

National Testing Agency

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| Question Paper Name : | B TECH EG 17th March 2021 Shift 2 |
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| Display Marks: | Yes |

B TECH EG

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|--------------------------------------|----------|
| Group Number : | 1 |
| Group Id : | 86435146 |
| Group Maximum Duration : | 0 |
| Group Minimum Duration : | 180 |
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Physics Section A

| | |
|--|-----------|
| Section Id : | 864351271 |
| Section Number : | 1 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351271 |
| Question Shuffling Allowed : | Yes |

Question Number : 1 Question Id : 8643514051 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A carrier signal $C(t) = 25 \sin(2.512 \times 10^{10}t)$ is amplitude modulated by a message signal $m(t) = 5 \sin(1.57 \times 10^8t)$ and transmitted through an antenna. What will be the bandwidth of the modulated signal ?

Options :

86435112151. 50 MHz

86435112152. 8 GHz

86435112153. 2.01 GHz

86435112154. 1987.5 MHz

Question Number : 1 Question Id : 8643514051 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક કેરીયર સિગ્નલ $C(t) = 25 \sin(2.512 \times 10^{10}t)$ ને એક સંદેશ સિગ્નલ $m(t) = 5 \sin(1.57 \times 10^8t)$ દ્વારા કંપવિસ્તાર અભિમિશ્રિત કરી એન્ટીના દ્વારા પ્રસારીત કરવામાં આવે છે. અભિમિશ્રિત (મોડ્યુલેટેડ) સિગ્નલની બેન્ડ-વીથ (bandwidth) કેટલી હશે ?

Options :

86435112151. 50 MHz

86435112152. 8 GHz

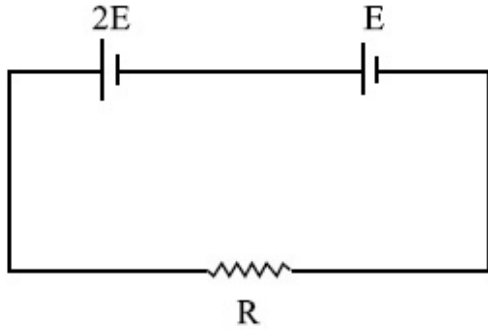
86435112153. 2.01 GHz

86435112154. 1987.5 MHz

Question Number : 2 Question Id : 8643514052 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two cells of emf $2E$ and E with internal resistance r_1 and r_2 respectively are connected in series to an external resistor R (see figure). The value of R , at which the potential difference across the terminals of the first cell becomes zero is



Options :

86435112155. $\frac{r_1}{2} - r_2$

86435112156. $\frac{r_1}{2} + r_2$

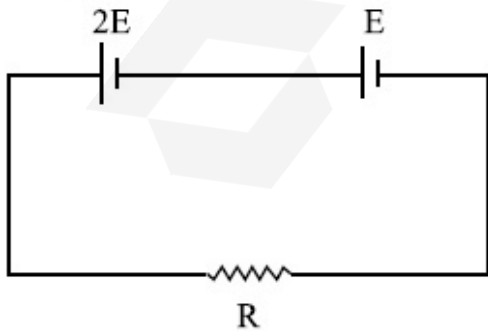
86435112157. $r_1 - r_2$

86435112158. $r_1 + r_2$

Question Number : 2 Question Id : 8643514052 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$2E$ અને E જેટલો emf અને અનુક્રમે r_1 અને r_2 નો આંતરિક અવરોધ ધરાવતાં બે કોષોને બાહ્ય અવરોધ R સાથે શ્રેણીમાં બેડવામાં આવેલ છે (આકૃતિ જુઓ). પ્રથમ કોષના ટર્મિનલોને સમાંતર સ્થિતિમાનનો તફાવત શૂન્ય થાય તે માટે R નું મૂલ્ય _____ છે.



Options :

86435112155. $\frac{r_1}{2} - r_2$

$$\frac{r_1}{2} + r_2$$

86435112156.

$$r_1 - r_2$$

86435112157.

$$r_1 + r_2$$

86435112158.

Question Number : 3 Question Id : 8643514053 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A sound wave of frequency 245 Hz travels with the speed of 300 ms^{-1} along the positive x -axis. Each point of the wave moves to and fro through a total distance of 6 cm. What will be the mathematical expression of this travelling wave ?

Options :

$$Y(x, t) = 0.03 [\sin 5.1x - (0.2 \times 10^3)t]$$

86435112159.

$$Y(x, t) = 0.03 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112160.

$$Y(x, t) = 0.06 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112161.

$$Y(x, t) = 0.06 [\sin 0.8x - (0.5 \times 10^3)t]$$

86435112162.

Question Number : 3 Question Id : 8643514053 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

245 Hz આવૃત્તિ ધરાવતું એક ધ્વનિ તરંગ 300 ms^{-1} ની ઝડપ સાથે ધન x -અક્ષની દિશામાં ગતિ કરે છે. તરંગનું દરકે બિંદુ આગળ-પાછળ એમ કુલ 6 cm જેટલું અંતર કાપે છે. આ પ્રસરતા તરંગ માટેનું ગણિતીય સૂત્ર કયું હશે ?

Options :

$$Y(x, t) = 0.03 [\sin 5.1x - (0.2 \times 10^3)t]$$

86435112159.

$$Y(x, t) = 0.03 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112160.

$$Y(x, t) = 0.06 [\sin 5.1x - (1.5 \times 10^3)t]$$

86435112161.

86435112162. $Y(x, t) = 0.06 [\sin 0.8x - (0.5 \times 10^3)t]$

Question Number : 4 Question Id : 8643514054 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A geostationary satellite is orbiting around an arbitrary planet 'P' at a height of $11R$ above the surface of 'P', R being the radius of 'P'. The time period of another satellite in hours at a height of $2R$ from the surface of 'P' is _____. 'P' has the time period of 24 hours.

Options :

86435112163. 5

86435112164. $6\sqrt{2}$

86435112165. 3

86435112166. $\frac{6}{\sqrt{2}}$

Question Number : 4 Question Id : 8643514054 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક ભૂસ્તરીય ઉપગ્રહ (સેટેલાઈટ) એક યાદચ્છિક ગ્રહ 'P' ની સપાટીથી $11R$ જેટલી ઊંચાઈએ પરિભ્રમણ કરે છે, જ્યાં R એ ગ્રહ 'P' ની ત્રિજ્યા છે. 'P' ની સપાટીથી $2R$ જેટલી ઊંચાઈએ પરિભ્રમણ કરતાં બીજા ઉપગ્રહનો કલાકમાં આવર્તકાળ _____ હશે. 'P' નો આવર્તકાળ 24 કલાક છે.

Options :

86435112163. 5

86435112164. $6\sqrt{2}$

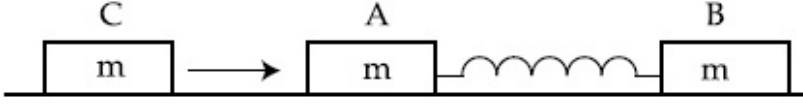
86435112165. 3

86435112166. $\frac{6}{\sqrt{2}}$

Question Number : 5 Question Id : 8643514055 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical blocks A and B each of mass m resting on the smooth horizontal floor are connected by a light spring of natural length L and spring constant K . A third block C of mass m moving with a speed v along the line joining A and B collides with A. The maximum compression in the spring is



Options :

86435112167. $\sqrt{\frac{m}{2K}}$

86435112168. $v\sqrt{\frac{m}{2K}}$

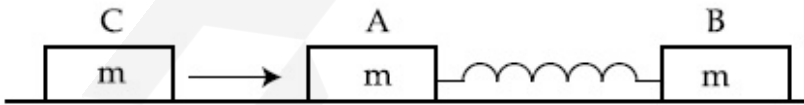
86435112169. $\sqrt{\frac{mv}{K}}$

86435112170. $\sqrt{\frac{mv}{2K}}$

Question Number : 5 Question Id : 8643514055 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

દરેક m દળના બે સમાન ચોસલા A અને B ને L જેટલી પ્રાકૃતિક લંબાઈ અને K જેટલો સ્પ્રિંગ અચળાંક ધરાવતી હલકી સ્પ્રિંગ સાથે જોડેલા છે. m દળ ધરાવતું અને A અને B ને જોડતી રેખા પર v જેટલી ઝડપ ધરાવતું એક ત્રીજું ચોસલું C, ચોસલા A સાથે સંઘાત અનુભવે છે. સ્પ્રિંગમાં ઉત્પન્ન મહત્તમ સંકોચન _____ થશે.



Options :

86435112167. $\sqrt{\frac{m}{2K}}$

86435112168. $v\sqrt{\frac{m}{2K}}$

86435112169. $\sqrt{\frac{mv}{K}}$

86435112170. $\sqrt{\frac{mv}{2K}}$

Question Number : 6 Question Id : 8643514056 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two particles A and B of equal masses are suspended from two massless springs of spring constants K_1 and K_2 respectively. If the maximum velocities during oscillations are equal, the ratio of the amplitude of A and B is

Options :

86435112171. $\frac{K_1}{K_2}$

86435112172. $\sqrt{\frac{K_1}{K_2}}$

86435112173. $\frac{K_2}{K_1}$

86435112174. $\sqrt{\frac{K_2}{K_1}}$

Question Number : 6 Question Id : 8643514056 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સમાન દળો ધરાવતા બે કણો A અને B ને દળરહિત અને અનુક્રમે K_1 અને K_2 સ્પ્રિંગ અચળાંકો ધરાવતી બે સ્પ્રિંગો વડે લટકાવવામાં આવેલા છે. બે દોલનો દરમિયાન મહત્તમ વેગો સમાન હોય, તો A અને B ના કંપવિસ્તારનો ગુણોત્તર _____ હશે.

Options :

86435112171. $\frac{K_1}{K_2}$

86435112172. $\sqrt{\frac{K_1}{K_2}}$

86435112173. $\frac{K_2}{K_1}$

86435112174. $\sqrt{\frac{K_2}{K_1}}$

Question Number : 7 Question Id : 8643514057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II

List - I

List - II

- | | |
|---|--|
| (a) Phase difference between current and voltage in a purely resistive AC circuit | (i) $\frac{\pi}{2}$; current leads voltage |
| (b) Phase difference between current and voltage in a pure inductive AC circuit | (ii) zero |
| (c) Phase difference between current and voltage in a pure capacitive AC circuit | (iii) $\frac{\pi}{2}$; current lags voltage |
| (d) Phase difference between current and voltage in an LCR series circuit | (iv) $\tan^{-1}\left(\frac{X_C - X_L}{R}\right)$ |

Choose the most appropriate answer from the options given below :

Options :

86435112175. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

86435112176. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

86435112177. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

86435112178. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Question Number : 7 Question Id : 8643514057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સૂચી - I ને સૂચી - II સાથે મેળવો.

સૂચી - I

સૂચી - II

(a) શુદ્ધ/ફક્ત અવરોધ ધરાવતા AC પરિપથમાં પ્રવાહ અને

(i) $\frac{\pi}{2}$; પ્રવાહ વોલ્ટેજથી આગળ

વોલ્ટેજ વચ્ચે કળા તફાવત

(b) શુદ્ધ/ફક્ત ઈન્ડક્ટર ધરાવતાં AC પરિપથમાં પ્રવાહ અને વોલ્ટેજ વચ્ચે કળા તફાવત

(ii) શૂન્ય

(c) શુદ્ધ/ફક્ત કેપેસિટર ધરાવતાં AC પરિપથમાં પ્રવાહ અને વોલ્ટેજ વચ્ચે કળા તફાવત

(iii) $\frac{\pi}{2}$; પ્રવાહ વોલ્ટેજથી પાછળ

(d) LCR શ્રેણી પરિપથમાં પ્રવાહ અને વોલ્ટેજ વચ્ચે કળા તફાવત

(iv) $\tan^{-1}\left(\frac{X_C - X_L}{R}\right)$

નીચે આપેલા વિકલ્પોમાંથી સૌથી વધારે યોગ્ય જવાબ પસંદ કરો :

Options :

86435112175. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

86435112176. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

86435112177. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

86435112178. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Question Number : 8 Question Id : 8643514058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What happens to the inductive reactance and the current in a purely inductive circuit if the frequency is halved ?

Options :

86435112179. Inductive reactance will be doubled and current will be halved.

86435112180. Inductive reactance will be halved and current will be doubled.

86435112181. Both, inductive reactance and current will be halved.

86435112182. Both, inducting reactance and current will be doubled.

Question Number : 8 Question Id : 8643514058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ફક્ત ઈન્ડક્ટીવ પરિપથમાં આવૃત્તિ અડધી કરતાં ઈન્ડક્ટીવ અવબાધનું શું થશે ?

Options :

86435112179. ઈન્ડક્ટીવ અવબાધ બમણો થશે અને પ્રવાહ અડધો થશે.

86435112180. ઈન્ડક્ટીવ અવબાધ અડધો થશે અને પ્રવાહ બમણો થશે.

86435112181. બંને, ઈન્ડક્ટીવ અવબાધ અને પ્રવાહ અડધા થશે.

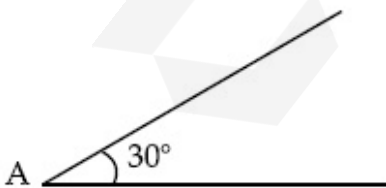
86435112182. બંને, ઈન્ડક્ટીવ અવબાધ અને પ્રવાહ બમણો થશે.

Question Number : 9 Question Id : 8643514059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A sphere of mass 2 kg and radius 0.5 m is rolling with an initial speed of 1 ms^{-1} goes up an inclined plane which makes an angle of 30° with the horizontal plane, without slipping.

How long will the sphere take to return to the starting point A ?



Options :

86435112183. 0.60 s

86435112184. 0.57 s

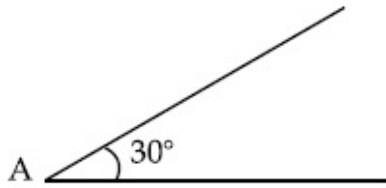
86435112185. 0.52 s

86435112186. 0.80 s

Question Number : 9 Question Id : 8643514059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

2 kg દળ ધરાવતો અને 0.5 m ની ત્રિજ્યા ધરાવતો એક ગોળો, સમક્ષિતિજ સમતલ સાથે 30° નો કોણ ધરાવતાં ઢળતા સમતલ (ઢોળાવ) પર 1 ms^{-1} ની પ્રારંભિક ઝડપ સાથે સરક્યા સિવાય ઉપર તરફ ગબડે છે. ગોળાને તેની ગતિના પ્રારંભિક બિંદુ A પર પાછા ફરતાં કેટલો સમય લાગશે ?



Options :

86435112183. 0.60 s

86435112184. 0.57 s

86435112185. 0.52 s

86435112186. 0.80 s

Question Number : 10 Question Id : 8643514060 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A rubber ball is released from a height of 5 m above the floor. It bounces back repeatedly,

always rising to $\frac{81}{100}$ of the height through which it falls. Find the average speed of the ball.

