

# Andhra Pradesh State Council of Higher Education

## Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name :</b>	Metallurgical Engineering 22nd July 2022 Shift 2
<b>Duration :</b>	180
<b>Total Marks :</b>	200
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No

## Mathematics

Section Id :	722544116
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 1 Question Id : 7225445802 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $A = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$  then  $A^T + A = I_2$  if

Options :

1. ✘  $\theta = n\pi, n \in \mathbb{Z}$

2. ✘  $\theta = (2n+1)\frac{\pi}{2}, n \in \mathbb{Z}$

3. ✔  $\theta = 2n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$

4. ✘  $\theta = (2n+1)\frac{\pi}{4}, n \in \mathbb{Z}$

**Question Number : 2 Question Id : 7225445803 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If for the matrix  $A$ ,  $A^3 = I$  then  $A^{-1} =$

**Options :**

1. ✓  $A^2$

2. ✗  $A^3$

3. ✗  $A$

4. ✗  $A^4$

**Question Number : 3 Question Id : 7225445804 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of  $\lambda$  for which the system of equations  
 $x + y + z = 6$  ,  $x + 2y + 3z = 10$  ,  $x + 2y + \lambda z = 12$  is inconsistent is

**Options :**

1. ✗  $\lambda = 1$

2. ✗  $\lambda = 2$

3. ✗  $\lambda = -2$

4. ✓  $\lambda = 3$

**Question Number : 4 Question Id : 7225445805 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$  then the value of  $|\text{adj } A|$  is

**Options :**

1. ✗  $a^{27}$

2. ✗  $a^9$

3. ✓  $a^6$

4. ✗  $a^2$

**Question Number : 5 Question Id : 7225445806 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $A + 2B = \begin{bmatrix} 1 & 2 & 0 \\ 6 & -3 & 3 \\ -5 & 3 & 1 \end{bmatrix}$  and  $2A - B = \begin{bmatrix} 2 & -1 & 5 \\ 2 & -1 & 6 \\ 0 & 1 & 2 \end{bmatrix}$  then  $\text{tr}(A) - \text{tr}(B)$  value equal

to

Options :

1. ✘ 0

2. ✘ 1

3. ✔ 2

4. ✘ 3

Question Number : 6 Question Id : 7225445807 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{2x+3}{(x+1)(x-3)} = \frac{a}{x+1} + \frac{b}{x-3} \text{ then } 2a+3b =$$

Options :

1. ✘ 14

2. ✘ 12

3. ✓  $25/4$

4. ✗  $-12$

**Question Number : 7 Question Id : 7225445808 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*The Number of partial fractions of  $\frac{3x^2 + 70x + 93}{(x-1)^4}$  is*

**Options :**

1. ✓  $3$

2. ✗  $4$

3. ✗  $5$

4. ✗  $2$

**Question Number : 8 Question Id : 7225445809 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*Given that  $A = \sin^2 \theta + \cos^4 \theta$ , then for all real values of  $\theta$*

**Options :**

1. ✘  $1 \leq A \leq 2$

2. ✔  $\frac{3}{4} \leq A \leq 1$

3. ✘  $\frac{13}{16} \leq A \leq 1$

4. ✘  $\frac{3}{4} \leq A \leq \frac{13}{16}$

**Question Number : 9 Question Id : 7225445810 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $\tan \theta = -\frac{4}{3}$ , then  $\sin \theta =$

**Options :**

1. ✘  $-\frac{4}{5}$  but not  $\frac{4}{5}$

2. ✔  $-\frac{4}{5}$  or  $\frac{4}{5}$

3. ✘  $\frac{4}{5}$  but not  $-\frac{4}{5}$

4. ✘  $-\frac{3}{5}$  but not  $\frac{3}{5}$

Question Number : 10 Question Id : 7225445811 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

*The general solution of*

$$\sin x - 3 \sin 2x + \sin 3x = \cos x - 3 \cos 2x + \cos 3x \text{ is}$$

Options :

1. ✘  $n\pi + \frac{\pi}{8}$

2. ✔  $\frac{n\pi}{2} + \frac{\pi}{8}$

3. ✘  $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$

4. ✘  $2n\pi + \cos^{-1} \frac{3}{2}$



**Question Number : 11 Question Id : 7225445812 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If  $x, y, z$  are in AP and  $\tan^{-1} x, \tan^{-1} y$  and  $\tan^{-1} z$  are also in AP then*

**Options :**

1. ✓  $x = y = z$

2. ✗  $2x = 3y = 6z$

3. ✗  $6x = 3y = 2z$

4. ✗  $6x = 4y = 3z$

**Question Number : 12 Question Id : 7225445813 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$  then  $x =$*

**Options :**

1. ✓  $\frac{1}{6}$

2. ✘  $\frac{1}{3}$

3. ✘  $\frac{1}{2}$

4. ✘  $\frac{3}{2}$

**Question Number : 13 Question Id : 7225445814 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The sides of a triangle are in the ratio  $1 : \sqrt{3} : 2$  then the angles of the triangle are in the ratio

**Options :**

1. ✘  $1:3:5$

2. ✘  $2:3:2$

3. ✘  $3:2:1$

4. ✔  $1:2:3$

**Question Number : 14 Question Id : 7225445815 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Let  $\cos(\alpha + \beta) = \frac{4}{5}$  and  $\sin(\alpha - \beta) = \frac{5}{13}$  where  $0 < \alpha, \beta \leq \frac{\pi}{4}$ , then  $\tan 2\alpha =$

**Options :**

1. ✘  $\frac{19}{12}$

2. ✘  $\frac{20}{7}$

3. ✘  $\frac{25}{16}$

4. ✔  $\frac{56}{33}$

**Question Number : 15 Question Id : 7225445816 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $1 + \sin x + \sin^2 x + \sin^3 x + \dots \infty = 4 + 2\sqrt{3}$ ,  $0 < x < \pi$ , then  $x =$

**Options :**

1. ✘  $\frac{\pi}{6}$

2. ✘  $\frac{\pi}{4}$

3. ✔  $\frac{2\pi}{3}$

4. ✘  $\frac{3\pi}{4}$

**Question Number : 16 Question Id : 7225445817 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The angles of a triangle are in the ratio 3:5:10 then the ratio of the smallest side to the greatest side is

**Options :**

1. ✘  $1 : \sin 10^\circ$

2. ✘  $1 : 2\sin 10^\circ$

3. ✘  $1 : \cos 10^\circ$

4. ✔  $1 : 2\cos 10^\circ$

Question Number : 17 Question Id : 7225445818 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$  then  $\cos^{-1} x + \cos^{-1} y =$

Options :

1. ✘  $\frac{2\pi}{3}$

2. ✔  $\frac{\pi}{3}$

3. ✘  $\frac{\pi}{6}$

4. ✘  $\pi$

Question Number : 18 Question Id : 7225445819 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The conjugate of a complex number is  $\frac{1}{i-1}$ , then that complex number is

Options :

1. ✓  $\frac{-1}{i+1}$

2. ✗  $\frac{1}{i-1}$

3. ✗  $\frac{-1}{i-1}$

4. ✗  $\frac{1}{i+1}$

**Question Number : 19 Question Id : 7225445820 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of  $\frac{(\sin \pi/8 + i \cos \pi/8)^8}{(\sin \pi/8 - i \cos \pi/8)^8} =$

**Options :**

1. ✗  $-1$

2. ✗  $0$

3. ✓ 1

4. ✗  $2i$ 

**Question Number : 20 Question Id : 7225445821 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*The lines  $2x - 3y - 5 = 0$  and  $3x - 4y = 7$  are diameters of a circle of area  $49\pi$  sq.units, then the equation of the circle is*

