National Testing Agency

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B TECH H

Group Number :	1
Group Id :	708191176
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Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics Section A

Section Id :	708191634
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20

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Section Marks : 80
Mark As Answered Required? : Yes
Sub-Section Number : 1
Sub-Section Id : 708191914
Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 70819116414 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{\frac{L}{g}}$. Measured value of 'L' is 1.0 m from meter scale having a minimum division of 1 mm and time of one complete oscillation is 1.95 s measured from stopwatch of 0.01 s resolution. The percentage error in the determination of 'g' will be :

Options :

70819154391. 1.33 %

70819154392. 1.03%

70819154393. 1.13%

70819154394. 1.30%

Question Number : 1 Question Id : 70819116414 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी सरल लोलक का आवर्तकाल, $T = 2\pi\sqrt{\frac{L}{g}}$ है। इस लोलक की मापित लम्बाई, जिसे उस मीटर स्केल से मापा गया है जिसका अल्पतमांश 1 mm है, 1.0 m है, तथा इसके एक दोलन का समय, जिसे 0.01 s का विभेदन कर सकने वाली विराम घडी द्वारा मापा गया है, 1.95 s है। 'g' का मान ज्ञात करने में होने वाली त्रुटि की प्रतिशतता होगी :

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Options :

70819154391. 1.33 %

70819154392. 1.03 %

70819154393. 1.13 %

70819154394. 1.30 %

Question Number : 2 Question Id : 70819116415 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A particle is projected with velocity v_0 along x–axis. A damping force is acting on the particle which is proportional to the square of the distance from the origin i.e. $ma = -\alpha x^2$. The distance at which the particle stops :

Options :

70819154395. $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

70819154396. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

70819154397. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

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70819154398. $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$

Question Number : 2 Question Id : 70819116415 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी कण को x–अक्ष के अनुदिश वेग v_0 से प्रक्षेपित किया गया है। इस कण पर कोई अवमंदक बल कार्य कर रहा है जो मूलबिन्दु से दूरी के वर्ग के अनुक्रमानुपाती है, अर्थात् $ma = -\alpha x^2$ है। वह दूरी जिस पर यह कण रुक जाएगा है :

Options :

70819154395. $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

70819154396. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

70819154397. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

70819154398. $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$

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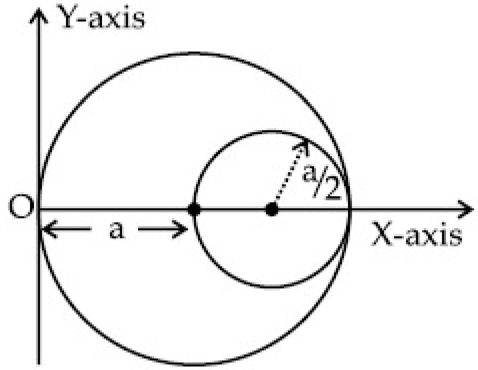
Question Number : 3 Question Id : 70819116416 Question Type : MCQ Option Shuffling : Yes Is Question M

Correct Marks : 4 Wrong Marks : 1

A circular hole of radius $\left(\frac{a}{2}\right)$ is cut out of a circular disc of radius 'a' as shown in figure. The centroid of the remaining circular portion with respect to point 'O' will be :



Options :

70819154399. $\frac{1}{6}a$

70819154400. $\frac{5}{6}a$

70819154401. $\frac{2}{3}a$

70819154402. $\frac{10}{11}a$

Question Number : 3 Question Id : 70819116416 Question Type : MCQ Option Shuffling : Yes Is Question Ma

Correct Marks : 4 Wrong Marks : 1

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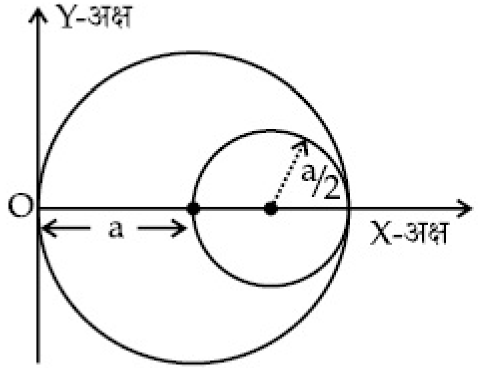
आरेख में दर्शाए अनुसार त्रिज्या, 'a' की किसी वृत्ताकार डिस्क में से त्रिज्या, $\left(\frac{a}{2}\right)$ का कोई छिद्र काट कर बाहर निकाला गया है। बिन्दु 'O' के सापेक्ष शेष बचे वृत्ताकार भाग का केन्द्रक किस दूरी पर होगा ?