(Take $g = 10 \text{ ms}^{-2}$)

Options :

86435112187. 2.0 ms^{-1} 86435112188. 2.50 ms^{-1}

86435112189. 3.0 ms^{-1} 86435112190. 3.50 ms^{-1}

Question Number : 10 Question Id : 8643514060 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ભોંયતળિયાથી 5 m ઊંચાઈએથી એક રબરનાં દડાને મુક્ત કરવામાં આવે છે. તે દરેક વખતે તે જેટલી ઊંચાઈએથી પતન કરે

છે તેનાથી $\frac{81}{100}$ જેટલી ઊંચાઈ સુધી પુનરાવર્તિત રીતે ઉછળે છે. દડાની સરેરાશ ઝડપ શોધો.

($g = 10 \text{ ms}^{-2}$ લો)

Options :

86435112187. 2.0 ms^{-1} 86435112188. 2.50 ms^{-1} 86435112189. 3.0 ms^{-1} 86435112190. 3.50 ms^{-1}

Question Number : 11 Question Id : 8643514061 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The velocity of a particle is $v = v_0 + gt + Ft^2$. Its position is $x = 0$ at $t = 0$; then its displacement after time ($t = 1$) is :

Options :

86435112191. $v_0 + \frac{g}{2} + F$ 86435112192. $v_0 + 2g + 3F$ 86435112193. $v_0 + \frac{g}{2} + \frac{F}{3}$ 86435112194. $v_0 + g + F$

Question Number : 11 Question Id : 8643514061 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક કણનો વેગ $v = v_0 + gt + Ft^2$ છે. તે $t = 0$ સમયે સ્થાન $x = 0$ છે, તો $(t = 1)$ સમયનાં અંતે સ્થાનાંતર _____ થશે.

Options :

86435112191. $v_0 + \frac{g}{2} + F$

86435112192. $v_0 + 2g + 3F$

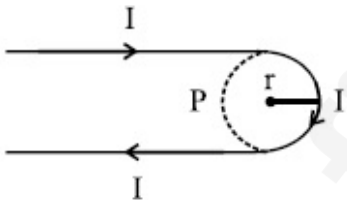
86435112193. $v_0 + \frac{g}{2} + \frac{F}{3}$

86435112194. $v_0 + g + F$

Question Number : 12 Question Id : 8643514062 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A hairpin like shape as shown in figure is made by bending a long current carrying wire. What is the magnitude of a magnetic field at point P which lies on the centre of the semicircle ?



Options :

86435112195. $\frac{\mu_0 I}{2\pi r} (2 - \pi)$

86435112196. $\frac{\mu_0 I}{2\pi r} (2 + \pi)$

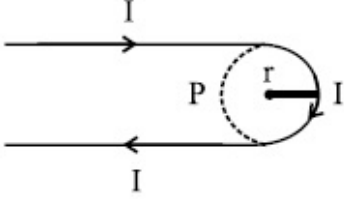
86435112197. $\frac{\mu_0 I}{4\pi r} (2 + \pi)$

86435112198. $\frac{\mu_0 I}{4\pi r}(2 - \pi)$

Question Number : 12 Question Id : 8643514062 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક લાંબા પ્રવાહધારિત તારને વાળીને હેયરપીનનાં આકારમાં આકૃતિમાં દર્શાવ્યા પ્રમાણે વાળવામાં આવે છે. અર્ધવર્તુળનાં કેન્દ્ર આગળ રહેલા બિંદુ P આગળ ચુંબકીય ક્ષેત્રનું મૂલ્ય કેટલું હશે ?



Options :

86435112195. $\frac{\mu_0 I}{2\pi r}(2 - \pi)$

86435112196. $\frac{\mu_0 I}{2\pi r}(2 + \pi)$

86435112197. $\frac{\mu_0 I}{4\pi r}(2 + \pi)$

86435112198. $\frac{\mu_0 I}{4\pi r}(2 - \pi)$

Question Number : 13 Question Id : 8643514063 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The atomic hydrogen emits a line spectrum consisting of various series. Which series of hydrogen atomic spectra is lying in the visible region ?

Options :

86435112199. Paschen series

86435112200. Balmer series

86435112201. Lyman series

86435112202. Brackett series

Question Number : 13 Question Id : 8643514063 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

પરમાણ્વીય હાઈડ્રોજન જુદી-જુદી શ્રેણીઓ ધરાવતો વર્ણપટ ઉત્સર્જિત કરે છે. પરમાણ્વીય હાઈડ્રોજનની કઈ શ્રેણી દૃશ્ય પ્રકાશ વિભાગમાં આવેલ છે ?

Options :

86435112199. પાશ્ચિન શ્રેણી

86435112200. બામ્બર શ્રેણી

86435112201. લાયમન શ્રેણી

86435112202. બ્રેકેટ શ્રેણી

Question Number : 14 Question Id : 8643514064 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical photocathodes receive the light of frequencies f_1 and f_2 respectively. If the velocities of the photo-electrons coming out are v_1 and v_2 respectively, then

Options :

86435112203. $v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2) \right]^{\frac{1}{2}}$

86435112204. $v_1^2 - v_2^2 = \frac{2h}{m}[f_1 - f_2]$

86435112205. $v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2) \right]^{\frac{1}{2}}$

86435112206. $v_1^2 + v_2^2 = \frac{2h}{m}[f_1 + f_2]$

Question Number : 14 Question Id : 8643514064 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

બે એકસમાન ફોટોકેથોડ અનુક્રમે f_1 અને f_2 આવૃત્તિ ધરાવતો પ્રકાશ ગ્રહણ કરે છે. બહાર આવતાં ફોટો-ઇલેક્ટ્રોનનાં અનુક્રમે વેગો v_1 અને v_2 હોય તો, _____.

Options :

86435112203.
$$v_1 - v_2 = \left[\frac{2h}{m}(f_1 - f_2) \right]^{\frac{1}{2}}$$

86435112204.
$$v_1^2 - v_2^2 = \frac{2h}{m}[f_1 - f_2]$$

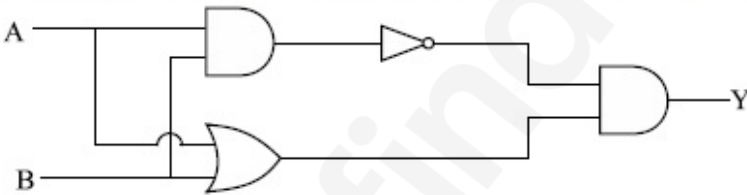
86435112205.
$$v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2) \right]^{\frac{1}{2}}$$

86435112206.
$$v_1^2 + v_2^2 = \frac{2h}{m}[f_1 + f_2]$$

Question Number : 15 Question Id : 8643514065 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following will be the output of the given circuit ?



Options :

86435112207. AND Gate

86435112208. NAND Gate

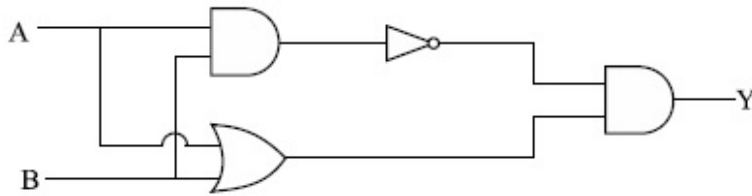
86435112209. XOR Gate

86435112210. NOR Gate

Question Number : 15 Question Id : 8643514065 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલ વિકલ્પો પૈકી કયો એક વિકલ્પ આપેલ પરિપથનો આઉટપુટ છે ?



Options :

86435112207. AND ગેટ

86435112208. NAND ગેટ

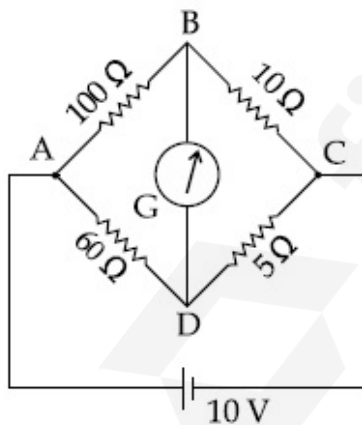
86435112209. XOR ગેટ

86435112210. NOR ગેટ

Question Number : 16 Question Id : 8643514066 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The four arms of a Wheatstone bridge have resistances as shown in the figure. A galvanometer of $15\ \Omega$ resistance is connected across BD. Calculate the current through the galvanometer when a potential difference of $10\ \text{V}$ is maintained across AC.



Options :

86435112211. $2.44\ \mu\text{A}$

86435112212. $2.44\ \text{mA}$

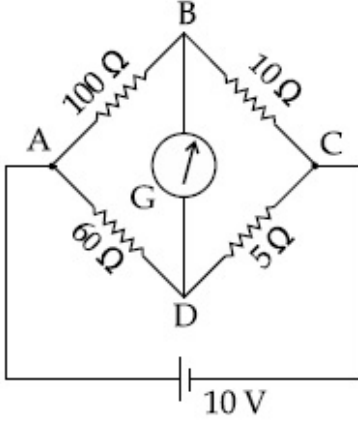
86435112213. $4.87\ \mu\text{A}$

86435112214. 4.87 mA

Question Number : 16 Question Id : 8643514066 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક વ્હીટસ્ટોન બ્રિજની ચાર ભુજાઓનાં અવરોધ આકૃતિમાં દર્શાવ્યા મુજબ છે. $15\ \Omega$ અવરોધ ધરવાતું એક ગેલ્વેનોમીટર BD ને સમાંતર બેડવામાં આવે છે. AC ને સમાંતર $10\ V$ નો સ્થિતિમાનનો તફાવત જાળવી રાખવામાં આવે ત્યારે ગેલ્વેનોમીટરમાંથી વહેતો પ્રવાહ ગણો :



Options :

86435112211. 2.44 μA

86435112212. 2.44 mA

86435112213. 4.87 μA

86435112214. 4.87 mA

Question Number : 17 Question Id : 8643514067 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A block of mass 1 kg attached to a spring is made to oscillate with an initial amplitude of 12 cm. After 2 minutes the amplitude decreases to 6 cm. Determine the value of the damping constant for this motion. (take $\ln 2 = 0.693$)

Options :

86435112215. $1.16 \times 10^2\ \text{kg s}^{-1}$ 86435112216. $0.69 \times 10^2\ \text{kg s}^{-1}$

86435112217. $5.7 \times 10^{-3} \text{ kg s}^{-1}$

86435112218. $3.3 \times 10^2 \text{ kg s}^{-1}$

Question Number : 17 Question Id : 8643514067 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

1 kg દ્રવ ધરાવતાં ચોસલાને સ્પ્રિંગ સાથે બેડી 12 cm જેટલા પ્રારંભિક કંપવિસ્તારથી દોલિત કરવામાં આવે છે. 2 મિનીટનાં અંતે કંપવિસ્તાર ઘટીને 6 cm થાય છે. ગતિ દરમિયાન અવમંદન અચળાંક મેળવો ($\ln 2 = 0.693$ લો)

Options :

86435112215. $1.16 \times 10^2 \text{ kg s}^{-1}$

86435112216. $0.69 \times 10^2 \text{ kg s}^{-1}$

86435112217. $5.7 \times 10^{-3} \text{ kg s}^{-1}$

86435112218. $3.3 \times 10^2 \text{ kg s}^{-1}$

Question Number : 18 Question Id : 8643514068 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If one mole of the polyatomic gas is having two vibrational modes and β is the ratio of molar

specific heats for polyatomic gas $\left(\beta = \frac{C_P}{C_V} \right)$ then the value of β is :

Options :

86435112219. 1.25

86435112220. 1.2

86435112221. 1.35

86435112222. 1.02

Question Number : 18 Question Id : 8643514068 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક મોલ અદુપરમાણ્વીય વાયુને બે કંપન મોડ્સ છે અને β એ અદુપરમાણ્વીય વાયુનો વિશિષ્ટ ઉષ્માઓનો મોલર ગુણોત્તર

$\left(\beta = \frac{C_P}{C_V} \right)$ છે, તો β નું મૂલ્ય _____ હશે.

Options :

86435112219. 1.25

86435112220. 1.2

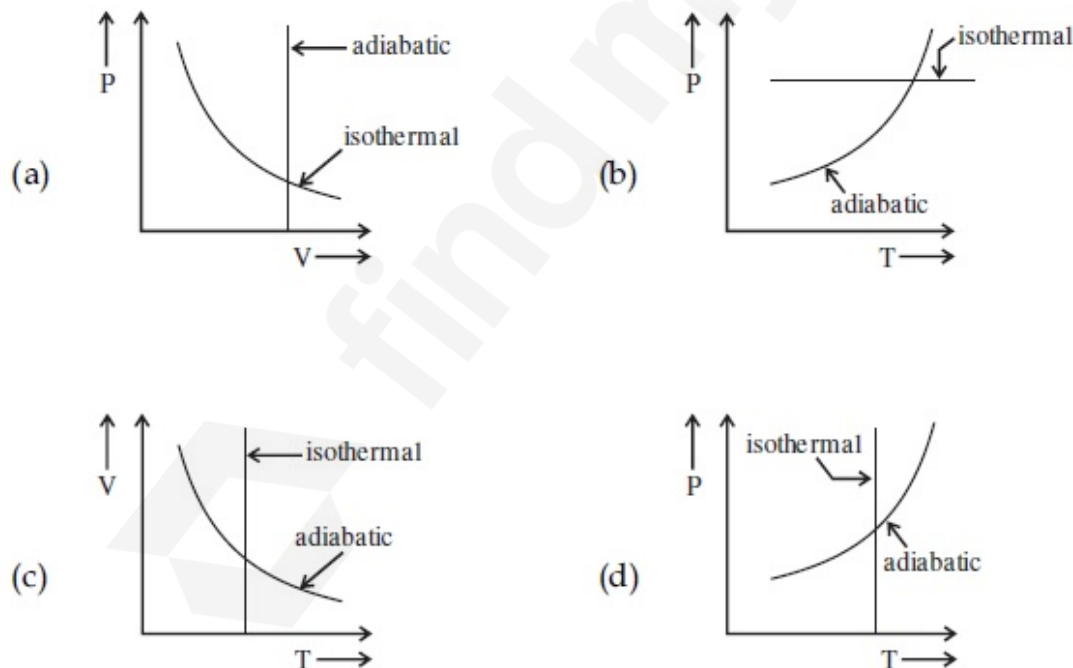
86435112221. 1.35

86435112222. 1.02

Question Number : 19 Question Id : 8643514069 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one is the correct option for the two different thermodynamic processes ?