**Options :**

1. ✗  $x^2 + y^2 + 2x - 2y - 62 = 0$

2. ✗  $x^2 + y^2 + 2x - 2y - 47 = 0$

3. ✓  $x^2 + y^2 - 2x + 2y - 47 = 0$

4. ✗  $x^2 + y^2 - 2x + 2y - 62 = 0$

**Question Number : 21 Question Id : 7225445822 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the point  $(a, -a)$  lies inside the circle  $x^2 + y^2 - 4x + 2y - 8 = 0$ , then 'a' lies in the interval

Options :

1. ✓  $(-1, 4)$
2. ✗  $(-\infty, -1)$
3. ✗  $(4, \infty)$
4. ✗  $[-1, 4]$

Question Number : 22 Question Id : 7225445823 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The focus of the parabola  $y^2 - 4y - 8x + 4 = 0$  is

Options :

1. ✗  $(1, 1)$
2. ✗  $(1, 2)$
3. ✗  $(2, 1)$



4. ✓ (2,2)

**Question Number : 23 Question Id : 7225445824 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The equation  $\frac{x^2}{10-a} + \frac{y^2}{4-a} = 1$  represents an ellipse if

**Options :**

1. ✓  $a < 4$ 2. ✗  $a > 4$ 3. ✗  $4 < a < 10$ 4. ✗  $a > 10$ 

**Question Number : 24 Question Id : 7225445825 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The vertices of the hyperbola  $9x^2 - 16y^2 - 36x + 96y - 252 = 0$ , are

**Options :**

1. ✗ (6,3) and (-6,3)

2. ✓  $(6,3)$  and  $(-2,3)$

3. ✗  $(-6,3)$  and  $(-6,-3)$

4. ✗  $(0, \pm \frac{2}{3})$

**Question Number : 25 Question Id : 7225445826 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*The eccentricity of the hyperbola with latus rectum 12 and semi conjugate axis  $2\sqrt{3}$  is*

**Options :**

1. ✓ 2

2. ✗ 3

3. ✗  $\sqrt{3}/2$

4. ✗  $2\sqrt{3}$

**Question Number : 26 Question Id : 7225445827 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The side of an equilateral triangle expands at the rate of 2 cm/sec, the rate of increase of its area when each side is 10 cm (in  $\text{cm}^2/\text{sec}$ )

Options :

1. ✘  $10\sqrt{2}$
2. ✘  $10\sqrt{3}$
3. ✔ 10
4. ✘ 5

Question Number : 27 Question Id : 7225445828 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(x+y) = f(x) f(y)$ , for all  $x, y$ .  $f(5) = 2$ ,  $f'(0) = 3$ , then  $f'(5) =$

Options :

1. ✔ 6
2. ✘ 2
3. ✘ 3

4. ✘ 5

**Question Number : 28 Question Id : 7225445829 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

$$\lim_{x \rightarrow \infty} \left[ \frac{x^2 + 2x - 1}{2x^2 - 3x - 2} \right]^{\frac{2x+1}{2x-1}} \text{ is equal to}$$

Options :

1. ✘ 0

2. ✘  $\infty$ 3. ✔  $1/2$ 4. ✘  $1/3$ 

**Question Number : 29 Question Id : 7225445830 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

$$\lim_{x \rightarrow 0} \frac{\sin^2 mx}{\tan^2 nx} \text{ is equal to}$$

Options :

1. ✘  $m/n$

2. ✘  $m^2 \cdot n^2$

3. ✔  $m^2/n^2$

4. ✘  $n^2/m^2$

**Question Number : 30 Question Id : 7225445831 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $f(x) = |x^2 - 5x + 6|$  then  $f'(x) =$

**Options :**

1. ✘  $2x - 5$  for  $2 < x < 3$

2. ✔  $5 - 2x$  for  $2 < x < 3$

3. ✘  $2x - 5$  for  $x > 2$

4. ✘  $5 - 2x$  for  $x < 3$

**Question Number : 31 Question Id : 7225445832 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $y = \log_y x$ , then  $\frac{dy}{dx} =$

Options :

1. ✓  $\frac{1}{x(1+\log y)}$

2. ✗  $\frac{1}{x+\log y}$

3. ✗  $\frac{1}{\log x(1+y)}$

4. ✗  $\frac{1}{y+\log x}$

Question Number : 32 Question Id : 7225445833 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The angle between tangents to the curve  $y = x^2 - 5x + 6$  at the points  $(2,0)$  and  $(3,0)$  is

Options :

1. ✘  $\frac{\pi}{3}$

2. ✔  $\frac{\pi}{2}$

3. ✘  $\frac{\pi}{6}$

4. ✘  $\frac{\pi}{4}$

**Question Number : 33 Question Id : 7225445834 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If errors of 1% is made in the base radius and height of a cylinder then the percentage error in its volume is*

**Options :**

1. ✘ 1%

2. ✘ 2%

3. ✔ 3%

4. ✘ 4%

Question Number : 34 Question Id : 7225445835 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of 'a' for which the function  $f(x) = a \sin x + \frac{1}{3} \sin 3x$

has an extremum at  $x = \frac{\pi}{3}$  is

Options :

1. ✘ 1

2. ✘ -1

3. ✘ 0

4. ✔ 2

Question Number : 35 Question Id : 7225445836 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $u = x^y$  then  $\frac{\partial^2 u}{\partial x \partial y} =$

Options :



1. ✘  $x^{y-1}(1+x \log y)$

2. ✘  $y^{x-1}(1+y \log x)$

3. ✔  $x^{y-1}(1+y \log x)$

4. ✘  $x^{y+1}(1-y \log x)$

**Question Number : 36 Question Id : 7225445837 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of  $\int e^{\sin^{-1} x} \frac{1}{\sqrt{1-x^2}} dx$

**Options :**

1. ✘  $2e^{\sin^{-1} x} + c$

2. ✔  $e^{\sin^{-1} x} + c$

3. ✘  $e^{\sin x} + c$

4. ✘  $e^{\cos^{-1} x} + c$

**Question Number : 37 Question Id : 7225445838 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

$$\text{If } \int \frac{4x+1}{x^2+3x+2} dx = a \log |x+1| + b \log |x+2| + C, \text{ then}$$

**Options :**

1. ✘  $a = b$
2. ✔  $a + b = 4$
3. ✘  $a = 2b$
4. ✘  $b = 2a$

**Question Number : 38 Question Id : 7225445839 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

$$\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx =$$

**Options :**

1. ✘  $-\frac{1}{\sin x + \cos x} + c$

2. ✓  $\log |\sin x + \cos x| + c$

3. ✗  $\log |\sin x - \cos x| + c$

4. ✗  $(\sin x + \cos x)^2 + c$

**Question Number : 39 Question Id : 7225445840 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $\int f(x)dx = 2(f(x))^3 + C$  then  $f(x) =$

**Options :**

1. ✗  $\frac{x}{2}$

2. ✗  $x^3$

3. ✗  $\frac{1}{\sqrt{x}}$

4. ✓  $\sqrt{\frac{x}{3}}$

Question Number : 40 Question Id : 7225445841 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\text{If } \int e^{ax} \cos bx \, dx = \frac{e^{2x}}{29} f(x) + C, \text{ then } f''(x) =$$

Options :

1. ✘  $29f(x)$
2. ✘  $-29f(x)$
3. ✘  $25f(x)$
4. ✔  $-25f(x)$

Question Number : 41 Question Id : 7225445842 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\text{The value of } x \text{ in } \int_{\sqrt{2}}^x \frac{1}{t\sqrt{t^2-1}} dt = \frac{\pi}{2} \text{ is}$$

Options :

1. ✘  $\frac{\sqrt{3}}{2}$

2. ✘  $2\sqrt{2}$

3. ✘  $2$

4. ✔  $-\sqrt{2}$

**Question Number : 42 Question Id : 7225445843 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of  $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$

