $x^{\frac{1}{5}}$
3. $x^{\frac{2}{5}}$
4. $x^{\frac{1}{2}}$

Options :

17807013317. 1
17807013318. 2
17807013319. 3
17807013320. 4

Question Number : 31 Question Id : 1780703371 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The latent heat of vapourisation at critical point is

1. less than zero
2. greater than zero
3. equal to zero
4. equal to one

Options :

17807013321. 1
17807013322. 2
17807013323. 3
17807013324. 4

Question Number : 32 Question Id : 1780703372 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
(A). Work done in a polytropic process	(I). $-\int v \, dp$
(B). Work done in a steady flow process	(II). Zero
(C). Heat transfer in a reversible adiabatic process	(III). $\frac{p_1 V_1 - p_2 V_2}{\gamma - 1}$
(D). Work done in an isentropic process	(IV). $\frac{p_1 V_1 - p_2 V_2}{n - 1}$

Choose the **correct** answer from the options given below:

1. (A) - (IV) , (B) - (I) , (C) - (III), (D) - (II)
2. (A) - (I), (B) - (IV), (C) - (II), (D) - (III)
3. (A) - (IV), (B) - (I), (C) - (II) , (D) - (III)
4. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

Options :

17807013325. 1
17807013326. 2
17807013327. 3
17807013328. 4

Question Number : 33 Question Id : 1780703373 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Which thermodynamics law predicts correctly, the degree of completion of chemical reaction?

1. Zeroth law
2. First law
3. Second law
4. Third law

Options :

17807013329. 1
17807013330. 2
17807013331. 3
17807013332. 4

Question Number : 34 Question Id : 1780703374 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A refrigerating machine working on reversed Carnot cycle takes out 2 kW of heat from the system while working between temperature limits of 300K and 200K. Coefficient of performance and power consumed by the cycle will be respectively.

1. 1 and 1 kW
2. 2 and 1 kW
3. 1 and 2 kW
4. 2 and 2 kW

Options :

17807013333. 1
17807013334. 2
17807013335. 3
17807013336. 4

Question Number : 35 Question Id : 1780703375 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the following statements:

- (A). Availability is generally conserved.
- (B). Availability can neither be negative or positive
- (C). Availability is the maximum theoretical work obtainable.
- (D). Availability can be destroyed in irreversibilities.

Choose the **correct** answer from the options given below:

1. (A), and (B) only
2. (A), and (C) only
3. (B), and (D) only
4. (C) and (D) only

Options :

17807013337. 1
17807013338. 2

17807013339. 3

17807013340. 4

Question Number : 36 Question Id : 1780703376 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Gas contained in a closed system consisting of a piston cylinder arrangement is expanded. Work done by the gas during expansion is 50 kJ. Decreases in internal energy of the gas during expansion is 30 kJ. Heat transfer during the process is equal to

1. -20 kJ
2. +20 kJ
3. -80 kJ
4. +80 kJ

Options :

17807013341. 1

17807013342. 2

17807013343. 3

17807013344. 4

Question Number : 37 Question Id : 1780703377 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a psychrometric chart, what does a vertical downward line represent?

1. Sensible cooling process
2. Adiabatic saturation process
3. Humidification process
4. Dehumidification process

Options :

17807013345. 1

17807013346. 2

17807013347. 3

17807013348. 4

Question Number : 38 Question Id : 1780703378 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
(Details of the processes of the cycle)	(Name of the cycle.)
(A). Two adiabatic, one isobaric and two isochoric.	(I). Diesel
(B). Two adiabatic and two isochoric.	(II). Carnot
(C). Two adiabatic, one isobaric and one isochoric.	(III). Dual
(D). Two adiabatics, and two isothermals.	(IV). Otto

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options :

17807013349. 1
17807013350. 2
17807013351. 3
17807013352. 4

Question Number : 39 Question Id : 1780703379 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An impulse turbine produces 50 kW of power when the blade mean speed is 400 m/s. What is the rate of change of momentum tangential to the rotor?

1. 200 N
2. 175 N
3. 150 N
4. 125 N

Options :

17807013353. 1
17807013354. 2
17807013355. 3
17807013356. 4

Question Number : 40 Question Id : 1780703380 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In which one of the following materials the heat energy propagation is minimum due to conduction heat transfer?