Options :

86435112223. (a) only

86435112224. (b) and (c)

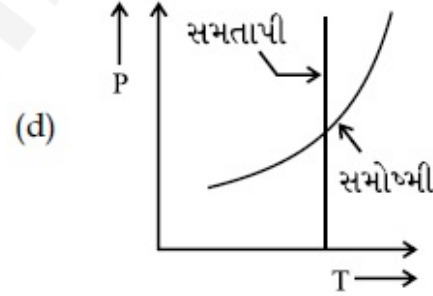
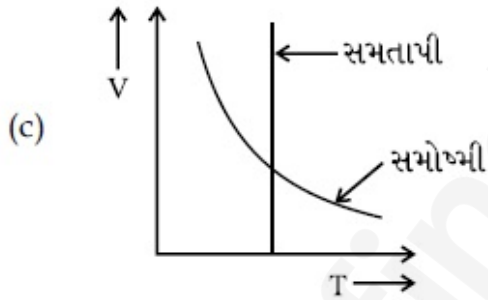
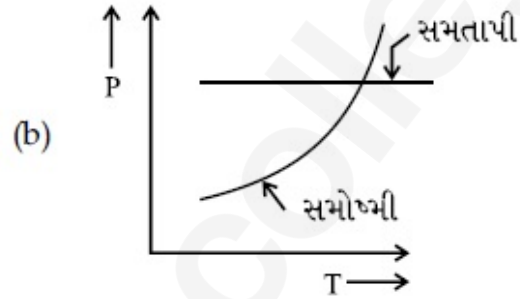
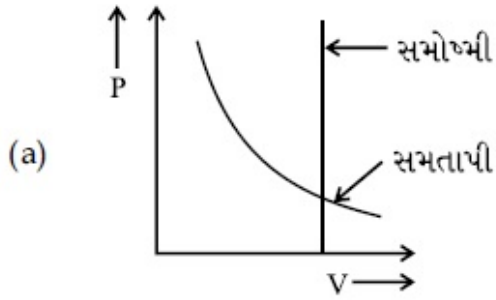
86435112225. (c) and (a)

86435112226. (c) and (d)

Question Number : 19 Question Id : 8643514069 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

બે જુદી-જુદી થર્મોડાયનેમિક પ્રક્રિયાઓ માટે કયો એક વિકલ્પ સાચો છે ?



Options :

86435112223. ફક્ત (a)

86435112224. (b) અને (c)

86435112225. (c) અને (a)

86435112226. (c) અને (d)

Question Number : 20 Question Id : 8643514070 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An object is located at 2 km beneath the surface of the water. If the fractional compression

$\frac{\Delta V}{V}$ is 1.36%, the ratio of hydraulic stress to the corresponding hydraulic strain will be

_____.

[Given : density of water is 1000 kgm^{-3} and $g = 9.8 \text{ ms}^{-2}$.]

Options :

86435112227. $1.96 \times 10^7 \text{ Nm}^{-2}$

86435112228. $1.44 \times 10^7 \text{ Nm}^{-2}$

86435112229. $2.26 \times 10^9 \text{ Nm}^{-2}$

86435112230. $1.44 \times 10^9 \text{ Nm}^{-2}$

Question Number : 20 Question Id : 8643514070 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એક વસ્તુ પાણીની સપાટીની નીચે 2 km અંતરે દેખાય છે. જો સંકોચન અંશ $\frac{\Delta V}{V}$ એ 1.36% હોય તો, તરલ પ્રતિબળ અને

તેને આનુષંગિક તરલ વિકૃતિનો ગુણોત્તર _____ થશે.

[પાણીની ઘનતા 1000 kgm^{-3} અને $g = 9.8 \text{ ms}^{-2}$ આપેલ છે.]

Options :

86435112227. $1.96 \times 10^7 \text{ Nm}^{-2}$

86435112228. $1.44 \times 10^7 \text{ Nm}^{-2}$

86435112229. $2.26 \times 10^9 \text{ Nm}^{-2}$

86435112230. $1.44 \times 10^9 \text{ Nm}^{-2}$

Physics Section B

Section Id :

864351272

Section Number :

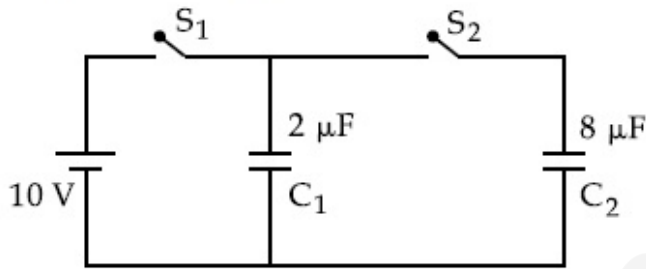
2

| | |
|---------------------------------------|-----------|
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 10 |
| Number of Questions to be attempted : | 5 |
| Section Marks : | 20 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351272 |
| Question Shuffling Allowed : | Yes |

Question Number : 21 Question Id : 8643514071 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A $2 \mu\text{F}$ capacitor C_1 is first charged to a potential difference of 10 V using a battery. Then the battery is removed and the capacitor is connected to an uncharged capacitor C_2 of $8 \mu\text{F}$. The charge in C_2 on equilibrium condition is _____ μC . (Round off to the Nearest Integer)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

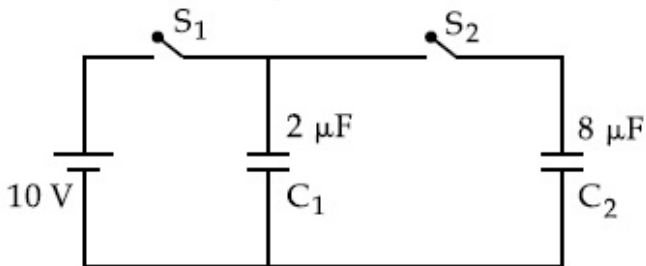
Possible Answers :

100

Question Number : 21 Question Id : 8643514071 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$2 \mu\text{F}$ ધરાવતું એક C_1 સંઘારકને સૌ પ્રથમ બેટરી વડે 10 V ના સ્થિતિમાન તફાવત વડે વિદ્યુતભારીત કરવામાં આવે છે. ત્યારબાદ બેટરીને દૂર કરવામાં આવે છે અને સંઘારકને બીજા $8 \mu\text{F}$ ના વિદ્યુતભાર રહિત C_2 સાથે જોડવામાં આવે છે. સંતુલન સ્થિતિમાં C_2 પરનો વિદ્યુતભાર _____ μC થશે. (નજીકતમ પૂર્ણાંકમાં લખો)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

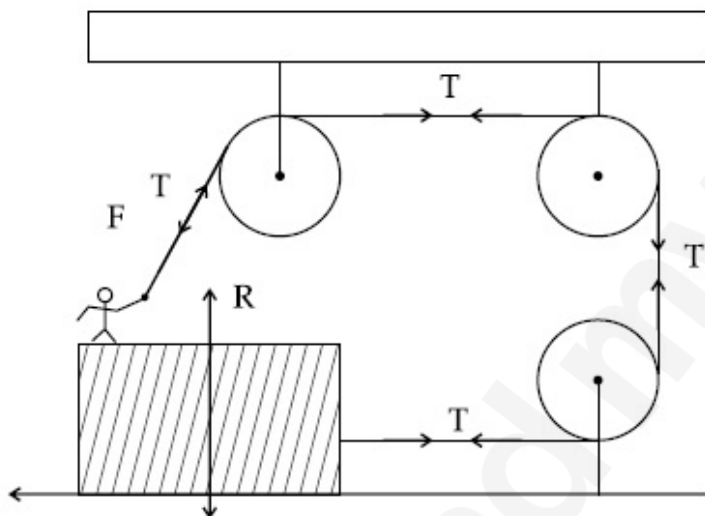
100

Question Number : 22 Question Id : 8643514072 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A boy of mass 4 kg is standing on a piece of wood having mass 5 kg. If the coefficient of friction between the wood and the floor is 0.5, the maximum force that the boy can exert on the rope so that the piece of wood does not move from its place is _____ N. (Round off to the Nearest Integer)

[Take $g = 10 \text{ ms}^{-2}$]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

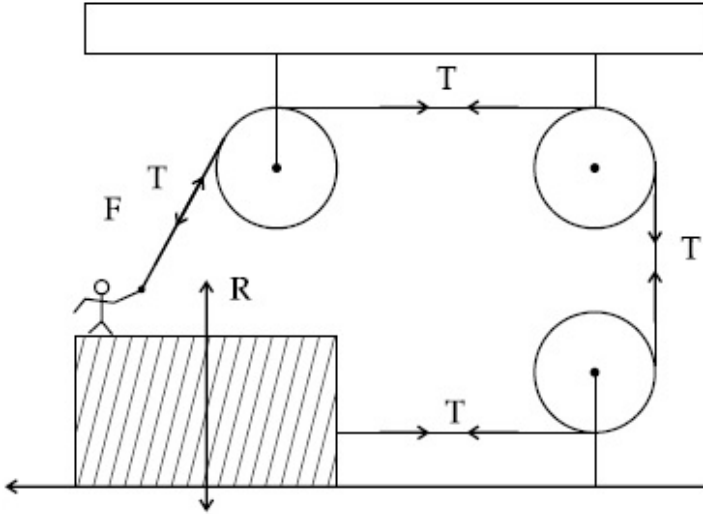
100

Question Number : 22 Question Id : 8643514072 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4 kg દળ ધરાવતો એક છોકરો 5 kg દળ ધરાવતાં લાકડાનાં ટૂકડા ઉપર ઉભો છે. બે લાકડાં અને ભૌંયતળિયા વચ્ચે ઘર્ષણાંકનું મૂલ્ય 0.5 હોય, તો લાકડાનો ટૂકડો પોતાના સ્થાનથી અસે નહીં તેટલું દોરડા પર છોકરા દ્વારા લગાવવાતું મહત્તમ બળ _____ N હશે. (નજીકતમ પૂર્ણાંકમાં લખો)

[$g = 10 \text{ ms}^{-2}$ લો]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 23 **Question Id :** 8643514073 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

The image of an object placed in air formed by a convex refracting surface is at a distance of

10 m behind the surface. The image is real and is at $\frac{2^{\text{rd}}}{3}$ of the distance of the object from

the surface. The wavelength of light inside the surface is $\frac{2}{3}$ times the wavelength in air. The

radius of the curved surface is $\frac{x}{13}$ m. The value of 'x' is_____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 23 Question Id : 8643514073 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

બહિર્ગોળ પરાવર્તિત સપાટી દ્વારા હવામાં રાખેલ વસ્તુનું વાસ્તવિક પ્રતિબિંબ સપાટીની પાછળ 10 m અંતરે બનાવે છે.

પ્રતિબિંબ વાસ્તવિક છે અને સપાટીથી વસ્તુના અંતરના $\frac{2}{3}$ અંતરે મળે છે. સપાટીની અંદર પ્રકાશની તરંગલંબાઈ હવામાં

તરંગલંબાઈ કરતા $\frac{2}{3}$ માં ભાગની છે. વક્સપાટીની ત્રિજ્યા $\frac{x}{13}$ m છે. 'x' નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643514074 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The electric field intensity produced by the radiation coming from a 100 W bulb at a distance of 3 m is E. The electric field intensity produced by the radiation coming from 60 W at the same distance is

$\sqrt{\frac{x}{5}}$ E. Where the value of x = _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 24 Question Id : 8643514074 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એક 100 W ના બલ્બ દ્વારા ઉત્સર્જતા વિકિરણને કારણે 3 m અંતરે વિદ્યુત ક્ષેત્રની તીવ્રતા E છે. 60 W ના બલ્બ દ્વારા

ઉત્સર્જતા વિકિરણને કારણે સમાન અંતરે વિદ્યુતક્ષેત્રની તીવ્રતા $\sqrt{\frac{x}{5}}$ E છે, જ્યાં x નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 25 Question Id : 8643514075 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Seawater at a frequency $f = 9 \times 10^2$ Hz, has permittivity $\epsilon = 80\epsilon_0$ and resistivity

$\rho = 0.25 \Omega\text{m}$. Imagine a parallel plate capacitor is immersed in seawater and is driven by an

alternating voltage source $V(t) = V_0 \sin(2\pi ft)$. Then the conduction current density

becomes 10^x times the displacement current density after time $t = \frac{1}{800}$ s. The value of x is

_____.

(Given : $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 25 Question Id : 8643514075 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

દરીયાનાં પાણીની $f = 9 \times 10^2$ Hz આવૃત્તિએ પરમીટીવીટી $\epsilon = 80\epsilon_0$ અને અવરોધકતા $\rho = 0.25 \Omega\text{m}$ છે. એક સમાંતર પ્લેટ કેપેસિટર (સંઘારક) ને દરીયાનાં પાણીમાં ડૂબાડેલું વિચારો અને તે $V(t) = V_0 \sin(2\pi ft)$ જેટલા ઉલટસૂલટ વોલ્ટેજ

ઉદ્ગમથી બેડાયલું છે. તો $t = \frac{1}{800}$ s સમય બાદ વાહક (conductor) પ્રવાહ ધનતાં અને displacement પ્રવાહ

ધનતાનો ગુણોત્તર 10^x છે, x નું મૂલ્ય _____ થશે.

($\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$ આપેલ છે)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 **Question Id :** 8643514076 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

The electric field in a region is given by $\vec{E} = \frac{2}{5}E_0\hat{i} + \frac{3}{5}E_0\hat{j}$ with $E_0 = 4.0 \times 10^3 \frac{N}{C}$. The flux of this field through a rectangular surface area 0.4 m^2 parallel to the $Y-Z$ plane is _____ $\text{Nm}^2 \text{C}^{-1}$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 26 **Question Id :** 8643514076 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

એક વિસ્તારમાં વિદ્યુતક્ષેત્ર $\vec{E} = \frac{2}{5}E_0\hat{i} + \frac{3}{5}E_0\hat{j}$; જ્યાં $E_0 = 4.0 \times 10^3 \frac{N}{C}$ આપેલ છે. આ ક્ષેત્રને કારણે 0.4 m^2 નું ક્ષેત્રફળ ધરાવતાં અને $Y-Z$ સમતલને સમાંતર એક લંબચોરસ સપાટીમાંથી પસાર થતું ફ્લક્સ _____ $\text{Nm}^2 \text{C}^{-1}$ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 27 **Question Id :** 8643514077 **Question Type :** SA

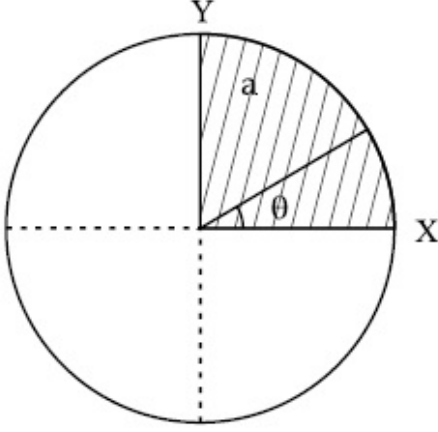
Correct Marks : 4 **Wrong Marks :** 0

The disc of mass M with uniform surface mass density σ is shown in the figure. The centre of

mass of the quarter disc (the shaded area) is at the position $\frac{x}{3} \frac{a}{\pi}, \frac{x}{3} \frac{a}{\pi}$ where

x is _____. (Round off to the Nearest Integer)

[a is an area as shown in the figure]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

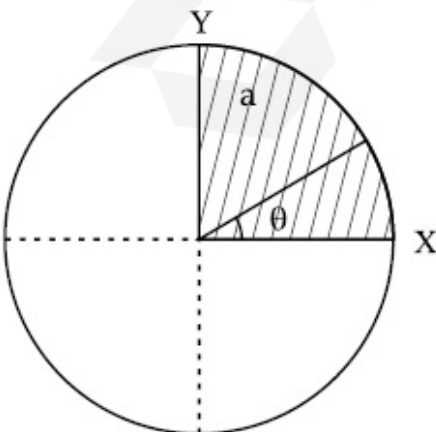
Question Number : 27 **Question Id :** 8643514077 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

આકૃતિમાં સમાંગ દળ M અને σ જેટલી સપાટી ઘનતા ધરાવતી એક તકિત દર્શાવેલ છે. એક ચોથાઈ તકિત (આચ્છાદિત

વિસ્તાર)નો દ્રવ્યમાન કેન્દ્ર સ્થાન $\left(\frac{x}{3} \frac{a}{\pi}, \frac{x}{3} \frac{a}{\pi}\right)$ તો x _____ છે. (નજીકતમ પૂર્ણાંકમાં લખો)

[a એ આકૃતિમાં દર્શાવેલ ક્ષેત્રફળ.]