**Options :**

1. ✔  $\frac{\pi^3}{24}$

2. ✘  $\frac{\pi^3}{48}$

3. ✘  $\frac{\pi^3}{64}$

4. ✘  $\frac{\pi^3}{12}$

Question Number : 43 Question Id : 7225445844 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(x)$  is a polynomial of degree 2 satisfying  $f(0) = 1$ ,

$$f'(0) = -2 \text{ and } f''(0) = 6 \text{ then } \int_{-1}^2 f(x) dx =$$

Options :

1. ✘ 6
2. ✘ 0
3. ✔ 9
4. ✘ -8

Question Number : 44 Question Id : 7225445845 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The degree of the differential equation  $a^2 \frac{d^2 y}{dx^2} = \left[ 1 + \left( \frac{dy}{dx} \right)^2 \right]^{3/2}$  is

Options :

1. ✔ 2
2. ✘ 1

3. ✖  $3$

4. ✖  $4$

**Question Number : 45 Question Id : 7225445846 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

$\log\left(\frac{y}{x}\right) = cx$ , where  $c$  is arbitrary constant is a solution of the differential equation

**Options :**

1. ✔  $\log\left(\frac{y}{x}\right) = \frac{x}{y} \frac{dy}{dx} - 1$

2. ✖  $\log\left(\frac{x}{y}\right) = \frac{x}{y} \frac{dy}{dx} - 1$

3. ✖  $\log\left(\frac{x}{y}\right) = \frac{y}{x} \frac{dy}{dx} + 1$

4. ✖  $\frac{dy}{dx} = 1 + \log\left(\frac{y}{x}\right)$

Question Number : 46 Question Id : 7225445847 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The solution of the differential equation  $\cos \theta dr - r \sin \theta d\theta = 0$  is

Options :

1. ✓  $r \cos \theta = c$  ,  $c$  – arbitrary constant
2. ✗  $r \sin \theta = c$  ,  $c$  – arbitrary constant
3. ✗  $r \cos \theta + r \sin \theta = c$  ,  $c$  – arbitrary constant
4. ✗  $r^2 \cos 2\theta = c$  ,  $c$  – arbitrary constant

Question Number : 47 Question Id : 7225445848 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The degree of  $\left(\frac{d^2 y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^2 = x \sin \frac{dy}{dx}$  is

Options :

1. ✗ 1
2. ✗ 2
3. ✗ 3



4. ✓ Not defined

Question Number : 48 Question Id : 7225445849 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The complimentary function of the differential equation  $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 3y = e^{2x}$  is

Options :

1. ✘  $x = c_1e^{-y} + c_2e^{-3y}$ ,  $c_1, c_2$  – arbitrary constants

2. ✓  $y = c_1e^{-x} + c_2e^{-3x}$ ,  $c_1, c_2$  – arbitrary constants

3. ✘  $y = c_1e^x + c_2e^{3x}$ ,  $c_1, c_2$  – arbitrary constants

4. ✘  $x = c_1e^y + c_2e^{3y}$ ,  $c_1, c_2$  – arbitrary constants

Question Number : 49 Question Id : 7225445850 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The particular integral of  $(D^2 + 4)y = \cos 2x$  is

Options :

1. ✘  $-\frac{1}{2}x \sin 2x$

2. ✘  $\frac{1}{2}x \sin 2x$

3. ✘  $-\frac{1}{4}x \cos 2x$

4. ✔  $\frac{1}{4}x \sin 2x$

**Question Number : 50 Question Id : 7225445851 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The integrating factor of the equation  $x^2y dx - (x^3 + y^3)dy = 0$  is

**Options :**

1. ✘  $-\frac{1}{x^4}$

2. ✘  $\frac{1}{x^4}$

3. ✘  $\frac{1}{y^4}$

4. ✓  $-\frac{1}{y^4}$

## Physics

Section Id :	722544117
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 51 Question Id : 7225445852 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Parsec is the unit of

Options :

1. ✘ Time
2. ✓ Distance
3. ✘ Frequency
4. ✘ Angular acceleration

**Question Number : 52 Question Id : 7225445853 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Among the following pairs, which pair does not have identical dimensions

**Options :**

1. ✓ Moment of inertia and moment of a force
2. ✗ Work and torque
3. ✗ Angular momentum and Planck's constant
4. ✗ Impulse and momentum

**Question Number : 53 Question Id : 7225445854 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

One of the two forces is double the other and their resultant is equal to the greater force.

The angle between them is

**Options :**

1. ✗  $\cos^{-1}(1/2)$
2. ✗  $\cos^{-1}(-1/2)$
3. ✗  $\cos^{-1}(1/4)$

4. ✓  $\cos^{-1}(-1/4)$

**Question Number : 54 Question Id : 7225445855 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If three vectors  $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$ ,  $\vec{B} = x\hat{i} + 3\hat{k}$  and  $\vec{C} = 7\hat{i} + 3\hat{j} - 11\hat{k}$  are coplanar, then the value of  $x$  is

**Options :**

1. ✗  $36/21$

2. ✓  $-51/13$

3. ✗  $51/32$

4. ✗  $-36/21$

**Question Number : 55 Question Id : 7225445856 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A body is allowed to fall from a height of 100 m. The time taken for the first 50 m is  $t_1$  and for the remaining 50 m is  $t_2$ , then

**Options :**

1. ✗  $t_1 = t_2$

2. ✓  $t_1 > t_2$

3. ✗  $t_1 < t_2$

4. ✗ Depends upon the mass

**Question Number : 56 Question Id : 7225445857 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two stones are projected with the same speed but making different angles with the horizontal. Their horizontal ranges are equal. The angle of projection of one stone is  $\pi/3$  and the maximum height reached by it is 102 meters. Then the maximum height reached by the other in meters is

**Options :**

1. ✗ 336

2. ✗ 224

3. ✗ 56

4. ✓ 34

**Question Number : 57 Question Id : 7225445858 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cricket ball is thrown at a speed of  $28 \text{ ms}^{-1}$  in a direction  $30^\circ$  above the horizontal. The time taken by the ball to return to the same level in seconds is

**Options :**

1. ✓ 2.9

2. ✗ 3.9

3. ✗ 1.9

4. ✗ 2

**Question Number : 58 Question Id : 7225445859 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The maximum height of a projectile is half of its range on the horizontal. If the velocity of the projection is  $u$ , then its range on the horizontal is

**Options :**

1. ✗  $\frac{2u^2}{5g}$

2. ✗  $\frac{3u^2}{5g}$

3. ✘  $\frac{u^2}{g}$

4. ✔  $\frac{4u^2}{5g}$

**Question Number : 59 Question Id : 7225445860 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cubical block rests on an inclined plane of coefficient of friction  $\mu = \frac{1}{\sqrt{3}}$ . What should be the angle of inclination so that the block just slides down the inclined plane?

**Options :**

1. ✔  $30^\circ$

2. ✘  $60^\circ$

3. ✘  $45^\circ$

4. ✘  $90^\circ$

**Question Number : 60 Question Id : 7225445861 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



For the equilibrium of a body on an inclined plane of inclination  $45^\circ$ , the coefficient of static friction will be

Options :

1.  Greater than one
2.  Zero
3.  Less than one
4.  Less than zero

Question Number : 61 Question Id : 7225445862 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The displacement  $x$  and time  $t$  for a particle are related to each other as  $t = \sqrt{x} + 3$ . The work done in first six seconds of its motion is

Options :

1.  6 J
2.  Zero
3.  4 J

4. ✘ 2 J

**Question Number : 62 Question Id : 7225445863 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A particle move with a velocity  $v = (5\hat{i} - 3\hat{j} + 6\hat{k})$  m/s under the influence of a constant force  $\vec{F} = 10\hat{i} + 10\hat{j} + 20\hat{k}$ . The instantaneous power applied to the particle is

**Options :**

1. ✘ 200 J/sec

2. ✘ 40 J/sec

3. ✔ 140 J/sec

4. ✘ 170 J/sec

**Question Number : 63 Question Id : 7225445864 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The main source of solar energy is

**Options :**

1. ✘ Nuclear fission

- 2. ✓ Nuclear fusion
- 3. ✗ Gravitational contraction
- 4. ✗ Combustion

**Question Number : 64 Question Id : 7225445865 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The particle executing the simple harmonic motion passes through the mean position. It has

**Options :**

- 1. ✗ Minimum kinetic energy and maximum potential energy
- 2. ✓ Maximum kinetic energy and minimum potential energy
- 3. ✗ Maximum kinetic energy and maximum potential energy
- 4. ✗ Minimum kinetic energy and minimum potential energy

**Question Number : 65 Question Id : 7225445866 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simple pendulum has a time period  $T_1$  on the earth's surface and  $T_2$  at a height of  $R$  above the earth's surface, where  $R$  is the radius of the earth. The value of  $T_2/T_1$  is

Options :

1. ✘ 1

2. ✘ 4

3. ✘  $\sqrt{2}$

4. ✔ 2

Question Number : 66 Question Id : 7225445867 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not a characteristic of musical sound?