1. Lead
2. Copper
3. Water
4. Air

Options :

- 17807013357. 1
- 17807013358. 2
- 17807013359. 3
- 17807013360. 4

Question Number : 41 Question Id : 1780703381 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the kinetic energy of the body with constant mass becomes four times the initial value, then the new momentum will be

- 1. four times the initial value
- 2. three times the initial value
- 3. two times the initial value
- 4. same as the initial value

Options :

- 17807013361. 1
- 17807013362. 2
- 17807013363. 3
- 17807013364. 4

Question Number : 42 Question Id : 1780703382 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The Nusselt number is related to the Reynolds number in laminar and turbulent flows respectively as

- 1. $Re^{-0.5}$ and $Re^{0.8}$
- 2. $Re^{0.5}$ and $Re^{0.8}$
- 3. $Re^{-0.5}$ and $Re^{-0.8}$
- 4. $Re^{0.5}$ and $Re^{-0.8}$

Options :

- 17807013365. 1
- 17807013366. 2
- 17807013367. 3
- 17807013368. 4

Question Number : 43 Question Id : 1780703383 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The equation of free vibration of a system is $\ddot{X} + 36\pi^2 X = 0$. Its natural frequency is

1. 4 Hz
2. 3 Hz
3. 6π Hz
4. 6 Hz

Options :

17807013369. 1
17807013370. 2
17807013371. 3
17807013372. 4

Question Number : 44 Question Id : 1780703384 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A body starting with initial velocity zero, moves in a straight line as per the law $s = 5t^3 - 3t^2 - 5$ (s = distance (m), t = time(s)). The acceleration of particle after 0.5 seconds will be

1. 8 m/s²
2. 9 m/s²
3. 10 m/s²
4. 11 m/s²

Options :

17807013373. 1
17807013374. 2
17807013375. 3
17807013376. 4

Question Number : 45 Question Id : 1780703385 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

According to maximum shear stress failure theory, yielding in material occurs when:

1. *Maximum shear stress* = $\sqrt{2} \times \text{yield stress}$
2. *Maximum shear stress* = $\frac{1}{2} \times \text{yield stress}$
3. *Maximum shear stress* = $2 \times \text{yield stress}$
4. *Maximum shear stress* = $\sqrt{\frac{2}{3}} \times \text{yield stress}$

Options :

17807013377. 1
17807013378. 2
17807013379. 3
17807013380. 4

Question Number : 46 Question Id : 1780703386 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
 Is Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1

During tensile tests on mild steel specimens, the following points are observed.

- (A). Elastic limit
- (B). Proportionality limit
- (C). Yield Point
- (D). Fracture point

Choose the **correct sequence of observation after the application of loading**

- 1. (A), (B), (C), (D)
- 2. (A), (C), (B), (D)
- 3. (B), (A), (C), (D)
- 4. (C), (B), (D), (A)

Options :

- 17807013381. 1
- 17807013382. 2
- 17807013383. 3
- 17807013384. 4

Question Number : 47 Question Id : 1780703387 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
 Is Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
Types of steel/Cast Iron (Iron - carbon diagram)	% of Carbon
(A) Hypo -eutectoid steel	(I) 0.8-2.0
(B) Hyper -eutectoid steel	(II) 4.3-6.67
(C) Hypo-eutectic Cast Iron	(III) 0.008-0.8
(D) Hyper eutectic Cast Iron	(IV) 2.0-4.3

Choose the **correct** answer from the options given below:

- 1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
- 2. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
- 3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
- 4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options :

- 17807013385. 1
- 17807013386. 2
- 17807013387. 3
- 17807013388. 4

Question Number : 48 Question Id : 1780703388 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The DC power source for arc welding has the characteristics $3V + I = 240$, where 'V' is the voltage in volt and 'I' is the current in ampere. For maximum power at the electrode, voltage should be set at -

1. 40 V
2. 140 V
3. 220 V
4. 240 V

Options :

17807013389. 1
17807013390. 2
17807013391. 3
17807013392. 4

Question Number : 49 Question Id : 1780703389 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
Machining Processes	Mechanism of Material Removal Reaction
(A) Chemical Machining	(I) Fusion and vaporisation
(B) Electro- Machining	(II) Corrosive
(C) Electro-chemical discharge Machining	(III) Erosion
(D) Ultrasonic Machining	(IV) Ion displacement

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

Options :

17807013393. 1
17807013394. 2
17807013395. 3
17807013396. 4

Question Number : 50 Question Id : 1780703390 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

If a helical spring is halved in length, its spring stiffness remains

1. same
2. halves
3. doubles
4. triples

Options :

17807013397. 1
17807013398. 2
17807013399. 3
17807013400. 4

Question Number : 51 Question Id : 1780703391 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
Casting products	Casting processes
(A). Hollow statues	(I). Gravity die casting
(B). Dentures	(II). Slush casting
(C). Aluminum alloy pistons	(III). Shell moulding
(D). Rocker arms	(IV). Investment casting

Choose the **correct** answer from the options given below:

1. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

Options :

17807013401. 1
17807013402. 2
17807013403. 3
17807013404. 4

Question Number : 52 Question Id : 1780703392 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is a solid state joining process?