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 **Question Id :** 8643514078 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

A body of mass 1 kg rests on a horizontal floor with which it has a coefficient of static friction $\frac{1}{\sqrt{3}}$. It is desired to make the body move by applying the minimum possible force

F N. The value of F will be _____. (Round off to the Nearest Integer)

[Take $g = 10 \text{ ms}^{-2}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 28 **Question Id :** 8643514078 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

1 kg દળ ધરાવતી વસ્તુ સમક્ષિતિજ ભોંયતળિયા ઉપર સ્થિર પડેલી છે કે જેમની વચ્ચે સ્થિત ઘર્ષણાંક $\frac{1}{\sqrt{3}}$ છે. વસ્તુને

F N જેટલા શક્ય લઘુત્તમ બળ લગાડીને ગતિ કરાવવી જરૂરી છે. F નું મૂલ્ય _____ હશે. (નજીકતમ પૂર્ણાંકમાં લખો) [$g = 10 \text{ ms}^{-2}$ લો]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 **Question Id :** 8643514079 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

A particle of mass m moves in a circular orbit in a central potential field $U(r) = U_0 r^4$. If Bohr's quantization conditions are applied, radii of possible orbitals r_n vary with $n^{\frac{1}{\alpha}}$, where α is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 29 **Question Id :** 8643514079 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

m દળ ધરાવતો એક કણ કેન્દ્રીય સ્થિતક્ષેત્ર $U(r) = U_0 r^4$ અસર હેઠળ વર્તુળાકાર કક્ષામાં ગતિ કરે છે. જો બોહરની ક્વોન્ટીકરણ શરતો લાગુ કરવામાં આવે તો, શક્ય કક્ષાઓની ત્રિજ્યાઓ r_n એ $n^{\frac{1}{\alpha}}$ અનુસાર બદલાય છે, જ્યાં α _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 30 **Question Id :** 8643514080 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

Suppose you have taken a dilute solution of oleic acid in such a way that its concentration becomes 0.01 cm^3 of oleic acid per cm^3 of the solution. Then you make a thin film of this solution (monomolecular thickness) of area 4 cm^2 by considering 100 spherical drops of radius $\left(\frac{3}{40\pi}\right)^{\frac{1}{3}} \times 10^{-3} \text{ cm}$. Then the thickness of oleic acid layer will be $x \times 10^{-14} \text{ m}$.

Where x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 30 Question Id : 8643514080 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે તમને ઓલિક એસિડનું એવું મંદ દ્રાવણ આપેલ છે કે જેથી ઓલિક એસિડની દ્રાવણમાં સાંદ્રતા 0.01 cm^3 પ્રતિ cm^3

છે. તમે હવે $\left(\frac{3}{40\pi}\right)^{\frac{1}{3}} \times 10^{-3} \text{ cm}$. ત્રિજ્યાનાં 100 ગોળાકાર બિંદુઓને લઈને આ દ્રાવણની 4 cm^2 ક્ષેત્રફળ ધરાવતી

પાતળી (એક આણ્વીય જડાઈની) કપોટી બનાવો છે. તો ઓલિક એસિડના સ્તરની જડાઈ $x \times 10^{-14} \text{ m}$ હશે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Chemistry Section A

| | |
|---------------------------------------|-----------|
| Section Id : | 864351273 |
| Section Number : | 3 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351273 |
| Question Shuffling Allowed : | Yes |

Question Number : 31 Question Id : 8643514081 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Amongst the following, the linear species is :

Options :

86435112241. N_3^-

86435112242. NO_2 86435112243. O_3 86435112244. Cl_2O

Question Number : 31 Question Id : 8643514081 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

આપેલા સ્પીસીઝો પૈકી, સ્પીસીઝ કે જે રેખીય છે તે શોધો :

Options :

86435112241. N_3^- 86435112242. NO_2 86435112243. O_3 86435112244. Cl_2O

Question Number : 32 Question Id : 8643514082 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

During which of the following processes, does entropy decrease ?

- (A) Freezing of water to ice at 0°C
- (B) Freezing of water to ice at -10°C
- (C) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- (D) Adsorption of $\text{CO}(\text{g})$ on lead surface.
- (E) Dissolution of NaCl in water

Choose the correct answer from the options given below :

Options :

86435112245. (A), (B), (C) and (D) only

86435112246. (A), (C) and (E) only

86435112247. (A) and (E) only

86435112248. (B) and (C) only

Question Number : 32 Question Id : 8643514082 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલા પ્રક્રમો દરમ્યાન કયામાં એન્ટ્રોપી ઘટશે ?

- (A) 0°C પર, પાણીમાંથી બરફમાં ઠારણ થવું
- (B) -10°C પર, પાણીમાંથી બરફમાં ઠારણ થવું
- (C) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- (D) લેડ સપાટી પર $\text{CO}(\text{g})$ નું અધિશોષણ
- (E) પાણીમાં NaCl નું ઓગળવું (Dissolution)

નીચે આપેલા વિકલ્પોમાંથી સાચો જવાબ પસંદ કરો.

Options :

86435112245. ફક્ત (A), (B), (C) અને (D)

86435112246. ફક્ત (A), (C) અને (E)

86435112247. ફક્ત (A) અને (E)

86435112248. ફક્ત (B) અને (C)

Question Number : 33 Question Id : 8643514083 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the coagulation of a negative sol, the species below, that has the highest flocculating power is :

Options :

86435112249. Ba^{2+}

86435112250. Na^{+}

86435112251. PO_4^{3-}

86435112252. SO_4^{2-}

Question Number : 33 Question Id : 8643514083 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ઋણાત્મક સોલ નું સ્કંદન, નીચે આપેલી સ્પીસીઝોમાંથી કઈ સૌથી વધારે સમાક્ષેપણ શક્તિ (flocculating power) ધરાવે છે ?

Options :

86435112249. Ba^{2+}

86435112250. Na^{+}

86435112251. PO_4^{3-}

86435112252. SO_4^{2-}

Question Number : 34 Question Id : 8643514084 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The set of elements that differ in mutual relationship from those of the other sets is :

Options :

86435112253. Be - Al

86435112254. B - Si

86435112255. Li - Na

86435112256. Li - Mg

Question Number : 34 Question Id : 8643514084 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

તત્વોનો સમુચ્ચય કે જે બીજા સમુચ્ચય (સેટ) કરતાં અલગ છે તે શોધો.

Options :

86435112253. Be - Al

86435112254. B - Si

86435112255. Li - Na

86435112256. Li - Mg

Question Number : 35 Question Id : 8643514085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II :

| List - I | List - II |
|---------------|---|
| (a) Haematite | (i) $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ |
| (b) Bauxite | (ii) Fe_2O_3 |
| (c) Magnetite | (iii) $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ |
| (d) Malachite | (iv) Fe_3O_4 |

Choose the correct answer from the options given below :

Options :

86435112257. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

86435112258. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435112259. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

86435112260. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

Question Number : 35 Question Id : 8643514085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સૂચિ - I સાથે સૂચિ - II ને જોડો.

| સૂચિ - I | સૂચિ - II |
|----------------|-------------------------------|
| (a) હેમેટાઈટ | (i) $Al_2O_3 \cdot xH_2O$ |
| (b) બોક્સાઈટ | (ii) Fe_2O_3 |
| (c) મેગ્નેટાઈટ | (iii) $CuCO_3 \cdot Cu(OH)_2$ |
| (d) મેલેકાઈટ | (iv) Fe_3O_4 |

નીચે આપેલા વિકલ્પોમાંથી સાચો જવાબ પસંદ કરો.

Options :

86435112257. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

86435112258. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435112259. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

86435112260. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

Question Number : 36 Question Id : 8643514086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The functional groups that are responsible for the ion-exchange property of cation and anion exchange resins, respectively, are :

Options :

86435112261. $-SO_3H$ and $-NH_2$

86435112262. $-NH_2$ and $-COOH$

86435112263. $-NH_2$ and $-SO_3H$

86435112264. $-SO_3H$ and $-COOH$

Question Number : 36 Question Id : 8643514086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

કેશાયન અને એનાયન વિનિમય રેઝિનોના આયન-વિનિમય ગુણધર્મો માટે જવાબદાર ક્રિયાશીલ સમૂહો અનુક્રમે શોધો.

Options :

86435112261. $-\text{SO}_3\text{H}$ અને $-\text{NH}_2$

86435112262. $-\text{NH}_2$ અને $-\text{COOH}$

86435112263. $-\text{NH}_2$ અને $-\text{SO}_3\text{H}$

86435112264. $-\text{SO}_3\text{H}$ અને $-\text{COOH}$

Question Number : 37 Question Id : 8643514087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

One of the by-products formed during the recovery of NH_3 from Solvay process is :

Options :

86435112265. NH_4Cl

86435112266. $\text{Ca}(\text{OH})_2$

86435112267. CaCl_2

86435112268. NaHCO_3

Question Number : 37 Question Id : 8643514087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સોલ્વે પ્રક્રમ દરમિયાન NH_3 પાછું મેળવતી વખતે બનતી એક ઉપ-પેદાશ શોધો.

Options :

86435112265. NH_4Cl

86435112266. $\text{Ca}(\text{OH})_2$

86435112267. CaCl_2

86435112268. NaHCO_3

Question Number : 38 Question Id : 8643514088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The set that represents the pair of neutral oxides of nitrogen is :

Options :

86435112269. NO and N_2O

86435112270. N_2O and NO_2

86435112271. NO and NO_2

86435112272. N_2O and N_2O_3

Question Number : 38 Question Id : 8643514088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

એવો સમુચ્ચય (સેટ) કે જે નાઈટ્રોજન નાં તટસ્થ ઓક્સાઈડોનું યુગ્મ દર્શાવે છે તે શોધો.

Options :

86435112269. NO અને N_2O

86435112270. N_2O અને NO_2

86435112271. NO અને NO_2

86435112272. N_2O અને N_2O_3

Question Number : 39 Question Id : 8643514089 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The common positive oxidation states for an element with atomic number 24, are :

Options :

86435112273. +1 to +6

86435112274. +2 to +6

86435112275. +1 and +3 to +6

86435112276. +1 and +3

Question Number : 39 Question Id : 8643514089 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

પરમાણુક્રમાંક 24 સાથેનાં એક તત્વ માટેની સામાન્ય ઓક્સિડેશન અવસ્થાઓ શોધો.

Options :

86435112273. +1 થી +6

86435112274. +2 થી +6

86435112275. +1 અને +3 થી +6

86435112276. +1 અને +3

Question Number : 40 Question Id : 8643514090 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II :

List - I

List - II

- | | |
|---|-------------------------------|
| (a) $[\text{Co}(\text{NH}_3)_6]$ $[\text{Cr}(\text{CN})_6]$ | (i) Linkage isomerism |
| (b) $[\text{Co}(\text{NH}_3)_3 (\text{NO}_2)_3]$ | (ii) Solvate isomerism |
| (c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ | (iii) Co-ordination isomerism |
| (d) $\text{cis}-[\text{CrCl}_2(\text{ox})_2]^{3-}$ | (iv) Optical isomerism |

Choose the correct answer from the options given below :

Options :

86435112277. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

86435112278. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

86435112279. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

86435112280. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Question Number : 40 Question Id : 8643514090 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સૂચિ - I સાથે સૂચિ - II ને જોડો.

સૂચિ - I

સૂચિ - II

- | | |
|---|---------------------------|
| (a) $[\text{Co}(\text{NH}_3)_6] [\text{Cr}(\text{CN})_6]$ | (i) બંધન સમઘટકતા |
| (b) $[\text{Co}(\text{NH}_3)_3 (\text{NO}_2)_3]$ | (ii) દ્રાવકમિશ્રણ સમઘટકતા |
| (c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ | (iii) સવર્ગ સમઘટકતા |
| (d) $\text{cis} - [\text{CrCl}_2(\text{ox})_2]^{3-}$ | (iv) પ્રકાશીય સમઘટકતા |

નીચે આપેલા વિકલ્પોમાંથી સાચો જવાબ પસંદ કરો.

Options :

86435112277. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

86435112278. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

86435112279. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

86435112280. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Question Number : 41 Question Id : 8643514091 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following statement(s) is (are) incorrect reason for eutrophication ?

- (A) excess usage of fertilisers
- (B) excess usage of detergents
- (C) dense plant population in water bodies
- (D) lack of nutrients in water bodies that prevent plant growth

Choose the most appropriate answer from the options given below :

Options :

86435112281. (A) only

86435112282. (B) and (D) only

86435112283. (C) only

86435112284. (D) only

Question Number : 41 Question Id : 8643514091 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સુપોષણ (eutrophication) નાં સંદર્ભમાં નીચે આપેલામાંથી કયું વિધાન(નો) ખોટું(ટા) છે ?

- (A) ખાતરોનો વધારે પડતો ઉપયોગ
 (B) પ્રક્ષાલકોનો વધારે પડતો ઉપયોગ
 (C) પાણીની અંદર (વોટર બોડી) વનસ્પતિની ગીચતા
 (D) પાણી (વોટર બોડી)માં પોષક તત્વોનાં અભાવે વનસ્પતિની વૃદ્ધિમાં અવરોધ.

નીચે આપેલા વિકલ્પોમાંથી સૌથી વધુ બંધબેસતો જવાબ પસંદ કરો.

Options :

86435112281. ફક્ત (A)

86435112282. ફક્ત (B) અને (D)

86435112283. ફક્ત (C)

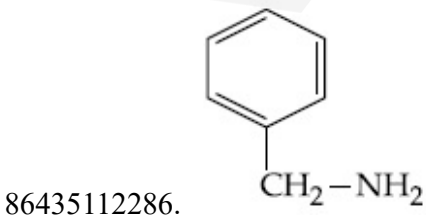
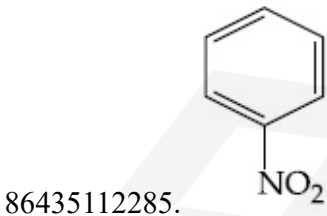
86435112284. ફક્ત (D)

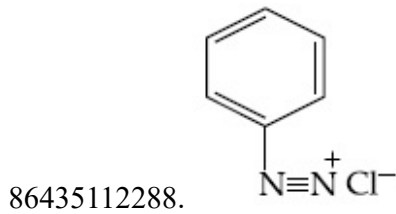
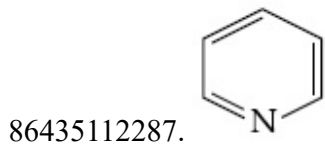
Question Number : 42 Question Id : 8643514092 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Nitrogen can be estimated by Kjeldahl's method for which of the following compound ?