Options :

1. ✘ Quality

2. ✘ Pitch

3. ✔ Wavelength

4. ✘ Loudness

**Question Number : 67 Question Id : 7225445868 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Doppler shift in frequency does not depend upon

**Options :**

1. ✘ The actual frequency of the wave
2. ✔ The distance of the source from the listener
3. ✘ The velocity of the source
4. ✘ The velocity of the observer

**Question Number : 68 Question Id : 7225445869 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Inaudibility limit is around

**Options :**

1. ✘ One-hundredth of the initial intensity
2. ✘ One-tenth of the initial intensity

- 3. ✘ One-thousandth of the initial intensity
- 4. ✔ One-millionth of the initial intensity

**Question Number : 69 Question Id : 7225445870 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An ideal gas at  $27^{\circ}\text{C}$  is compressed adiabatically to  $8/27$  of its original volume. If  $\gamma = 5/3$ , then the rise in temperature is

**Options :**

- 1. ✘ 450K
- 2. ✔ 375K
- 3. ✘ 225K
- 4. ✘ 405K

**Question Number : 70 Question Id : 7225445871 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A system is provided with 200 calories of heat and the work done by the system on the surrounding is 40 J. Then its internal energy

**Options :**

1. ✘ Increases by 600 J
2. ✘ Decreases by 800 J
3. ✔ Increases by 800 J
4. ✘ Decreases by 50J

**Question Number : 71 Question Id : 7225445872 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The temperature of  $n$  moles of an ideal gas is increased from  $T$  to  $4T$  through a process for which pressure  $P = a T^{-1}$  where  $a$  is a constant. Then the work done by the gas is

**Options :**

1. ✘  $nRT$
2. ✘  $4nRT$
3. ✘  $2nRT$
4. ✔  $6nRT$

**Question Number : 72 Question Id : 7225445873 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When an ideal gas with pressure  $P$  and volume  $V$  is compressed isothermally to one fourth of its volume, the pressure is  $P_1$ . When the same gas is compressed polytropically according to the equation  $PV^{1.5} = \text{constant}$  to one fourth of its initial volume, the pressure is  $P_2$ . The ratio of  $P_2/P_1$  is

Options :

1. ✘  $\frac{1}{2}$

2. ✘  $\frac{1}{2^{1.5}}$

3. ✔  $2$

4. ✘  $2^{1.5}$

Question Number : 73 Question Id : 7225445874 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A Carnot engine whose efficiency is 40%, receives heat at 500K. If the efficiency is to be 50%, the source temperature for the same exhaust temperature is

Options :

1. ✘ 900 K



2. ✓ 600 K

3. ✘ 700 K

4. ✘ 800 K

**Question Number : 74 Question Id : 7225445875 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Optical fibers carry very large information compared to copper cables because of their

**Options :**

1. ✘ Large thickness

2. ✓ Extremely wide bandwidth

3. ✘ Extremely less bandwidth

4. ✘ Light weight

**Question Number : 75 Question Id : 7225445876 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A superconductor is a perfect ..... material.

Options :

1. ✓ Diamagnetic

2. ✗ Dielectric

3. ✗ Insulating

4. ✗ Semiconducting

## Chemistry

Section Id :	722544118
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 76 Question Id : 7225445877 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not a characteristic of Plank's theory radiation?

Options :

1. ✘ Energy is always associated with radiations
2. ✔ The absorption and emission of energy occur continuously and not in small packets of energy called quanta
3. ✘ The energy associated with a quantum of radiation is directly proportional to its frequency
4. ✘ The emission and absorption of energy takes place in small packets called quanta

**Question Number : 77 Question Id : 7225445878 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The atomic number of calcium is 20 and mass number is 40, it contains

**Options :**

1. ✔ 20 protons, 20 electrons and 20 neutrons
2. ✘ 20 protons, 20 electrons and 22 neutrons
3. ✘ 20 protons, 20 electrons and 40 neutrons
4. ✘ 40 protons, 20 electrons and 20 neutrons

**Question Number : 78 Question Id : 7225445879 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which molecule among the following obeys the octet rule?

**Options :**

1. ✘  $\text{PF}_5$

2. ✘  $\text{NO}$

3. ✘  $\text{ClO}_2$

4. ✔  $\text{O}_2$

**Question Number : 79 Question Id : 7225445880 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following has higher ionic radius?

**Options :**

1. ✔  $\text{C}^{4-}$

2. ✘  $\text{N}^{3-}$

3. ✘  $\text{O}^{2-}$

4. ✘  $\text{Na}^+$

**Question Number : 80 Question Id : 7225445881 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

0.2 equivalents of  $\text{H}_2\text{SO}_4$  is present in 100 mL of the solution. What is its normality?

**Options :**

1. ✘ 1 N

2. ✔ 2 N

3. ✘ 4 N

4. ✘ 20 N

**Question Number : 81 Question Id : 7225445882 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which ion is isoelectronic with CO?

**Options :**

1. ✔  $\text{CN}^-$

2. ✘  $\text{O}_2^+$

3. ✘  $O_2^-$

4. ✘  $N_2^+$

**Question Number : 82 Question Id : 7225445883 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

20 mL of 0.01 M HCl solution is diluted to 100 mL What is the molarity of final solution?

**Options :**

1. ✘ 0.02 M

2. ✔ 0.002 M

3. ✘ 0.05 M

4. ✘ 0.001 M

**Question Number : 83 Question Id : 7225445884 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How many moles of HCl are required to react with completely with 2 moles of  $Na_2CO_3$ ?

**Options :**

1. ✘ 1
2. ✘ 2
3. ✘ 3
4. ✔ 4

**Question Number : 84 Question Id : 7225445885 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is a Lewis acid and also Bronsted acid?

**Options :**

1. ✘  $\text{CO}_2$
2. ✘  $\text{AlCl}_3$
3. ✔  $\text{H}^+$
4. ✘  $\text{Cu}^{2+}$

**Question Number : 85 Question Id : 7225445886 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the pH of 0.01 M NaOH solution?

Options :

1. ✘ 2
2. ✘ 8
3. ✘ 10
4. ✔ 12

Question Number : 86 Question Id : 7225445887 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Four alkali metals A, B, C and D are having standard electrode potentials as -3.05, -1.66, -0.40 and 0.80 V respectively. Which one will be most reducing?

Options :

1. ✔ A
2. ✘ B
3. ✘ C
4. ✘ D



**Question Number : 87 Question Id : 7225445888 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is used as depolarizer in dry cell battery?