1. Gas tungston arc welding
2. Friction welding
3. Submerged arc welding
4. Resistance spot welding

Options :

17807013405. 1

17807013406. 2
17807013407. 3
17807013408. 4

Question Number : 53 Question Id : 1780703393 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Sine bar is specified by

1. Its total length
2. The size of rollers
3. The weight of the Sine bar
4. The center distance between two rollers

Options :

17807013409. 1
17807013410. 2
17807013411. 3
17807013412. 4

Question Number : 54 Question Id : 1780703394 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

V- block used in the workshop to check

1. surface roughness of work piece
2. dimensions of oval job
3. taper on job
4. roundness of cylindrical job

Options :

17807013413. 1
17807013414. 2
17807013415. 3
17807013416. 4

Question Number : 55 Question Id : 1780703395 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The power required for turning a mild steel rod is found to be $0.1 \text{ kW/cm}^3/\text{min}$. The maximum power available at the machine spindle is 4 kW. Assuming a cutting speed of 38 m/min and feed rate of 0.32 mm/rev, the maximum metal removal rate and depth of cut are respectively:

1. $48 \text{ cm}^3/\text{min}$ and 3.29 mm
2. $40 \text{ cm}^3/\text{min}$ and 3.29 mm
3. $40 \text{ cm}^3/\text{min}$ and 4.29 mm
4. $48 \text{ cm}^3/\text{min}$ and 4.29 mm

Options :

17807013417. 1
17807013418. 2
17807013419. 3

17807013420. 4

**Question Number : 56 Question Id : 1780703396 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1**

Feed drives in CNC milling are provided by

1. Servo Motors
2. Induction Motors
3. Stepper Motors
4. Synchronous Motors

Options :

17807013421. 1
17807013422. 2
17807013423. 3
17807013424. 4

**Question Number : 57 Question Id : 1780703397 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1**

Order writing in the area of production planning and control is included in the phase of

1. action phase
2. control phase
3. planning phase
4. both action and planning phase

Options :

17807013425. 1
17807013426. 2
17807013427. 3
17807013428. 4

**Question Number : 58 Question Id : 1780703398 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1**

A company requires 16000 units of raw material costing Rs 2 per unit. The cost of placing an order is Rs 100 and the carrying costs are 10 % per year per unit of the average inventory, The Economic Order Quantity is

1. 4000 units.
2. 4040 units.
3. 4004 units.
4. 4400 units.

Options :

17807013429. 1
17807013430. 2
17807013431. 3
17807013432. 4

**Question Number : 59 Question Id : 1780703399 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

The integration of CAD and CAM is known as

1. CAE
2. CAM alone
3. CAD alone
4. CIM

Options :

17807013433. 1
17807013434. 2
17807013435. 3
17807013436. 4

Question Number : 60 Question Id : 1780703400 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Simplex method is used for

1. Value Engineering
2. Linear programming
3. Queuing theory
4. Network analysis

Options :

17807013437. 1
17807013438. 2
17807013439. 3
17807013440. 4

Question Number : 61 Question Id : 1780703401 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If 'A' is the optimistic time, 'B' is the pessimistic time and 'C' is the most likely time of an activity, then the expected time of activity is

1. $\frac{(A + 4B + C)}{6}$
2. $\frac{(4A + B + C)}{6}$
3. $\frac{(A + B + 4C)}{6}$
4. $\frac{(4A + 4B + C)}{6}$

Options :

17807013441. 1
17807013442. 2
17807013443. 3

Question Number : 62 Question Id : 1780703402 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Arrange the following steps in the correct sequence for a basic mechatronic system

- (A). Process the data in a micro-controller or processor
- (B). Generate a physical output using actuators
- (C). Sense input from the environment using sensors
- (D). Convert the output to a desired form (mechanical, electrical etc.)