Options :



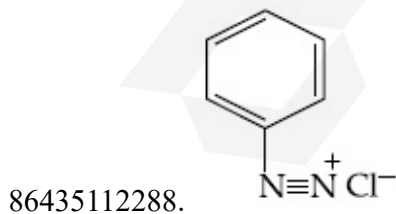
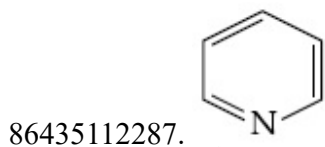
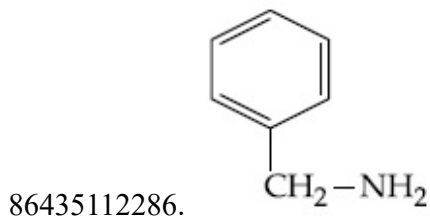
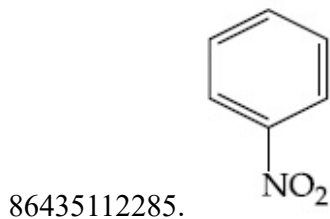


Question Number : 42 Question Id : 8643514092 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચેનામાંથી કયા સંયોજન માટે જોડાણ પદ્ધતિ વડે નાઈટ્રોજનનું પરિમાપન થઈ શકે છે ?

Options :



Question Number : 43 Question Id : 8643514093 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct pair(s) of the ambident nucleophiles is (are) :

- (A) AgCN/KCN
- (B) RCOOAg/RCOOK
- (C) AgNO₂/KNO₂
- (D) AgI/KI

Options :

86435112289. (A) only

86435112290. (B) only

86435112291. (A) and (C) only

86435112292. (B) and (C) only

Question Number : 43 Question Id : 8643514093 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ઉભયદંતી કેન્દ્રાનુરાગીઓનું સાચું યુગ્મ(મો) શોધો.

- (A) AgCN/KCN
- (B) RCOOAg/RCOOK
- (C) AgNO₂/KNO₂
- (D) AgI/KI

Options :

86435112289. ફક્ત (A)

86435112290. ફક્ત (B)

86435112291. ફક્ત (A) અને (C)

86435112292. ફક્ત (B) અને (C)

Question Number : 44 Question Id : 8643514094 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : 2-methylbutane on oxidation with KMnO_4 gives 2-methylbutan-2-ol.

Statement II : n-alkanes can be easily oxidised to corresponding alcohols with KMnO_4 .

Choose the correct option :

Options :

86435112293. Both statement I and statement II are correct

86435112294. Both statement I and statement II are incorrect

86435112295. Statement I is correct but statement II is incorrect

86435112296. Statement I is incorrect but statement II is correct

Question Number : 44 Question Id : 8643514094 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચે બે વિધાનો આપેલા છે :

વિધાન I : 2-મિથાઈલ બ્યુટેન ઉપર KMnO_4 નું ઓક્સિડેશન કરતાં તે 2-મિથાઈલ બ્યુટેન -2-ઓલ આપે છે.

વિધાન II : n-આલ્કેનો KMnO_4 સાથે તેના સંલગ્ન આલ્કોહોલમાં સરળતાથી ઓક્સિડેશન પામે છે.

સાચો વિકલ્પ પસંદ કરો.

Options :

86435112293. બંને વિધાન I અને વિધાન II સાચાં છે.

86435112294. બંને વિધાન I અને વિધાન II ખોટા છે.

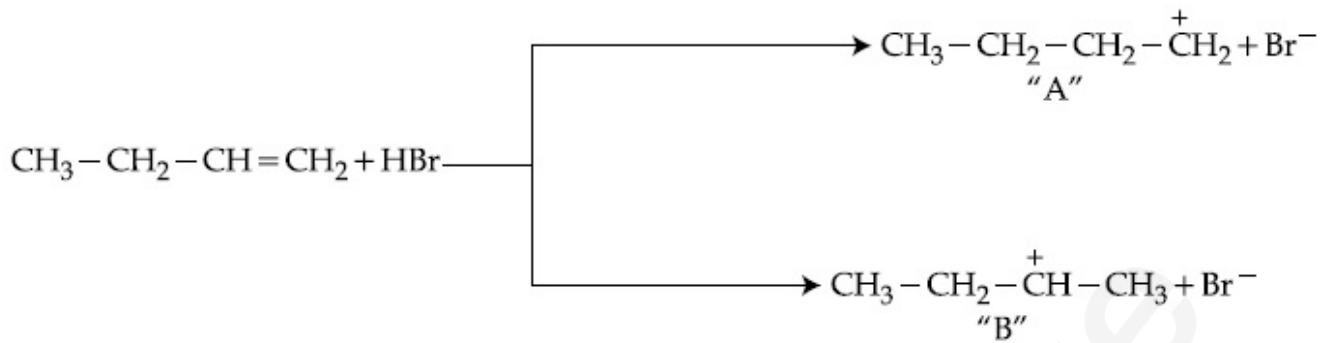
86435112295. વિધાન I સાચું છે પણ વિધાન II ખોટું છે.

86435112296. વિધાન I ખોટું છે પણ વિધાન II સાચું છે.

Question Number : 45 Question Id : 8643514095 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Choose the correct statement regarding the formation of carbocations A and B given.

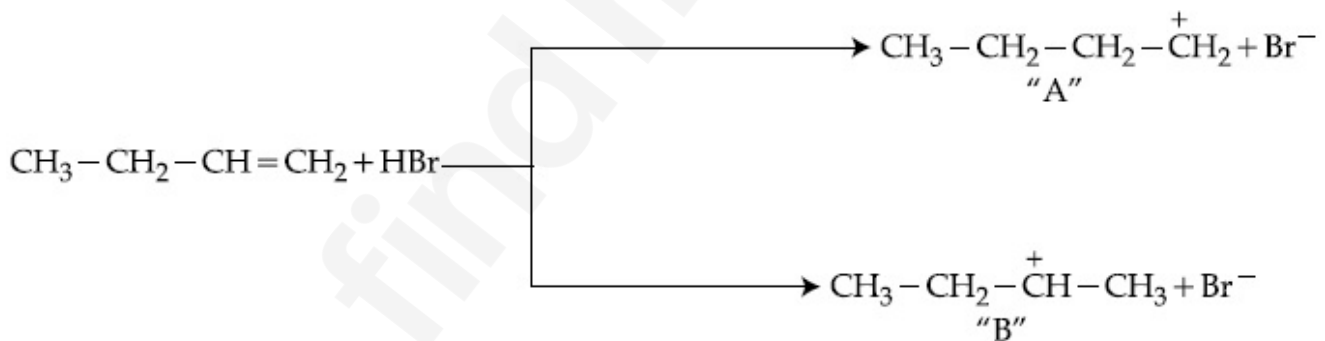


Options :

86435112297. Carbocation A is more stable and formed relatively at slow rate
86435112298. Carbocation B is more stable and formed relatively at slow rate
86435112299. Carbocation A is more stable and formed relatively at faster rate
86435112300. Carbocation B is more stable and formed relatively at faster rate

Question Number : 45 Question Id : 8643514095 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



સર્જન પામતાં કાર્બોકેશાયનો A અને B નાં સંદર્ભમાં સાચું વિધાન પસંદ કરો.

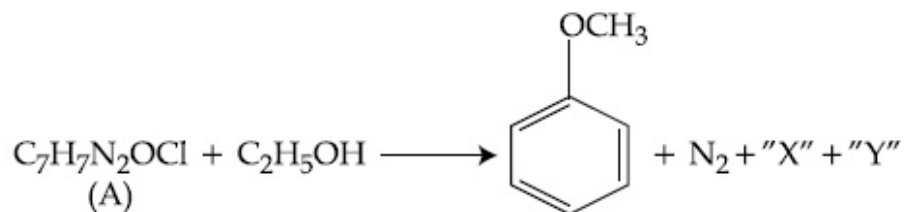
Options :

86435112297. કાર્બોકેશાયન A વધુ સ્થિર છે અને તે સાપેક્ષમાં ધીમા દરે સર્જન પામે છે.
86435112298. કાર્બોકેશાયન B વધુ સ્થિર છે અને તે સાપેક્ષમાં ધીમાં દરે સર્જન પામે છે.
86435112299. કાર્બોકેશાયન A વધુ સ્થિર છે અને તે સાપેક્ષમાં ઝડપી દરે સર્જન પામે છે.
86435112300. કાર્બોકેશાયન B વધુ સ્થિર છે અને તે સાપેક્ષમાં ઝડપી દરે સર્જન પામે છે.

Question Number : 47 Question Id : 8643514097 Question Type : MCQ Option Shuffling : Yes Is Question

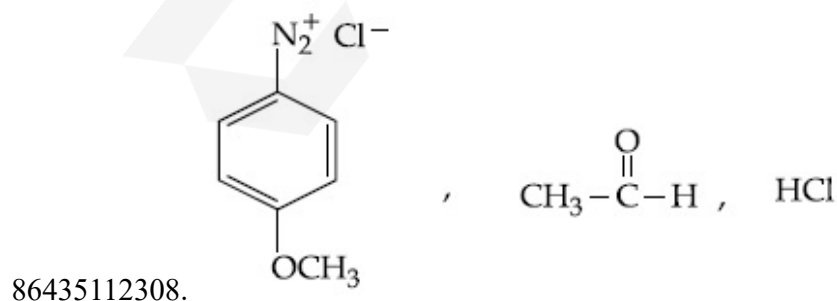
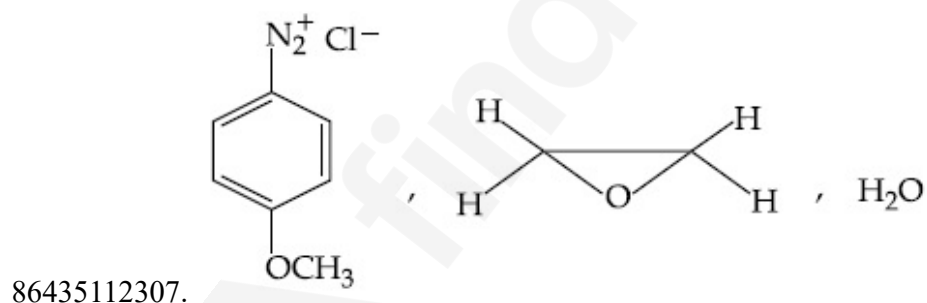
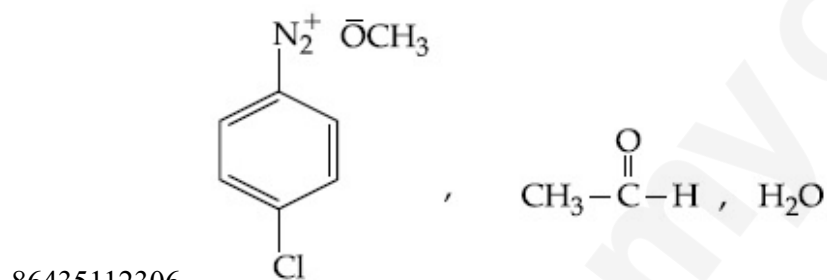
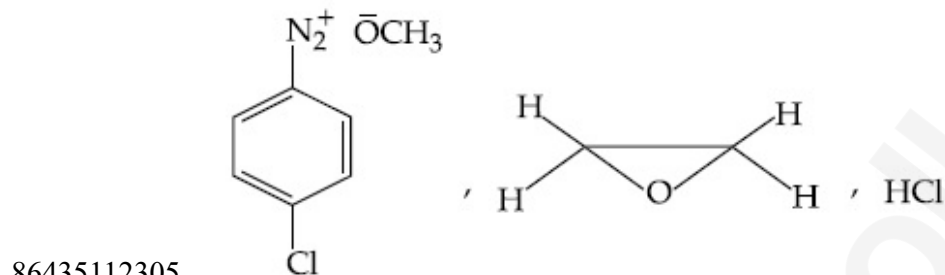
Mandatory : No

Correct Marks : 4 Wrong Marks : 1



In the above reaction, the structural formula of (A), "X" and "Y" respectively are :

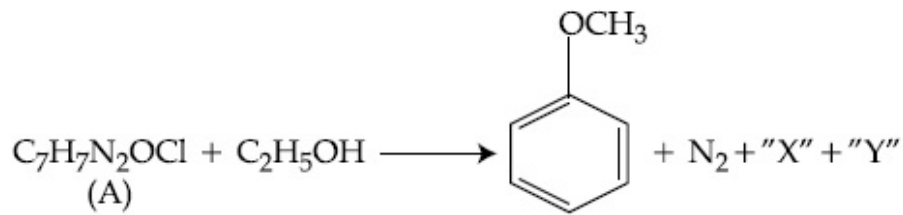
Options :



Question Number : 47 Question Id : 8643514097 Question Type : MCQ Option Shuffling : Yes Is Question

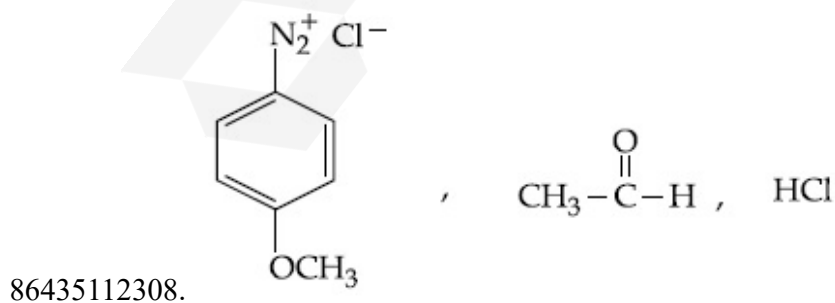
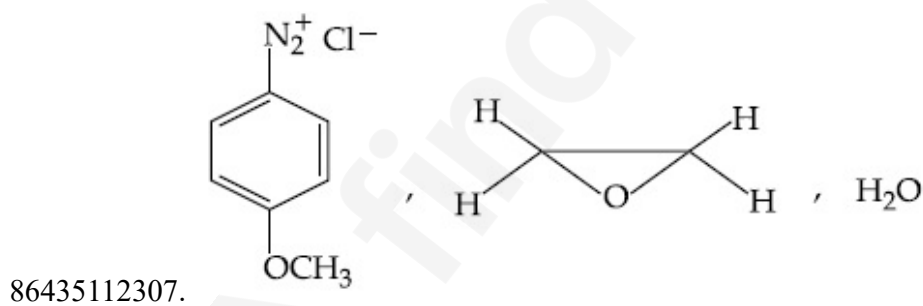
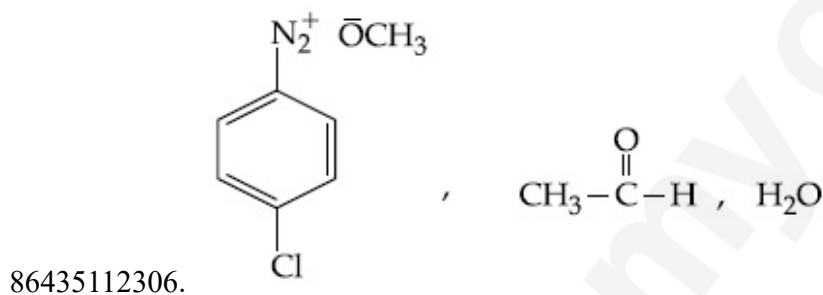
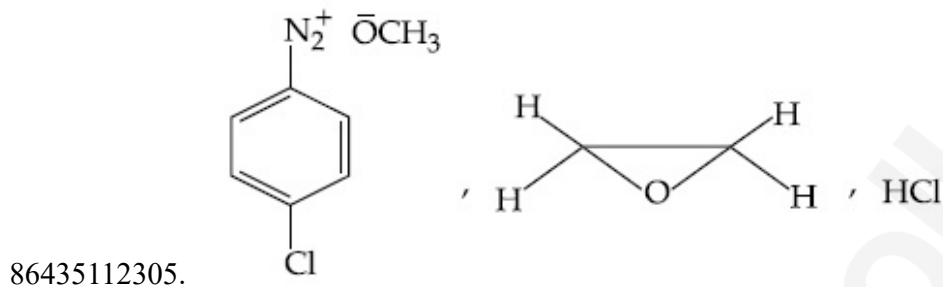
Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ઉપરની પ્રક્રિયામાં (A), "X" અને "Y" નાં બંધારણીય સૂત્ર અનુક્રમે શોધો.