**Options :**

1. ✘ Ammonium chloride
2. ✘ Potassium hydroxide
3. ✔ Manganese dioxide
4. ✘ Sodium phosphate

**Question Number : 88 Question Id : 7225445889 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How much copper is deposited when 2 Faraday of electricity is passed through a  $\text{CuSO}_4$  solution? (Cu atomic weight = 63.54)

**Options :**

1. ✘ 31.77 g
2. ✘ 159.54 g

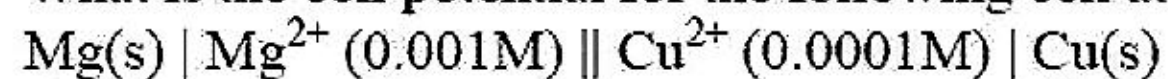
127.77 g

3. ✘

4. ✔ 63.54 g

**Question Number : 89 Question Id : 7225445890 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the cell potential for the following cell at 298 K?



Given  $E_0$  of  $\text{Cu}^{2+}|\text{Cu} = 0.34 \text{ V}$  and  $E_0$  of  $\text{Mg}^{2+} | \text{Mg} = -2.37 \text{ V}$

Options :

1. ✘ 1.34 V

2. ✔ 2.68 V

3. ✘ 0.268 V

4. ✘ 0.134 V

**Question Number : 90 Question Id : 7225445891 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The hard water sample contains the following ions/salts. Which water sample is more in hardness?

Options :

1. ✘ 100 grams of  $\text{CaCO}_3$  per litre
2. ✘ 50 equivalents of  $\text{Ca}^{2+}$  ions per litre
3. ✔ 20 moles of  $\text{CaCO}_3$  per litre
4. ✘ 20 moles of  $\text{MgCO}_3$  per litre

Question Number : 91 Question Id : 7225445892 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

20 ml of hard water required 10 ml of EDTA solution. The hardness of water sample is 1000 ppm. What is the molarity of EDTA?

Options :

1. ✔ 0.02 M
2. ✘ 0.03 M
3. ✘ 0.005 M
4. ✘ 0.05 M

**Question Number : 92 Question Id : 7225445893 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The hardness of water sample is 500 ppm. What is the weight of  $\text{MgSO}_4$  present in it, assume that the hardness is only due to the presence of magnesium sulphate.

**Options :**

1. ✘ 0.3 g
2. ✘ 1.2 g
3. ✔ 0.6 g
4. ✘ 0.01 g

**Question Number : 93 Question Id : 7225445894 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The rate of corrosion is high if

**Options :**

1. ✔ Anodic areas are small and cathodic areas are large
2. ✘ Anodic areas are large and cathodic areas are small
3. ✘ Both anodic and cathodic areas are large

4. ✘ Does not depend upon the area of anode and cathode

**Question Number : 94 Question Id : 7225445895 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In electroplating, the metal to be coated or electroplated is made of

**Options :**

1. ✘ Anode
2. ✔ Cathode
3. ✘ Both anode and cathode
4. ✘ Inert metal

**Question Number : 95 Question Id : 7225445896 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a thermosetting plastic?

**Options :**

1. ✘ Bakelite
2. ✘ Melamine

3. ✘ Epoxy resins

4. ✔ Teflon

**Question Number : 96 Question Id : 7225445897 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one of the following molecule contains the functionality TWO?

**Options :**

1. ✘ 1, 2-Dihydroxy benzene

2. ✘ Benzene

3. ✘ Phenol

4. ✔ Ethylene

**Question Number : 97 Question Id : 7225445898 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a synthetic rubber?

**Options :**

1. ✘ Buna-S

- 2. ✘ Buna-N
- 3. ✘ Neoprene
- 1. 4-Polyisoprene
- 4. ✔

**Question Number : 98 Question Id : 7225445899 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a renewable source of energy?

**Options :**

- 1. ✘ Solar energy
- 2. ✘ Wind Energy
- 3. ✔ Petrol
- 4. ✘ Hydro energy

**Question Number : 99 Question Id : 7225445900 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is not a greenhouse gas?

**Options :**

1. ✘ CH<sub>4</sub>
2. ✘ Water vapour
3. ✘ Chlorofluoro carbons
4. ✔ SO<sub>2</sub>

**Question Number : 100 Question Id : 7225445901 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one is responsible for the depletion of ozone layer?

**Options :**

1. ✘ Carbon free radical
2. ✘ Oxygen free radical
3. ✔ Chlorine free radical
4. ✘ Fluorine free radical



## Metallurgical Engineering

Section Id :	722544119
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 101 Question Id : 7225445902 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The resolving power of an optical microscope is

Options :

1. ✘  $10 A^0$
2. ✘  $100 A^0$
3. ✔  $1000 A^0$
4. ✘  $10000 A^0$

Question Number : 102 Question Id : 7225445903 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The term Pearlite in steels refer to

Options :

- A solid solution
1. ✘
- An intermetallic compound
2. ✘
- A mixture of two phases
3. ✔
- An inclusion
4. ✘

**Question Number : 103 Question Id : 7225445904 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Out of the following binary systems the one which does not show eutectic reaction is

**Options :**

- Fe - C
1. ✘
- Cu - Al
2. ✘
- Al - Si
3. ✘
- Ni - Cu
4. ✔

**Question Number : 104 Question Id : 7225445905 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The peritectic reaction in steel occurs at

Options :

1. ✘  $1146^{\circ}\text{C}$

2. ✔  $1495^{\circ}\text{C}$

3. ✘  $910^{\circ}\text{C}$

4. ✘  $723^{\circ}\text{C}$

Question Number : 105 Question Id : 7225445906 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

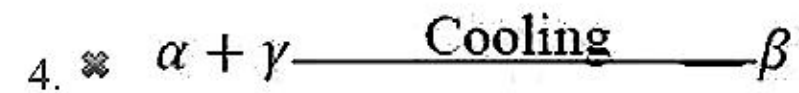
Eutectoid reaction among the following is

Options :

1. ✘  $L \xrightarrow{\text{Cooling}} \alpha + \beta$

2. ✔  $\gamma \xrightarrow{\text{Cooling}} \alpha + \beta$

3. ✘  $\alpha + L \xrightarrow{\text{Cooling}} \beta$



**Question Number : 106 Question Id : 7225445907 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Transformation of austenite to martensite occurs by

**Options :**

1. ✖ Lattice diffusion

2. ✖ Spinodal decomposition

3. ✖ Nucleating-and-growth

4. ✔ Diffusion less process

**Question Number : 107 Question Id : 7225445908 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The alloying element which shifts the nose of the C-curve to the left is

**Options :**

1. ✖ Cr

2. ✖ Mn

3. ✘ V

4. ✔ Co

**Question Number : 108 Question Id : 7225445909 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Dual-phase steel contains

Options :

1. ✘ Ferrite and pearlite
2. ✘ Tempered martensite
3. ✔ Ferrite and martensite
4. ✘ Ferrite and cementite

**Question Number : 109 Question Id : 7225445910 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Case carburising of steel components is done for improving

Options :

1. ✘ Machinability

- 2.  Fatigue resistance
- 3.  Hardenability
- 4.  Plasticity

**Question Number : 110 Question Id : 7225445911 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Substitutional solid solution forms when

**Options :**

- 1.  The crystal structure of two metals are different
- 2.  Solute atoms are very small compared to solvent atoms
- 3.  Solute and solvent atoms possess almost equal diameters
- 4.  The chemical affinity of the two metals is high

**Question Number : 111 Question Id : 7225445912 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the softest structure that appears on Fe-C equilibrium diagram?