Choose the **correct** answer from the options given below:

- 1. (A), (B), (C), (D)
- 2. (A), (C), (B), (D)
- 3. (C), (A), (B), (D)
- 4. (C), (B), (D), (A)

Options :

- 17807013445. 1
- 17807013446. 2
- 17807013447. 3
- 17807013448. 4

Question Number : 63 Question Id : 1780703403 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Arrange the following elements of a feedback control loop in the correct order

- (A). Actuator
- (B). Error detection
- (C). Controller
- (D). Feedback sensor

Choose the **correct** answer from the options given below:

- 1. (B), (C), (A), (D)
- 2. (A), (C), (B), (D)
- 3. (B), (A), (D), (C)
- 4. (C), (B), (D), (A)

Options :

- 17807013449. 1
- 17807013450. 2
- 17807013451. 3
- 17807013452. 4

Question Number : 64 Question Id : 1780703404 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following describes the function of a sensor?

1. Converts energy into motion
2. Provide corrective option
3. Processes data and controls actions
4. Measures physical parameters

Options :

- 17807013453. 1
- 17807013454. 2
- 17807013455. 3
- 17807013456. 4

Question Number : 65 Question Id : 1780703405 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Arrange the steps in the flow of power for a robotic arm, in the correct order

- (A). Controller sends signals to actuators
- (B). Motion is transmitted to joints via gears or linkages.
- (C). Input power source supplies energy
- (D). Actuators convert electric energy into mechanical motion

Choose the **correct** answer from the options given below:

1. (A), (B), (C), (D)
2. (A), (C), (B), (D)
3. (C), (A), (D),(B)
4. (C), (B), (D), (A)

Options :

- 17807013457. 1
- 17807013458. 2
- 17807013459. 3
- 17807013460. 4

Question Number : 66 Question Id : 1780703406 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Using a robot with 1 degree of freedom and having 1 sliding point with a full range of 1m, if the robot's control memory has a 12-bit storage capacity then, the control resolution for the axis of motion will be:

1. 0.144 mm
2. 0.244 mm
3. 0.344 mm
4. 0.444 mm

Options :

- 17807013461. 1

17807013462. 2
17807013463. 3
17807013464. 4

Question Number : 67 Question Id : 1780703407 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Match **List-I** with **List-II**

List-I	List-II
Terms	Description
(A). Mechatronics	(I). Converts digital signal to analog signal
(B). Actuators	(II). The integration of mechanics, electronics and computing
(C). D/A Converter	(III). Converts control signals into physical motion
(D). Servo Motor	(IV). A motor is designed for precise control of angular or linear positions.

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (II), (B) - (III), (C) - (I), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options :

17807013465. 1
17807013466. 2
17807013467. 3
17807013468. 4

Question Number : 68 Question Id : 1780703408 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The degrees of freedom of a SCARA robot are

1. two
2. three
3. four
4. five

Options :

17807013469. 1
17807013470. 2
17807013471. 3
17807013472. 4

Question Number : 69 Question Id : 1780703409 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The translatory joint in robot is known as

1. spherical
2. cylindrical
3. prismatic
4. revolute

Options :

17807013473. 1
17807013474. 2
17807013475. 3
17807013476. 4

Question Number : 70 Question Id : 1780703410 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Name of the device that selects between several analog or digital input signals and forwards the selected input to a single output line

1. Modulator
2. Router
3. LAN
4. Multiplexer

Options :

17807013477. 1
17807013478. 2
17807013479. 3
17807013480. 4

Question Number : 71 Question Id : 1780703411 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following symbols is used as the notation for designing arm and body of a robot, with joined arm configuration?

1. TRL
2. TLL, LTL, LVL
3. LLL
4. TRR

Options :

17807013481. 1
17807013482. 2
17807013483. 3
17807013484. 4

Question Number : 72 Question Id : 1780703412 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following is not an actuator?

1. Hydraulic actuator
2. Digital actuator
3. Pneumatic actuator
4. Electric actuator

Options :

17807013485. 1
17807013486. 2
17807013487. 3
17807013488. 4

Question Number : 73 Question Id : 1780703413 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Automated Guided Vehicle (AGV) robots can be placed in the category of

1. Mobile robot
2. Neutral robot
3. Saturated robot
4. Unsaturated robot

Options :

17807013489. 1
17807013490. 2
17807013491. 3
17807013492. 4

Question Number : 74 Question Id : 1780703414 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Proximity Sensors are used to

1. detect non-magnetic but conductive materials
2. measure the strain
3. measure the distance
4. measure the temperature

Options :

17807013493. 1
17807013494. 2
17807013495. 3
17807013496. 4

Question Number : 75 Question Id : 1780703415 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following devices produces incremental motion through equal pulses?

1. AC servomotor
2. DC Servomotor
3. Stepper motor
4. Series motor

Options :

17807013497. 1
17807013498. 2
17807013499. 3
17807013500. 4