Options :



Question Number : 48 Question Id : 8643514098 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Primary, secondary and tertiary amines can be separated using :

Options :

86435112309. Chloroform and KOH
86435112310. Benzene sulphonic acid
86435112311. para-Toluene sulphonyl chloride
86435112312. Acetyl amide

Question Number : 48 Question Id : 8643514098 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

નીચેનાં નો ઉપયોગ કરીને પ્રાથમિક, દ્વિતીયક અને તૃતીયક એમાઈનો (amines) અલગ (પ્રભેદિત) પાડી શકાય છે જે શોધો.

Options :

86435112309. ક્લોરોફોર્મ અને KOH
86435112310. બેન્ઝિન સલ્ફોનિક એસિડ
86435112311. પેરા-ટોલ્યુઈન સલ્ફોનાઈલ ક્લોરાઈડ
86435112312. એસિટાઈલ એમાઈડ

Question Number : 49 Question Id : 8643514099 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

List - I

Chemical Compound

- (a) Sucralose
 (b) Glyceryl ester of stearic acid
 (c) Sodium benzoate
 (d) Bithionol

List - II

Used as

- (i) Synthetic detergent
 (ii) Artificial sweetener
 (iii) Antiseptic
 (iv) Food preservative

Choose the correct match :

Options :

86435112313. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

86435112314. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435112315. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

86435112316. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Question Number : 49 Question Id : 8643514099 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

સૂચિ - I સાથે સૂચિ - II ને જોડો.

સૂચિ - I

રાસાયણિક સંયોજન

- (a) સુક્રાલોઝ
 (b) સ્ટેરિક એસિડનો ગ્લિસરાઈલ એસ્ટર
 (c) સોડિયમ બેન્ઝોએટ
 (d) બીથીઓનોલ (Bithionol)

સૂચિ - II

તરીકે ઉપયોગ

- (i) સાંત્લેપિત પ્રક્ષાલક
 (ii) કૃત્રિમ ગળ્યા પદાર્થો
 (iii) જીવાણુનાશી
 (iv) ખાદ્ય પરિરક્ષકો

સાચી જોડ પસંદ કરો.

Options :

86435112313. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

86435112314. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

86435112315. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

86435112316. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Question Number : 50 Question Id : 8643514100 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Fructose is an example of :

Options :

86435112317. Aldohexose

86435112318. Ketohexose

86435112319. Pyranose

86435112320. Heptose

Question Number : 50 Question Id : 8643514100 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ક્રુકટોઝ એ નીચેનામાંનું એક ઉદાહરણ છે જે શોધો.

Options :

86435112317. આલ્ડોહેક્ઝોઝ

86435112318. કિટોહેક્ઝોઝ

86435112319. પાયરેનોઝ

86435112320. હેપ્ટોઝ

Chemistry Section B

| | |
|--|-----------|
| Section Id : | 864351274 |
| Section Number : | 4 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 10 |
| Number of Questions to be attempted : | 5 |

| | |
|------------------------------|-----------|
| Section Marks : | 20 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351274 |
| Question Shuffling Allowed : | Yes |

Question Number : 51 Question Id : 8643514101 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of chlorine atoms in 20 mL of chlorine gas at STP is _____ 10^{21} . (Round off to the Nearest Integer).

[Assume chlorine is an ideal gas at STP

$R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$, $N_A = 6.023 \times 10^{23}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 51 Question Id : 8643514101 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

STP પર 20 mL ક્લોરિન વાયુમાં ક્લોરિન પરમાણુઓની સંખ્યા _____ 10^{21} છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[ધારી લો કે STP પર ક્લોરિન આદર્શ વાયુ છે

$R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$, $N_A = 6.023 \times 10^{23}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 Question Id : 8643514102 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

KBr is doped with 10^{-5} mole percent of SrBr_2 . The number of cationic vacancies in 1 g of KBr crystal is _____ 10^{14} . (Round off to the Nearest Integer).

[Atomic Mass : K : 39.1 u, Br : 79.9 u

$N_A = 6.023 \times 10^{23}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 52 **Question Id :** 8643514102 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

SrBr_2 નાં 10^{-5} મોલ ટકા સાથે KBr ને અશુદ્ધિ તરીકે મિશ્ર કરવામાં આવે છે. KBr સ્ફટિકનાં 1 ગ્રામમાં કેટાયનિક રિક્તો (જગ્યાઓ) ની સંખ્યા _____ 10^{14} છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[પરમાણ્વીય દળ : K : 39.1 u Br : 79.9 u

$N_A = 6.023 \times 10^{23}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 53 **Question Id :** 8643514103 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

In the ground state of atomic Fe($Z = 26$), the spin-only magnetic moment is _____ $\times 10^{-1}$ BM. (Round off to the Nearest Integer).

[Given : $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 53 Question Id : 8643514103 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Fe($Z=26$) ની ભૂમિ અવસ્થામાં સ્પીન-ફક્ત ચુંબકીય ચાકમાત્રા _____ $\times 10^{-1}$ BM છે.
(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[આપેલ : $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 54 Question Id : 8643514104 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A 1 molal $K_4Fe(CN)_6$ solution has a degree of dissociation of 0.4. Its boiling point is equal to that of another solution which contains 18.1 weight percent of a non electrolytic solute A. The molar mass of A is _____ u. (Round off to the Nearest Integer).

[Density of water = 1.0 g cm^{-3}]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 54 Question Id : 8643514104 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 મોલલ $K_4Fe(CN)_6$ દ્રાવણ 0.4 વિયોજન અંશ ધરાવે છે. તેનું ઉત્કલનબિંદુ બીજા દ્રાવણને સમાન છે કે જે વિદ્યુત અવિભાજ્ય દ્રાવ્ય A નાં 18.1 વજન ટકા ધરાવે છે. A નું મોલર દળ _____ u છે.

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[પાણીની ઘનતા = 1.0 g cm^{-3}]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643514105 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Consider the reaction $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$. The temperature at which $K_C = 20.4$ and

$K_P = 600.1$, is _____ K. (Round off to the Nearest Integer).

[Assume all gases are ideal and $R = 0.0831 \text{ L bar K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 55 Question Id : 8643514105 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ પ્રક્રિયાને ધ્યાનમાં લો. કયા તાપમાને $K_C = 20.4$ અને $K_P = 600.1$ થાય તે

_____ K છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

[ધારી લો બધાં જ વાયુઓ આદર્શ છે અને $R = 0.0831 \text{ L bar K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 56 Question Id : 8643514106 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A KCl solution of conductivity 0.14 S m^{-1} shows a resistance of 4.19Ω in a conductivity cell.

If the same cell is filled with an HCl solution, the resistance drops to 1.03Ω . The conductivity of the HCl solution is _____ $\times 10^{-2} \text{ S m}^{-1}$. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 56 Question Id : 8643514106 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

વાહકતા કોષમાં 0.14 S m^{-1} વાહકતા ધરાવતું KCl નું દ્રાવણ 4.19Ω અવરોધ દર્શાવે છે. જો આ જ કોષમાં HCl દ્રાવણ ભરવામાં આવે તો અવરોધ 1.03Ω થતો (નીચે) જાય છે. તો HCl નાં દ્રાવણની વાહકતા _____ $\times 10^{-2} \text{ S m}^{-1}$ છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 57 Question Id : 8643514107 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The reaction $2A + B_2 \rightarrow 2AB$ is an elementary reaction.

For a certain quantity of reactants, if the volume of the reaction vessel is reduced by a factor of 3, the rate of the reaction increases by a factor of _____. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 57 Question Id : 8643514107 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$2A + B_2 \rightarrow 2AB$ પ્રક્રિયા એ એક પ્રાથમિક (elementary) પ્રક્રિયા છે. એક નિશ્ચિત પ્રક્રિયકોનાં જથ્થા માટે, જો પ્રક્રિયા પાત્રનું કદ 3 અવયવ (3 times) ઘટાડવામાં આવે તો, પ્રક્રિયા વેગમાં વધારો _____ અવયવ (times) થશે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 58 Question Id : 8643514108 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

On complete reaction of FeCl_3 with oxalic acid in aqueous solution containing KOH , resulted in the formation of product A. The secondary valency of Fe in the product A is _____.

(Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 58 Question Id : 8643514108 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

KOH ઘરાવતાં જલીય દ્રાવણમાં FeCl_3 ની સાથે ઓક્સેલિક એસિડની પ્રક્રિયા થતાં પરિણામ સ્વરૂપે નીપજ A નું સર્જન થાય છે. નીપજ A માં Fe ની દ્વિતીયક સંયોજકતા _____ છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643514109 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The total number of C-C sigma bond/s in mesityl oxide ($\text{C}_6\text{H}_{10}\text{O}$) is _____. (Round off to the Nearest Integer).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 59 Question Id : 8643514109 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

એસિટોન સાથે NaOH ની પ્રક્રિયા થતાં નીચળ તરીકે મેસિટાઈલ ઓક્સાઈડ (C_6H_5CO) અને છે. મેસિટાઈલ ઓક્સાઈડમાં C-C સિગ્મા બંધ (ધો) ની કુલ સંખ્યા _____ છે. (નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

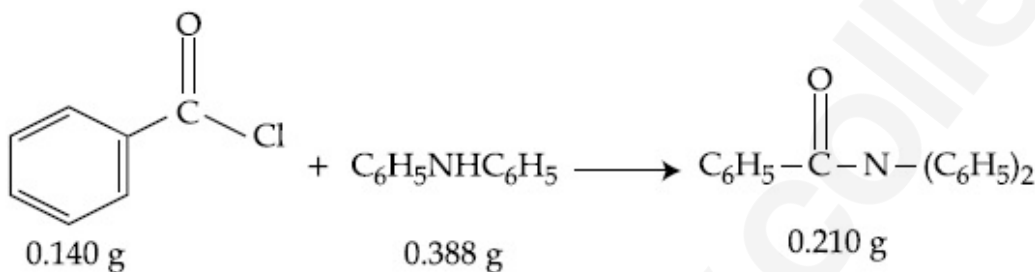
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 **Question Id :** 8643514110 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0



Consider the above reaction. The percentage yield of amide product is _____. (Round off to the Nearest Integer).

(Given : Atomic mass : C : 12.0 u, H : 1.0 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 u)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

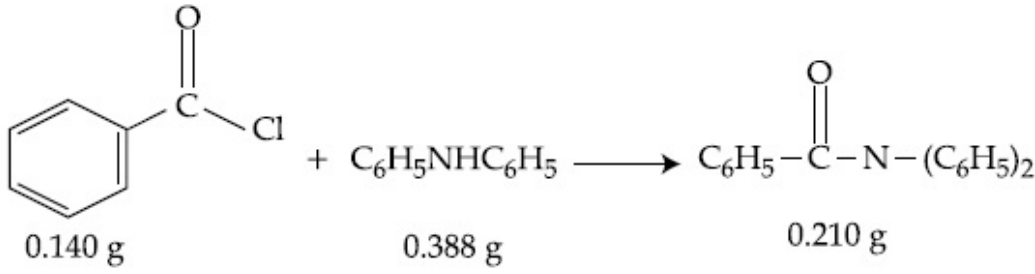
Text Areas : PlainText

Possible Answers :

100

Question Number : 60 **Question Id :** 8643514110 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0



ઉપરની પ્રક્રિયાને ધ્યાનમાં લો. એમાઈડ નીપજ ની નીપજ ટકાવારી _____ છે.

(આપેલ પરમાણ્વીય દળો : C : 12.0 u, H : 1.0 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 u)

(નજીકનાં પૂર્ણાંકમાં રાઉન્ડ ઓફ કરો)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Mathematics Section A

| | |
|---------------------------------------|-----------|
| Section Id : | 864351275 |
| Section Number : | 5 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351275 |
| Question Shuffling Allowed : | Yes |

Question Number : 61 Question Id : 8643514111 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of solutions of the equation $\sin^{-1}\left[x^2 + \frac{1}{3}\right] + \cos^{-1}\left[x^2 - \frac{2}{3}\right] = x^2$, for

$x \in [-1, 1]$, and $[x]$ denotes the greatest integer less than or equal to x , is :

Options :

86435112331. 0

86435112332. 2

86435112333. 4

86435112334. Infinite

Question Number : 61 Question Id : 8643514111 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો $[x]$ એ x અથવા x થી નાનો મહત્તમ પૂર્ણાંક દર્શાવે, તો $x \in [-1, 1]$ માટે સમીકરણ

$$\sin^{-1}\left[x^2 + \frac{1}{3}\right] + \cos^{-1}\left[x^2 - \frac{2}{3}\right] = x^2 \text{ નાં ઉકેલોની સંખ્યા } \underline{\hspace{2cm}} \text{ છે.}$$

Options :

86435112331. 0

86435112332. 2

86435112333. 4

86435112334. અનંત

Question Number : 62 Question Id : 8643514112 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the Boolean expression $(p \wedge q) \circledast (p \circledast q)$ is a tautology, then \circledast and \circledast are respectively given by :

Options :

86435112335. \wedge, \vee 86435112336. \vee, \rightarrow 86435112337. \rightarrow, \rightarrow 86435112338. \wedge, \rightarrow

Question Number : 62 Question Id : 8643514112 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો બૂલીય અભિવ્યક્તિ $(p \wedge q) \oplus (p \otimes q)$ એ નિત્ય-સત્ય હોય, તો \oplus અને \otimes અનુક્રમે _____ છે.