**Options :**

1. ✘ Pearlite
2. ✘ Cementite
3. ✔ Ferrite
4. ✘ Austenite

**Question Number : 112 Question Id : 7225445913 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The structure produced by austempering of steel is \_\_\_\_\_

**Options :**

1. ✔ Bainite
2. ✘ Martensite
3. ✘ Troostite
4. ✘ Austenite

**Question Number : 113 Question Id : 7225445914 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Hardening temperature for high speed steel is \_\_\_\_\_ °C

**Options :**

1. ✘ 550 - 650
2. ✘ 800 - 900
3. ✘ 750 - 950
4. ✔ 1150 - 1350

**Question Number : 114 Question Id : 7225445915 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Sub-zero treatment is most applicable for

**Options :**

1. ✔ High-speed steel
2. ✘ Steels containing < 0.2% carbon
3. ✘ Mild steel



Steels not containing retained austenite

4. ✖

**Question Number : 115 Question Id : 7225445916 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Hardenability of Steel is the measure of

**Options :**

1. ✖ Its cementite content

2. ✔ The depth to which steel can be hardened

3. ✖ Its hardness

4. ✖ The depth to which pearlite forms

**Question Number : 116 Question Id : 7225445917 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Compound formed during age hardening of duralumin is

**Options :**

1. ✖ CuAl

- 2. ✓  $\text{CuAl}_2$
- 3. ✗  $\text{Cu}_2\text{Al}_3$
- 4. ✗  $\text{Cu}_3\text{Al}_2$

**Question Number : 117 Question Id : 7225445918 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a carbide forming element in steel

**Options :**

- 1. ✓ Ni
- 2. ✗ Cr
- 3. ✗ Mo
- 4. ✗ W

**Question Number : 118 Question Id : 7225445919 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which is the hardest structure that appears on Fe-C equilibrium diagram?

Options :

1. ✘ Pearlite
2. ✔ Cementite
3. ✘ Martensite
4. ✘ Austenite

Question Number : 119 Question Id : 7225445920 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Troostite is a mixture

Options :

1. ✘ Austenite and Ferrite
2. ✔ Ferrite and cementite
3. ✘ Ferrite and martensite
4. ✘ Ferrite and pearlite

**Question Number : 120 Question Id : 7225445921 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Alloying element used in material for the construction of leaf & coil springs is

Options :

1. ✘ Cobalt
2. ✘ Aluminium
3. ✘ Nickel
4. ✔ Silicon

**Question Number : 121 Question Id : 7225445922 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Spheroidal graphite is obtained in cast irons by

Options :

1. ✘ Inoculating the melt with ferrosilicon
2. ✘ Adding Ni to the melt in the form of round shots

3. ✓ Treating the melts of controlled composition with Mg.
4. ✘ Annealing of flake graphite cast iron

**Question Number : 122 Question Id : 7225445923 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The inequality of diffusion of components in a binary solution of alloys is given by

**Options :**

1. ✘ Graham's law
2. ✘ Fick's law
3. ✘ Cottrell effect
4. ✓ Kirkendall effect

**Question Number : 123 Question Id : 7225445924 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The recrystallized grain size will be smaller

**Options :**

1. ✘ Lower the annealing temperature and lower the amount of prior cold work
2. ✘ Higher the annealing temperature and lower the amount of prior cold work
3. ✔ Lower the annealing temperature and higher the amount of prior cold work
4. ✘ Higher the annealing temperature and higher the amount of prior cold work

**Question Number : 124 Question Id : 7225445925 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one of the following is a forging defect

**Options :**

1. ✘ Shrinkage cracks
2. ✘ Laps
3. ✔ Cold shuts
4. ✘ Insufficient penetration

**Question Number : 125 Question Id : 7225445926 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following defects in metal does not get welded up during its hot working

**Options :**

1. ✓ Blowholes
2. ✗ Internal porosity
3. ✗ Cracks
4. ✗ Pipes

**Question Number : 126 Question Id : 7225445927 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Lead is subjected to hot working at

**Options :**

1. ✗  $100^{\circ}\text{C}$
2. ✗  $200^{\circ}\text{C}$

3. ✘ 300<sup>0</sup>C

4. ✔ 20<sup>0</sup>C

**Question Number : 127 Question Id : 7225445928 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Flange wrinkling is the defect found in

**Options :**

1. ✘ Rolling

2. ✔ Deep drawing

3. ✘ Extrusion

4. ✘ Forging

**Question Number : 128 Question Id : 7225445929 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The operation of removal of scale from the steel slabs formed by rolling of ingots is called



**Options :**

1. ✘ Shot blasting
2. ✔ Pickling
3. ✘ Scarfing
4. ✘ Slitting

**Question Number : 129 Question Id : 7225445930 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The temperature at which the grains and the grain boundaries will have equal strength is called \_\_\_\_\_ temperature

**Options :**

1. ✘ Curie
2. ✘ Recrystallization
3. ✘ Absolute zero

Equi-cohesive

4. ✓

**Question Number : 130 Question Id : 7225445931 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Residual stress are measured mainly by \_\_\_\_\_

**Options :**

1. ✗ Dye-penetrant method

2. ✗ Magnetic particle method

3. ✓ X-ray analysis

4. ✗ Ultrasonic testing

**Question Number : 131 Question Id : 7225445932 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The process used for making collapsible shaving cream tubes is \_\_\_\_\_

**Options :**

1. ✗ Forging

- 2. ✘ Rolling
- 3. ✘ Indirect extrusion
- 4. ✔ Impact extrusion

**Question Number : 132 Question Id : 7225445933 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The common lubricant used during compaction of metal powders is

**Options :**

- 1. ✘ Acetone
- 2. ✘ Ethyl alcohol
- 3. ✔ Stearic acid
- 4. ✘ Glycerol

**Question Number : 133 Question Id : 7225445934 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Plane strain condition is found in

**Options :**

1.  Thick plates
2.  Thin sheets
3.  Not so thick sheets
4.  Strips

**Question Number : 134 Question Id : 7225445935 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

High stacking - fault energy metal exhibit

**Options :**

1.  High work hardening
2.  Low work hardening
3.  Do not work harden
4.  Moderate work hardening

**Question Number : 135 Question Id : 7225445936 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Dislocation density depends on

**Options :**

- 1. ✘ Temperature
- 2. ✘ Strain-rate
- 3. ✔ Degree of cold work
- 4. ✘ Time

**Question Number : 136 Question Id : 7225445937 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The deformation in an alloy containing overaged particles or ceramic particles is by

**Options :**

- 1. ✘ Slip
- 2. ✘ Shearing of particles

3. ✓ By-passing and looping

4. ✘ Multiple slip

**Question Number : 137 Question Id : 7225445938 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is the ore of Titanium

**Options :**

1. ✘ Wustite

2. ✘ Bauxite

Limonite

3. ✘

4. ✓ Ilmenite

**Question Number : 138 Question Id : 7225445939 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Increase in carbon content of steel \_\_\_\_\_ DBTT

**Options :**

1. ✘ Increases
2. ✔ Decreases
3. ✘ Does not effect
4. ✘ Steel does not have DBTT

**Question Number : 139 Question Id : 7225445940 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Ductile materials exhibit \_\_\_\_\_ fracture

**Options :**

1. ✔ Cup and cone
2. ✘ Flat
3. ✘ Helical
4. ✘ Combined

**Question Number : 140 Question Id : 7225445941 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The maximum working temperature is determined by

Options :

1. ✘ Melting point
2. ✔ Hot shortness temperature
3. ✘ Recrystallization temperature
4. ✘ Work-hardening

Question Number : 141 Question Id : 7225445942 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The process used for powder production is \_\_\_\_\_

Options :

1. ✘ Forging
2. ✘ Tapping
3. ✘ Rolling



4. ✓ Atomization

**Question Number : 142 Question Id : 7225445943 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In CO<sub>2</sub> moulding process which of the following is used as binder

**Options :**

1. ✗ Bentonite

2. ✗ Dextrine

3. ✓ Sodium silicate

4. ✗ Water

**Question Number : 143 Question Id : 7225445944 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Orange-peel defect in deep-drawing depends on

**Options :**

1. ✓ Grain size

- 2. ✘ Force used
- 3. ✘ Thickness of sheet
- 4. ✘ Hold down pressure

**Question Number : 144 Question Id : 7225445945 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The important consideration in determining deep-drawability is

**Options :**

- 1. ✘ Work-hardening coefficient (  $n$  )
- 2. ✘ Drawing load
- 3. ✔ Anisotropy ratio,  $R$
- 4. ✘ Frictional condition

**Question Number : 145 Question Id : 7225445946 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Cementite ( $\text{Fe}_3\text{C}$ ) crystal structure is

**Options :**

1. ✘ B.C.C.
2. ✔ Orthorhombic
3. ✘ CPH
4. ✘ FCC

**Question Number : 146 Question Id : 7225445947 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In face-centered cubic lattice, the most closely packed planes are

**Options :**

1. ✘ (1 0 0)
2. ✘ (1 1 0)

3. ✓ (1 1 1)

4. ✘ (1 1 2)

**Question Number : 147 Question Id : 7225445948 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Stacking faults are \_\_\_\_\_ imperfections

**Options :**

1. ✘ Linear

2. ✘ Point

3. ✘ Volume

4. ✓ Surface

**Question Number : 148 Question Id : 7225445949 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Choose the correct statement

**Options :**

Burgers vector is parallel to an edge dislocation

1. ✘

2. ✘ Burgers vector is perpendicular to screw dislocation
3. ✔ Screw dislocation can undergo cross slip
4. ✘ Screw dislocation can undergo climb

**Question Number : 149 Question Id : 7225445950 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

German silver is an alloy of

**Options :**

1. ✔ Cu, Ni & Zn
2. ✘ Cu, Al & Ag
3. ✘ Cu, Ni & Ag
4. ✘ Ag, Ni & Zn

**Question Number : 150 Question Id : 7225445951 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

1. The phase rule as applied to the eutectic point in a isobaric binary metallic system gives a value of degree of freedom (F) equal to

Options :

1. ✘ 3

2. ✔ 0

3. ✘ 2

4. ✘ 1

Question Number : 151 Question Id : 7225445952 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following alloy can be strengthened by Age-hardening

Options :

1. ✘ Cu – Zn

2. ✘ Cu - Sn

3. ✘ Ni – Cu

4. ✔ Cu – Be

**Question Number : 152 Question Id : 7225445953 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Example for a thermosetting polymer is

**Options :**

1. ✘ Polyethylene

2. ✔ Polyester

3. ✘ Cellulose nitrate

4. ✘ PVC

**Question Number : 153 Question Id : 7225445954 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Bull's eye structure is observed in

**Options :**

1. ✘ White cast iron

2. ✘ Grey cast iron

3. ✘ Nodular cast iron
4. ✔ Malleable cast iron

**Question Number : 154 Question Id : 7225445955 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Mechanical twinning is commonly observed in

**Options :**

1. ✔ Copper and its alloys
2. ✘ Steels
3. ✘ Al alloys
4. ✘ Zinc and its alloys

**Question Number : 155 Question Id : 7225445956 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Surgical instruments are made of

**Options :**



Austenitic stainless steels

1. ✘

Martensitic stainless steels

2. ✔

High carbon steels

3. ✘

Super alloys

4. ✘

**Question Number : 156 Question Id : 7225445957 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Carbon percentage in Razor blades is in the range of

**Options :**

1. ✘ 0.1 - 0.3

2. ✘ 0.3 - 0.5

3. ✘ 0.6 - 0.8

4. ✔ 1.1 - 1.4

**Question Number : 157 Question Id : 7225445958 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Zirconium alloys are used in nuclear reactors as

**Options :**

- 1. ✘ Moderator
- 2. ✘ Fuel
- 3. ✘ Catalyst
- 4. ✔ Cladding material

**Question Number : 158 Question Id : 7225445959 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Corrosion resistance of stainless steel is due to

**Options :**

- 1. ✘ Addition of Ni
- 2. ✔ Addition of Cr

3. ✘ Presence of C

4. ✘ Presence of Mo

**Question Number : 159 Question Id : 7225445960 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following conditions favor dephosphorization in steel making

**Options :**

1. ✘ Acid slag and oxidizing atmosphere

2. ✔ Basic slag and oxidizing atmosphere

3. ✘ Acid slag and reducing atmosphere

4. ✘ Basic slag and reducing atmosphere

**Question Number : 160 Question Id : 7225445961 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Banking of blast furnace means

Options :

1. ✓ Stopping blast furnace operation for a specific period
2. ✘ Controlled reduction in production rate
3. ✘ Hard driving of blast furnace to increase production
4. ✘ Draining of pig iron before shutting down

Question Number : 161 Question Id : 7225445962 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For desulphurization of iron

Options :

1. ✘ Slag should be viscous
2. ✘ Atmosphere should be oxidizing
3. ✘ Slag basicity should be low and temperature should be high

Both slag basicity and temperature should be high

4. ✓

**Question Number : 162 Question Id : 7225445963 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Open-hearth process of steel making is getting obsolete because

**Options :**

1. ✘ It can use only hot metal

2. ✘ It can use only scrap

3. ✓ It has low thermal efficiency

4. ✘ Control of carbon is difficult in this process

**Question Number : 163 Question Id : 7225445964 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Increase in alumina content of blast furnace slag

**Options :**

1. ✘ Increases its melting point, but decreases its viscosity

- 2. ✓ Increases both its melting point and viscosity
- 3. ✗ Decreases both its melting point but increases its viscosity
- 4. ✗ Does not affect its melting point but increases its viscosity

**Question Number : 164 Question Id : 7225445965 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a function of coke in iron blast furnace?

**Options :**

- 1. ✗ Acts as a fuel
- 2. ✗ Imparts permeability
- 3. ✓ Acts as a flux
- 4. ✗ Acts as a reductant

**Question Number : 165 Question Id : 7225445966 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The reaction of  $C + CO_2 \rightarrow 2CO$  occurring in the blast furnace is called

**Options :**

1. ✘ Reduction reaction
2. ✘ Naumann reaction
3. ✔ Solution loss reaction
4. ✘ Calcination reaction

**Question Number : 166 Question Id : 7225445967 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which type of grain structure is preferred for Creep applications

**Options :**

1. ✘ Fine
2. ✔ Coarse
3. ✘ Columnar

Dendritic

4. ✘

**Question Number : 167 Question Id : 7225445968 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Salamander is

**Options :**

1. ✘ Unreduced ore

2. ✘ Irregularity in B.F.

3. ✘ Solid residue in scrubbers

4. ✔ Solid Fe remaining in hearth

**Question Number : 168 Question Id : 7225445969 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Slag bond in sinter has \_\_\_\_\_ compared to diffusion bond

**Options :**

1. ✘ Higher reducibility and high strength



2. ✓ Low reducibility and high strength

3. ✘ Low reducibility and low strength

4. ✘ Higher reducibility and low strength

**Question Number : 169 Question Id : 7225445970 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Wustite is

**Options :**

1. ✘  $\text{Fe}_2\text{O}_3$

2. ✓  $\text{FeO}$

3. ✘  $\text{FeCO}_3$

4. ✘  $\text{FeO} \cdot \text{SiO}_2$

**Question Number : 170 Question Id : 7225445971 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Phosphorous is better removed in \_\_\_\_\_ process

**Options :**

- 1. ✘ Open-hearth
- 2. ✘ LD
- 3. ✔ LDAC
- 4. ✘ B.F.

**Question Number : 171 Question Id : 7225445972 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following employs a bottom blowing operation?

**Options :**

- 1. ✘ L.D. converter
- 2. ✔ OBM
- 3. ✘ Open hearth furnace

4. ✘ Kaldo furnace

**Question Number : 172 Question Id : 7225445973 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In acid steel making process which is the chief impurity to be eliminated from iron

**Options :**

1. ✘ Phosphorous

2. ✘ Manganese

3. ✔ Silicon

4. ✘ Sulphur

**Question Number : 173 Question Id : 7225445974 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Killing of the steel bath is a process practiced to remove \_\_\_\_\_

**Options :**

1. ✘ Carbon

- 2. ✓ Oxygen
- 3. ✗ Sulphur
- 4. ✗ Phosphorous

**Question Number : 174 Question Id : 7225445975 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which is not a basic refractory?