Options :

86435112335. \wedge, \vee

86435112336. \vee, \rightarrow

86435112337. \rightarrow, \rightarrow

86435112338. \wedge, \rightarrow

Question Number : 63 Question Id : 8643514113 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let O be the origin. Let $\vec{OP} = x\hat{i} + y\hat{j} - \hat{k}$ and $\vec{OQ} = -\hat{i} + 2\hat{j} + 3x\hat{k}$, $x, y \in \mathbb{R}$, $x > 0$, be

such that $|\vec{PQ}| = \sqrt{20}$ and the vector \vec{OP} is perpendicular to \vec{OQ} . If $\vec{OR} = 3\hat{i} + z\hat{j} - 7\hat{k}$,

$z \in \mathbb{R}$, is coplanar with \vec{OP} and \vec{OQ} , then the value of $x^2 + y^2 + z^2$ is equal to :

Options :

86435112339. 1

86435112340. 2

86435112341. 7

86435112342. 9

Question Number : 63 Question Id : 8643514113 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે O ઉગમબિંદુ છે. ધારો કે $\vec{OP} = x\hat{i} + y\hat{j} - \hat{k}$ અને $\vec{OQ} = -\hat{i} + 2\hat{j} + 3x\hat{k}$, $x, y \in \mathbb{R}$, $x > 0$ એવા

છે કે જેથી $|\vec{PQ}| = \sqrt{20}$ તથા સદિશ \vec{OP} એ \vec{OQ} ને લંબ છે. જો $\vec{OR} = 3\hat{i} + z\hat{j} - 7\hat{k}$, $z \in \mathbb{R}$ એ \vec{OP} અને

\vec{OQ} સાથે સમતલીય હોય, તો $x^2 + y^2 + z^2$ નું મૂલ્ય _____ છે.

Options :

86435112339. 1

86435112340. 2

86435112341. 7

86435112342. 9

Question Number : 64 Question Id : 8643514114 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If x, y, z are in arithmetic progression with common difference d , $x \neq 3d$, and the determinant

of the matrix $\begin{bmatrix} 3 & 4\sqrt{2} & x \\ 4 & 5\sqrt{2} & y \\ 5 & k & z \end{bmatrix}$ is zero, then the value of k^2 is :

Options :

86435112343. 6

86435112344. 12

86435112345. 36

86435112346. 72

Question Number : 64 Question Id : 8643514114 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો x, y, z એ સામાન્ય તફાવત t વાળી સમાંતર શ્રેણીમાં હોય, જ્યાં $x \neq 3t$ અને શ્રેણિક $\begin{bmatrix} 3 & 4\sqrt{2} & x \\ 4 & 5\sqrt{2} & y \\ 5 & k & z \end{bmatrix}$ નો નિશ્ચાયક

શૂન્ય હોય, તો k^2 નું મૂલ્ય _____ છે.

Options :

86435112343. 6

86435112344. 12

86435112345. 36

86435112346. 72

Question Number : 65 Question Id : 8643514115 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of the limit $\lim_{\theta \rightarrow 0} \frac{\tan(\pi \cos^2 \theta)}{\sin(2\pi \sin^2 \theta)}$ is equal to :

Options :

86435112347. $\frac{1}{4}$ 86435112348. $-\frac{1}{2}$ 86435112349. $-\frac{1}{4}$

86435112350. 0

Question Number : 65 Question Id : 8643514115 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{\theta \rightarrow 0} \frac{\tan(\pi \cos^2 \theta)}{\sin(2\pi \sin^2 \theta)} = \dots \text{ \textcircled{?} }.$

Options :

86435112347. $\frac{1}{4}$ 86435112348. $-\frac{1}{2}$

86435112349. $-\frac{1}{4}$

86435112350. 0

Question Number : 66 Question Id : 8643514116 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the integral $\int_0^{10} \frac{[\sin 2\pi x]}{e^x - [x]} dx = \alpha e^{-1} + \beta e^{-\frac{1}{2}} + \gamma$, where α, β, γ are integers and $[x]$ denotes

the greatest integer less than or equal to x , then the value of $\alpha + \beta + \gamma$ is equal to :

Options :

86435112351. 0

86435112352. 10

86435112353. 20

86435112354. 25

Question Number : 66 Question Id : 8643514116 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો સંકલ $\int_0^{10} \frac{[\sin 2\pi x]}{e^x - [x]} dx = \alpha e^{-1} + \beta e^{-\frac{1}{2}} + \gamma$, જ્યાં α, β, γ પૂર્ણાંકો છે અને $[x]$ એ x અથવા x થી નાનો

મહત્તમ પૂર્ણાંક દર્શાવે છે, તો $\alpha + \beta + \gamma = \dots$

Options :

86435112351. 0

86435112352. 10

86435112353. 20

86435112354. 25

Question Number : 67 Question Id : 8643514117 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the curve $y=y(x)$ is the solution of the differential equation

$$2(x^2 + x^{5/4}) dy - y(x + x^{1/4}) dx = 2x^{9/4} dx, x > 0 \text{ which passes through the point}$$

$\left(1, 1 - \frac{4}{3} \log_e 2\right)$, then the value of $y(16)$ is equal to :

Options :

$$4\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$$

86435112355.

$$\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$$

86435112356.

$$\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$$

86435112357.

$$4\left(\frac{31}{3} + \frac{8}{3} \log_e 3\right)$$

86435112358.

Question Number : 67 Question Id : 8643514117 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો વક્ર $y=y(x)$ એ વિકલ સમીકરણ $2(x^2 + x^{5/4}) dy - y(x + x^{1/4}) dx = 2x^{9/4} dx, x > 0$ નો ઉકેલ હોય, અને

તે બિંદુ $\left(1, 1 - \frac{4}{3} \log_e 2\right)$ માંથી પસાર થતો હોય, તો $y(16) = \underline{\hspace{2cm}}$.

Options :

$$4\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$$

86435112355.

$$\left(\frac{31}{3} - \frac{8}{3} \log_e 3\right)$$

86435112356.

$$86435112357. \left(\frac{31}{3} + \frac{8}{3} \log_e 3 \right)$$

$$86435112358. 4 \left(\frac{31}{3} + \frac{8}{3} \log_e 3 \right)$$

Question Number : 68 Question Id : 8643514118 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $y = y(x)$ be the solution of the differential equation

$$\cos x(3\sin x + \cos x + 3) dy = (1 + y \sin x(3\sin x + \cos x + 3))dx, 0 \leq x \leq \frac{\pi}{2}, y(0) = 0. \text{ Then, } y\left(\frac{\pi}{3}\right) \text{ is}$$

equal to :

Options :

$$86435112359. 2 \log_e \left(\frac{3\sqrt{3} - 8}{4} \right)$$

$$86435112360. 2 \log_e \left(\frac{\sqrt{3} + 7}{2} \right)$$

$$86435112361. 2 \log_e \left(\frac{2\sqrt{3} + 9}{6} \right)$$

$$86435112362. 2 \log_e \left(\frac{2\sqrt{3} + 10}{11} \right)$$

Question Number : 68 Question Id : 8643514118 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે $y = y(x)$ એ વિકલ સમીકરણ

$$\cos x(3\sin x + \cos x + 3) dy = (1 + y \sin x(3\sin x + \cos x + 3))dx, 0 \leq x \leq \frac{\pi}{2}, y(0) = 0 \text{ નો ઉકેલ છે. તો}$$

$$y\left(\frac{\pi}{3}\right) = \underline{\hspace{2cm}}.$$

Options :

$$2 \log_e \left(\frac{3\sqrt{3} - 8}{4} \right)$$

86435112359.

$$2 \log_e \left(\frac{\sqrt{3} + 7}{2} \right)$$

86435112360.

$$2 \log_e \left(\frac{2\sqrt{3} + 9}{6} \right)$$

86435112361.

$$2 \log_e \left(\frac{2\sqrt{3} + 10}{11} \right)$$

86435112362.

Question Number : 69 Question Id : 8643514119 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \begin{cases} \left(2 - \sin\left(\frac{1}{x}\right)\right) |x|, & x \neq 0 \\ 0, & x = 0 \end{cases}$. Then f is :

Options :

86435112363. monotonic on $(0, \infty)$ only

86435112364. monotonic on $(-\infty, 0)$ only

86435112365. monotonic on $(-\infty, 0) \cup (0, \infty)$

86435112366. not monotonic on $(-\infty, 0)$ and $(0, \infty)$

Question Number : 69 Question Id : 8643514119 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે વિધેય $f: \mathbb{R} \rightarrow \mathbb{R}$ એ $f(x) = \begin{cases} \left(2 - \sin\left(\frac{1}{x}\right)\right) |x|, & x \neq 0 \\ 0, & x = 0 \end{cases}$ મુજબ વ્યાખ્યાયિત છે. તો f _____.

Options :

86435112363. ફક્ત $(0, \infty)$ પર એકસૂત્રી (monotonic) છે.

86435112364. ફક્ત $(-\infty, 0)$ પર એકસૂત્રી છે.

86435112365. $(-\infty, 0) \cup (0, \infty)$ પર એકસૂત્રી છે.

86435112366. $(-\infty, 0)$ અને $(0, \infty)$ પર એકસૂત્રી નથી.

Question Number : 70 Question Id : 8643514120 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of

$$\lim_{n \rightarrow \infty} \frac{[r] + [2r] + \dots + [nr]}{n^2},$$

where r is a non-zero real number and $[r]$ denotes the greatest integer less than or equal to r , is equal to :

Options :

86435112367. r

86435112368. $\frac{r}{2}$

86435112369. $2r$

86435112370. 0

Question Number : 70 Question Id : 8643514120 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો r એ શૂન્યેતર વાસ્તવિક સંખ્યા હોય તથા $[r]$ એ r અથવા r થી નાનો મહત્તમ પૂર્ણાંક દર્શાવે તો

$$\lim_{n \rightarrow \infty} \frac{[r] + [2r] + \dots + [nr]}{n^2} = \underline{\hspace{2cm}}.$$

Options :

86435112367. r 86435112368. $\frac{r}{2}$ 86435112369. $2r$ 86435112370. 0

Question Number : 71 Question Id : 8643514121 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let a computer program generate only the digits 0 and 1 to form a string of binary numbers with probability of occurrence of 0 at even places be $\frac{1}{2}$ and probability of occurrence of 0 at the odd place be $\frac{1}{3}$. Then the probability that '10' is followed by '01' is equal to :

Options :

86435112371. $\frac{1}{9}$ 86435112372. $\frac{1}{6}$ 86435112373. $\frac{1}{3}$ 86435112374. $\frac{1}{18}$

Question Number : 71 Question Id : 8643514121 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે એક સંગણન આયોજન ફક્ત અંકો 0 તથા 1 દ્વારા બનતી દ્વિઅંકી સંખ્યાઓની હાર ઉત્પન્ન કરે છે, જ્યાં સમ સ્થાન

પર 0 આવવાની સંભાવના $\frac{1}{2}$ છે તથા વિષમ સ્થાન પર 0 આવવાની સંભાવના $\frac{1}{3}$ છે. તો '10' નો અનુગામી '01' આવે

તેની સંભાવના _____ છે.

Options :

86435112371. $\frac{1}{9}$

86435112372. $\frac{1}{6}$

86435112373. $\frac{1}{3}$

86435112374. $\frac{1}{18}$

Question Number : 72 Question Id : 8643514122 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the sides AB, BC and CA of a triangle ABC have 3, 5 and 6 interior points respectively, then the total number of triangles that can be constructed using these points as vertices, is equal to :

Options :

86435112375. 360

86435112376. 364

86435112377. 333

86435112378. 240

Question Number : 72 Question Id : 8643514122 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો ત્રિકોણ ABC ની બાજુઓ AB, BC તથા CA નાં અંતરિત (interior) અનુક્રમે 3, 5 તથા 6 બિંદુઓ આવેલા હોય, તો આ બિંદુઓ જેના શિરોબિંદુઓ હોય તેવા બનતા કુલ ત્રિકોણોની સંખ્યા _____ છે.

Options :

86435112375. 360

86435112376. 364

86435112377. 333

86435112378. 240

Question Number : 73 Question Id : 8643514123 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let the tangent to the circle $x^2 + y^2 = 25$ at the point R(3, 4) meet x -axis and y -axis at points P and Q, respectively. If r is the radius of the circle passing through the origin O and having centre at the incentre of the triangle OPQ, then r^2 is equal to :

Options :

86435112379. $\frac{125}{72}$

86435112380. $\frac{625}{72}$

86435112381. $\frac{529}{64}$

86435112382. $\frac{585}{66}$

Question Number : 73 Question Id : 8643514123 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે વર્તુળ $x^2 + y^2 = 25$ નાં બિંદુ R(3, 4) પરનો સ્પર્શક x -અક્ષ તથા y -અક્ષને બિંદુઓ P તથા Q માં મળે છે. જો ઉગમબિંદુ O માંથી પસાર થતા ત્રિજ્યા r વાળા વર્તુળનું કેન્દ્ર એ ત્રિકોણ OPQ નું અંતઃકેન્દ્ર હોય, તો $r^2 =$ _____.

Options :

$$86435112379. \frac{125}{72}$$

$$86435112380. \frac{625}{72}$$

$$86435112381. \frac{529}{64}$$

$$86435112382. \frac{585}{66}$$

Question Number : 74 Question Id : 8643514124 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let S_1, S_2 and S_3 be three sets defined as

$$S_1 = \{z \in \mathbb{C} : |z-1| \leq \sqrt{2}\}$$

$$S_2 = \{z \in \mathbb{C} : \operatorname{Re}((1-i)z) \geq 1\}$$

$$S_3 = \{z \in \mathbb{C} : \operatorname{Im}(z) \leq 1\}$$

Then the set $S_1 \cap S_2 \cap S_3$

Options :

86435112383. has exactly two elements

86435112384. has exactly three elements

86435112385. is a singleton

86435112386. has infinitely many elements

Question Number : 74 Question Id : 8643514124 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે ત્રણ ગણ S_1, S_2 અને S_3 એ

$$S_1 = \{z \in \mathbb{C} : |z-1| \leq \sqrt{2}\},$$

$$S_2 = \{z \in \mathbb{C} : \operatorname{Re}((1-i)z) \geq 1\},$$

$$S_3 = \{z \in \mathbb{C} : \operatorname{Im}(z) \leq 1\}$$

પ્રમાણે વ્યાખ્યાયિત છે. તો ગણ $S_1 \cap S_2 \cap S_3$ _____.

Options :

86435112383. માં બરાબર બે ઘટકો છે.

86435112384. માં બરાબર ત્રણ ઘટકો છે.

86435112385. એક ઘટકીય છે.

86435112386. માં અસંખ્ય ઘટકો આવેલા છે.