**Options :**

- 1. ✗ Chromo magnesite
- 2. ✗ Magnesite
- 3. ✗ Dolomite
- 4. ✓ Silicon carbide

**Question Number : 175 Question Id : 7225445976 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Segar cones are used for determination of \_\_\_\_\_ of refractories

Options :

1. ✓ Softening temperature
2. ✘ Spalling resistance
3. ✘ Electrical conductivity
4. ✘ Resistance to slag attack

Question Number : 176 Question Id : 7225445977 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In pidgeon process, the reducing agent used is

Options :

1. ✘ Carbon
2. ✘ Carbon monoxide
3. ✘ Hydrogen

4. ✓ Ferrosilicon

**Question Number : 177 Question Id : 7225445978 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In Parkes process, desilverizing of molten lead is effected by the addition of

**Options :**

1. ✘ Carbon

2. ✘ Aluminum

3. ✘ Copper

4. ✓ Zinc

**Question Number : 178 Question Id : 7225445979 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Bacterial leaching is useful for

**Options :**

1. ✘ Leaching of enriched ores

In situ-leaching low-grade ores

2. ✓

Fast recovery of metal values

3. ✗

Refining of metals

4. ✗

**Question Number : 179 Question Id : 7225445980 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Chemical formula of Cassiterite is

Options :

1. ✗ ZnS

2. ✓ SnO<sub>2</sub>

3. ✗ CaF<sub>2</sub>

4. ✗ Cu<sub>2</sub>O

**Question Number : 180 Question Id : 7225445981 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is a mineral of molybdenum

Options :

1. ✘ Scheelite
2. ✘ Kainite
3. ✔ Wulfenite
4. ✘ Carnellite

Question Number : 181 Question Id : 7225445982 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Hydrometallurgical process as compared to pyrometallurgical processes

Options :

1. ✘ Deal with rich-grade ores
2. ✘ Will not result in recovery of valuable by-products
3. ✘ Are carried out at elevated temperatures



4. ✓ Produce metals in variety of physical forms

**Question Number : 182 Question Id : 7225445983 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Cathodic protection to steel can be provided by

**Options :**

1. ✓ Sacrificial anode
2. ✘ Painting
3. ✘ Non-metallic coating
4. ✘ Anodizing

**Question Number : 183 Question Id : 7225445984 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The formation of corrosion retarding films on metal surfaces is known as \_\_\_\_\_

**Options :**

1. ✘ Polarization

- 2. ✘ Pitting
- 3. ✘ Cavitation
- 4. ✔ Passivation

**Question Number : 184 Question Id : 7225445985 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Example of a sacrificial anode which is used in the protection of underground pipelines

**Options :**

- 1. ✘ Steel
- 2. ✘ Platinum
- 3. ✔ Magnesium
- 4. ✘ Graphite

**Question Number : 185 Question Id : 7225445986 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Second law of thermodynamics is concerned with

Options :

1. ✘ Amount of energy transferred
2. ✔ Direction of energy transfer
3. ✘ Irreversible processes only
4. ✘ Non-cyclic process only

Question Number : 186 Question Id : 7225445987 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

First law of thermodynamics is mathematically expressed as

Options :

1. ✔  $dQ = dU + dW$
2. ✘  $dQ = dU - dW$
3. ✘  $dU = dQ + dW$

4. ✘  $dW = dQ + dU$

**Question Number : 187 Question Id : 7225445988 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Ellingham diagrams for  $M - MO_x$  reactions is a plot of

**Options :**

1. ✘  $\Delta G$  vs  $T$

2. ✘  $\Delta G$  vs  $1/T$

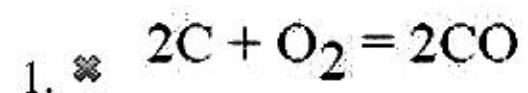
3. ✔  $\Delta G^0$  vs  $T$

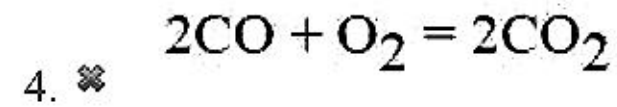
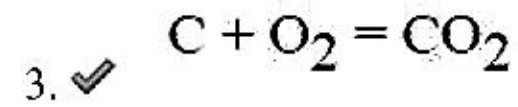
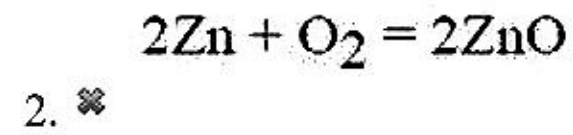
4. ✘  $\Delta G^0$  vs  $1/T$

**Question Number : 188 Question Id : 7225445989 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In Ellingham diagram of oxides, the reaction that is parallel to the temperature axis is

**Options :**





**Question Number : 189 Question Id : 7225445990 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

\_\_\_\_\_ process is used for casting dental alloys

**Options :**

1. ✘ Shell moulding

2. ✔ Investment casting

3. ✘ True centrifugal

4. ✘ Dry sand

**Question Number : 190 Question Id : 7225445991 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The ideal theoretical shape of a Riser is

Options :

- 1.  Cylindrical
- 2.  Conical
- 3.  Spherical
- 4.  Cubic

Question Number : 191 Question Id : 7225445992 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The casting process used for the manufacture of Heavy machine beds is

Options :

- 1.  Die casting
- 2.  Investment casting
- 3.  Gravity casting

4. ✖ Centrifugal casting

**Question Number : 192 Question Id : 7225445993 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Hot tears are casting defects caused by

**Options :**

- 1. ✖ Some sand shearing from the cope surface
- 2. ✖ Two streams of metals that are too cold to figure properly
- 3. ✔ Discontinuity is metal casting resulting from hindered contraction
- 4. ✖ Excessive gaseous substances not able to escape

**Question Number : 193 Question Id : 7225445994 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Rat tail is a casting defect whis is due to

**Options :**

- 1. ✔ Non-uniform ramming of mould

- 2. ✖ More moisture content in moulding sand
- 3. ✖ Poor expansion properties of moulding sand
- 4. ✖ Too low pouring temperature

**Question Number : 194 Question Id : 7225445995 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A mixture of 50% sand and 50% clay is called \_\_\_\_\_ sand

**Options :**

- 1. ✖ Green
- 2. ✖ Dry
- 3. ✔ Loam
- 4. ✖ Bentonite

**Question Number : 195 Question Id : 7225445996 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



Sweep pattern is used for molding parts having \_\_\_\_\_ shape

Options :

1. ✘ Elliptical
2. ✔ Uniform symmetrical
3. ✘ Rectangular
4. ✘ Complicated

Question Number : 196 Question Id : 7225445997 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Thermit welding uses the following energy source

Options :

1. ✘ Electrical energy
2. ✔ Chemical energy
3. ✘ Energy of high velocity electrons

4. ✘ Heat due to friction

**Question Number : 197 Question Id : 7225445998 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following material has highest weldability

**Options :**

1. ✘ Brass

2. ✘ Stainless steel

3. ✘ Aluminium

4. ✔ Plain Carbon steel

**Question Number : 198 Question Id : 7225445999 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is a solid state welding process

**Options :**

1. ✘ TIG

2. ✘ SAW

3. ✓ Explosive

4. ✘ Stud arc

**Question Number : 199 Question Id : 7225446000 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The process with highest penetration is  
Options :

1. ✘ SMAW

2. ✓ EBW

3. ✘ Oxy-acetylene welding

4. ✘ Friction welding

**Question Number : 200 Question Id : 7225446001 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The most common soldering material 'tinman's solder is

Options :

1. ✖ An eutectic mixture of 38% Sn and 62% Pb
2. ✖ Having a melting point of  $232^{\circ}\text{C}$
3. ✔ An eutectic mixture of 62% Sn and 38% Pb
4. ✖ A mixture of 35% Sn and 65% Pb.