Question Number : 75 Question Id : 8643514125 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined as $f(x) = e^{-x} \sin x$. If $F: [0, 1] \rightarrow \mathbb{R}$ is a differentiable function such

that $F(x) = \int_0^x f(t) dt$, then the value of $\int_0^1 (F'(x) + f(x))e^x dx$ lies in the interval

Options :

86435112387. $\left[\frac{330}{360}, \frac{331}{360} \right]$

86435112388. $\left[\frac{327}{360}, \frac{329}{360} \right]$

86435112389. $\left[\frac{331}{360}, \frac{334}{360} \right]$

86435112390. $\left[\frac{335}{360}, \frac{336}{360} \right]$

Question Number : 75 Question Id : 8643514125 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે $f: \mathbb{R} \rightarrow \mathbb{R}$ એ $f(x) = e^{-x} \sin x$ વડે વ્યાખ્યાયિત છે. જો $F: [0, 1] \rightarrow \mathbb{R}$ એ એવો વિકલનીય વિધેય હોય, જ્યાં

$F(x) = \int_0^x f(t) dt$, તો $\int_0^1 (F'(x) + f(x))e^x dx$ નું મૂલ્ય અંતરાલ _____ માં આવેલ છે.

Options :

86435112387. $\left[\frac{330}{360}, \frac{331}{360} \right]$

86435112388. $\left[\frac{327}{360}, \frac{329}{360} \right]$

86435112389. $\left[\frac{331}{360}, \frac{334}{360} \right]$

86435112390. $\left[\frac{335}{360}, \frac{336}{360} \right]$

Question Number : 76 Question Id : 8643514126 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The value of $\sum_{r=0}^6 \binom{6}{r} \cdot \binom{6}{6-r}$ is equal to :

Options :

86435112391. 924

86435112392. 1024

86435112393. 1124

86435112394. 1324

Question Number : 76 Question Id : 8643514126 Question Type : MCQ Option Shuffling : Yes Is Question

Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\sum_{r=0}^6 ({}^6C_r \cdot {}^6C_{6-r}) \text{ નું મૂલ્ય } \underline{\hspace{2cm}} \text{ છે.}$$

Options :

86435112391. 924

86435112392. 1024

86435112393. 1124

86435112394. 1324

Question Number : 77 Question Id : 8643514127 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the equation of plane passing through the mirror image of a point (2, 3, 1) with respect to

line $\frac{x+1}{2} = \frac{y-3}{1} = \frac{z+2}{-1}$ and containing the line $\frac{x-2}{3} = \frac{1-y}{2} = \frac{z+1}{1}$ is

$\alpha x + \beta y + \gamma z = 24$, then $\alpha + \beta + \gamma$ is equal to :

Options :

86435112395. 21

86435112396. 20

86435112397. 19

86435112398. 18

Question Number : 77 Question Id : 8643514127 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

જો બિંદુ (2, 3, 1) નાં સુરેખા $\frac{x+1}{2} = \frac{y-3}{1} = \frac{z+2}{-1}$ ને સાપેક્ષ મળતા આરસી પ્રતિબિંબમાંથી પસાર થતાં તથા

રેખા $\frac{x-2}{3} = \frac{1-y}{2} = \frac{z+1}{1}$ ને સમાવતા સમતલનું સમીકરણ $\alpha x + \beta y + \gamma z = 24$ હોય, તો $\alpha + \beta + \gamma =$

_____.

Options :

86435112395. 21

86435112396. 20

86435112397. 19

86435112398. 18

Question Number : 78 Question Id : 8643514128 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two tangents are drawn from a point P to the circle $x^2 + y^2 - 2x - 4y + 4 = 0$, such that the angle between these tangents is $\tan^{-1}\left(\frac{12}{5}\right)$, where $\tan^{-1}\left(\frac{12}{5}\right) \in (0, \pi)$. If the centre of the circle is denoted by C and these tangents touch the circle at points A and B, then the ratio of the areas of ΔPAB and ΔCAB is :

Options :

86435112399. 9 : 4

86435112400. 3 : 1

86435112401. 2 : 1

86435112402. 11 : 4

Question Number : 78 Question Id : 8643514128 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

બિંદુ P માંથી વર્તુળ $x^2 + y^2 - 2x - 4y + 4 = 0$ પર બે સ્પર્શકો એવી રીતે દોરવામાં આવે છે કે જેથી આ સ્પર્શકો વચ્ચેનો ખૂણો $\tan^{-1}\left(\frac{12}{5}\right)$ થાય, જ્યાં $\tan^{-1}\left(\frac{12}{5}\right) \in (0, \pi)$. જો વર્તુળનાં કેન્દ્રને C વડે દર્શાવવામાં આવે અને આ સ્પર્શકો વર્તુળને બિંદુઓ A તથા B માં સ્પર્શે, તો ΔPAB તથા ΔCAB નાં ક્ષેત્રફળોનો શક્ય ગુણોત્તર _____ છે.

Options :

86435112399. 9 : 4

86435112400. 3 : 1

86435112401. 2 : 1

86435112402. 11 : 4

Question Number : 79 Question Id : 8643514129 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The number of solutions of the equation $x + 2 \tan x = \frac{\pi}{2}$ in the interval $[0, 2\pi]$ is :

Options :

86435112403. 2

86435112404. 3

86435112405. 4

86435112406. 5

Question Number : 79 Question Id : 8643514129 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

અંતરાલ $[0, 2\pi]$ માં સમીકરણ $x + 2 \tan x = \frac{\pi}{2}$ નાં ઉકેલોની સંખ્યા _____ છે.

Options :

86435112403. 2

86435112404. 3

86435112405. 4

86435112406. 5

Question Number : 80 Question Id : 8643514130 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let L be a tangent line to the parabola $y^2 = 4x - 20$ at (6, 2). If L is also a tangent to the ellipse

$$\frac{x^2}{2} + \frac{y^2}{b} = 1, \text{ then the value of } b \text{ is equal to :}$$

Options :

86435112407. 11

86435112408. 14

86435112409. 16

86435112410. 20

Question Number : 80 Question Id : 8643514130 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ધારો કે L એ પરવલય $y^2 = 4x - 20$ ની (6, 2) પરની સ્પર્શ રેખા છે. જો L એ ઉપવલય $\frac{x^2}{2} + \frac{y^2}{b} = 1$ નું પણ સ્પર્શક

હોય, તો b નું મૂલ્ય _____ છે.

Options :

86435112407. 11

86435112408. 14

86435112409. 16

86435112410. 20

Mathematics Section B

Section Id :

864351276

Section Number :

6

Section type :

Online

Mandatory or Optional :

Mandatory

| | |
|---------------------------------------|-----------|
| Number of Questions : | 10 |
| Number of Questions to be attempted : | 5 |
| Section Marks : | 20 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 864351276 |
| Question Shuffling Allowed : | Yes |

Question Number : 81 Question Id : 8643514131 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let $I_n = \int_1^e x^{19} (\log|x|)^n dx$, where $n \in \mathbb{N}$. If $(20)I_{10} = \alpha I_9 + \beta I_8$, for natural numbers α and β ,
then $\alpha - \beta$ equals to _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :

100

Question Number : 81 Question Id : 8643514131 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

ધારો કે $I_n = \int_1^e x^{19} (\log|x|)^n dx$, જ્યાં $n \in \mathbb{N}$. જો પ્રાકૃતિક સંખ્યાઓ α અને β માટે, $(20)I_{10} = \alpha I_9 + \beta I_8$ થાય,
તો $\alpha - \beta =$ _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :

100

Question Number : 82 Question Id : 8643514132 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let $\tan\alpha$, $\tan\beta$ and $\tan\gamma$; $\alpha, \beta, \gamma \neq \frac{(2n-1)\pi}{2}$, $n \in \mathbb{N}$ be the slopes of three line segments OA, OB and OC, respectively, where O is origin. If circumcentre of ΔABC coincides with origin and its orthocentre lies on y -axis, then the value of $\left(\frac{\cos 3\alpha + \cos 3\beta + \cos 3\gamma}{\cos \alpha \cos \beta \cos \gamma}\right)^2$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 82 **Question Id :** 8643514132 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

ધારો કે $\tan\alpha$, $\tan\beta$ અને $\tan\gamma$; $\alpha, \beta, \gamma \neq \frac{(2n-1)\pi}{2}$, $n \in \mathbb{N}$ એ અનુક્રમે ત્રણ રેખા ખંડો OA, OB અને OC નાં ઢાળ છે, જ્યાં O ઉગમબિંદુ છે. જો ΔABC નું પરિકેન્દ્ર એ ઉગમબિંદુ સાથે એકાકાર થાય અને તેનું લંબકેન્દ્ર y -અક્ષ પર આવેલ હોય, તો $\left(\frac{\cos 3\alpha + \cos 3\beta + \cos 3\gamma}{\cos \alpha \cos \beta \cos \gamma}\right)^2$ નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 **Question Id :** 8643514133 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

If 1, $\log_{10}(4^x - 2)$ and $\log_{10}\left(4^x + \frac{18}{5}\right)$ are in arithmetic progression for a real number x , then

the value of the determinant $\begin{vmatrix} 2\left(x - \frac{1}{2}\right) & x - 1 & x^2 \\ 1 & 0 & x \\ x & 1 & 0 \end{vmatrix}$ is equal to :

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 83 **Question Id :** 8643514133 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

જો વાસ્તવિક સંખ્યા x માટે 1, $\log_{10}(4^x - 2)$ અને $\log_{10}\left(4^x + \frac{18}{5}\right)$ સમાંતર શ્રેણીમાં હોય, તો નિશ્ચાયક

$\begin{vmatrix} 2\left(x - \frac{1}{2}\right) & x - 1 & x^2 \\ 1 & 0 & x \\ x & 1 & 0 \end{vmatrix}$ નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 **Question Id :** 8643514134 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

Consider a set of $3n$ numbers having variance 4. In this set, the mean of first $2n$ numbers is 6 and the mean of the remaining n numbers is 3. A new set is constructed by adding 1 into each of first $2n$ numbers, and subtracting 1 from each of the remaining n numbers. If the variance of the new set is k , then $9k$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 84 Question Id : 8643514134 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

જેનું વિચરણ 4 હોય તેવો $3n$ સંખ્યાઓનો ગણ ગણતરીમાં લો. આ ગણમાં પ્રથમ $2n$ સંખ્યાઓનો મધ્યક 6 છે અને બાકીની n સંખ્યાઓનો મધ્યક 3 છે. પહેલી દરેક $2n$ સંખ્યાઓમાં 1 ઉમેરી તથા બાકીની દરેક n સંખ્યાઓમાંથી 1 બાદ કરીને એક નવો ગણ બનાવવામાં આવે છે. જો નવા ગણનો વિચરણ k હોય, તો $9k =$ _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 Question Id : 8643514135 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f: [-1, 1] \rightarrow \mathbb{R}$ be defined as $f(x) = ax^2 + bx + c$ for all $x \in [-1, 1]$, where $a, b, c \in \mathbb{R}$ such that $f(-1) = 2$, $f'(-1) = 1$ and for $x \in (-1, 1)$ the maximum value of $f''(x)$ is $\frac{1}{2}$. If $f(x) \leq \alpha$, $x \in [-1, 1]$, then the least value of α is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 85 Question Id : 8643514135 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે દરેક $x \in [-1, 1]$ માટે $f: [-1, 1] \rightarrow \mathbb{R}$ એ $f(x) = ax^2 + bx + c$, જ્યાં $a, b, c \in \mathbb{R}$ મુજબ એ પ્રમાણે વ્યાખ્યાયિત કરવામાં આવે છે કે જેથી $f(-1) = 2, f'(-1) = 1$ અને $x \in (-1, 1)$ માટે $f''(x)$ નું મહત્તમ મૂલ્ય $\frac{1}{2}$ હોય. જો $f(x) \leq \alpha, x \in [-1, 1]$ હોય, તો α નું ન્યૂનતમ મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 **Question Id :** 8643514136 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

Let the coefficients of third, fourth and fifth terms in the expansion of $\left(x + \frac{a}{x^2}\right)^n, x \neq 0$, be

in the ratio 12 : 8 : 3. Then the term independent of x in the expansion, is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 86 **Question Id :** 8643514136 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

ધારો કે $\left(x + \frac{a}{x^2}\right)^n, x \neq 0$ નાં વિસ્તરણમાં ત્રીજા, ચોથા અને પાંચમાં પદોનાં સહગુણકો 12 : 8 : 3 ગુણોત્તરમાં આવેલા છે. તો વિસ્તરણમાં x થી સ્વતંત્ર પદ _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 Question Id : 8643514137 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $f: [-3, 1] \rightarrow \mathbb{R}$ be given as

$$f(x) = \begin{cases} \min \{(x+6), x^2\}, & -3 \leq x \leq 0 \\ \max \{\sqrt{x}, x^2\}, & 0 \leq x \leq 1. \end{cases}$$

If the area bounded by $y=f(x)$ and x -axis is A , then the value of $6A$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 87 Question Id : 8643514137 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે $f: [-3, 1] \rightarrow \mathbb{R}$ એ

$$f(x) = \begin{cases} \min \{(x+6), x^2\}, & -3 \leq x \leq 0 \\ \max \{\sqrt{x}, x^2\}, & 0 \leq x \leq 1 \end{cases}$$

મુજબ આપેલ છે. જો A એ $y=f(x)$ અને x -અક્ષ દ્વારા સંવૃત ક્ષેત્રફળ હોય, તો $6A$ નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643514138 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let P be an arbitrary point having sum of the squares of the distances from the planes $x+y+z=0$, $lx-nz=0$ and $x-2y+z=0$, equal to 9. If the locus of the point P is $x^2+y^2+z^2=9$, then the value of $l-n$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 88 Question Id : 8643514138 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે સ્વૈર બિંદુ P નો સમતલો $x + y + z = 0$, $lx - nz = 0$ અને $x - 2y + z = 0$ થી અંતરોનાં વર્ગોનો સરવાળો 9 છે. જો બિંદુ P નું બિંદુપથ $x^2 + y^2 + z^2 = 9$ હોય, તો $l - n$ નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643514139 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let \vec{x} be a vector in the plane containing vectors $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$. If the vector \vec{x} is perpendicular to $(3\hat{i} + 2\hat{j} - \hat{k})$ and its projection on \vec{a} is $\frac{17\sqrt{6}}{2}$, then the value of

$|\vec{x}|^2$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 89 Question Id : 8643514139 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે \vec{x} એ સદિશો $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ અને $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$ ને સમાવતા સમતલ પરનું સદિશ છે. જો સદિશ \vec{x} એ

$(3\hat{i} + 2\hat{j} - \hat{k})$ ને લંબ હોય અને તેનું \vec{a} પરનું પ્રક્ષેપ $\frac{17\sqrt{6}}{2}$ હોય, તો $|\vec{x}|^2$ નું મૂલ્ય _____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 **Question Id :** 8643514140 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $B = \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \neq \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ such that $AB = B$ and $a + d = 2021$, then the value of $ad - bc$

is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

Question Number : 90 **Question Id :** 8643514140 **Question Type :** SA

Correct Marks : 4 **Wrong Marks :** 0

ધારો કે $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ અને $B = \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \neq \begin{bmatrix} 0 \\ 0 \end{bmatrix}$, જ્યાં $AB = B$ અને $a + d = 2021$. તો $ad - bc$ નું મૂલ્ય

_____ છે.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100