Options :

70819154399. $\frac{1}{6}a$

70819154400. $\frac{5}{6}a$

70819154401. $\frac{2}{3}a$

70819154402. $\frac{10}{11}a$

Question Number : 4 Question Id : 70819116417 Question Type : MCQ Option Shuffling : Yes Is Question M

Correct Marks : 4 Wrong Marks : 1

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A body weighs 49 N on a spring balance at the north pole. What will be its weight recorded on the same weighing machine, if it is shifted to the equator ?

[Use $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$ and radius of earth, $R = 6400$ km.]

Options :

70819154403. 49.17 N

70819154404. 49 N

70819154405. 48.83 N

70819154406. 49.83 N

Question Number : 4 Question Id : 70819116417 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

कमानीतार तुला से मापने पर किसी पिण्ड का उत्तरी ध्रुव पर भार 49 N है। यदि इस पिण्ड को विषुवत् वृत्त पर ले जाकर इसी तुला से तोलें, तो इसका मापित भार क्या होगा ?

[$g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$ तथा पृथ्वी की त्रिज्या $R = 6400$ km लीजिए]

Options :

70819154403. 49.17 N

70819154404. 49 N

70819154405. 48.83 N

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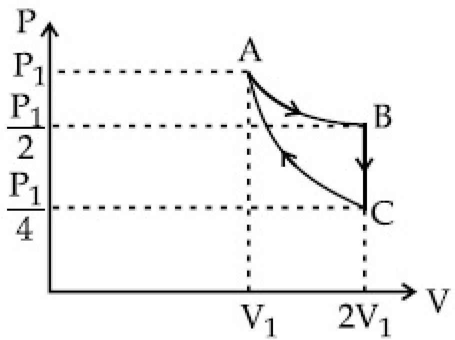
70819154406. 49.83 N

Question Number : 5 Question Id : 70819116418 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If one mole of an ideal gas at (P_1, V_1) is allowed to expand reversibly and isothermally (A to B) its pressure is reduced to one-half of the original pressure (see figure). This is followed by a constant volume cooling till its pressure is reduced to one-fourth of the initial value ($B \rightarrow C$). Then it is restored to its initial state by a reversible adiabatic compression (C to A). The net workdone by the gas is equal to :



Options :

70819154407. $RT\left(\ln 2 - \frac{1}{2(\gamma - 1)}\right)$

70819154408. $-\frac{RT}{2(\gamma - 1)}$

70819154409. RT ln 2

70819154410. 0

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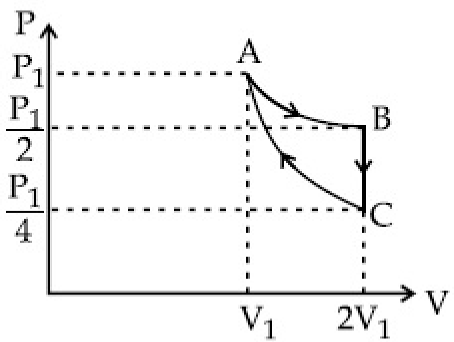
Question Number : 5 Question Id : 70819116418 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

(P_1, V_1) पर किसी आदर्श गैस के 1 मोल को उत्क्रमणीय और समतापीय (A से B तक) स्थिति में फैलने दिए जाने पर इसका दाब अपने मूल दाब का आधा हो जाता है (आरेख देखिए)। इसके पश्चात् नियत आयतन पर, इसको अपना दाब आरम्भिक दाब का एक चौथाई होने तक $(B \rightarrow C)$, ठंडा किया जाता है। इसके पश्चात् उत्क्रमणीय रुद्धोष्म संपीडन द्वारा इसको आरम्भिक अवस्था (C से A) पर लाया जाता है। गैस द्वारा किया गया कुल कार्य है :



Options :

70819154407. $RT\left(\ln 2-\frac{1}{2(\gamma-1)}\right)$

70819154408. $-\frac{RT}{2(\gamma-1)}$

70819154409. RT ln 2

70819154410. शून्य

Question Number : 6 Question Id : 70819116419 Question Type : MCQ Option Shuffling : Yes Is Question M

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Correct Marks : 4 Wrong Marks : 1

On the basis of kinetic theory of gases, the gas exerts pressure because its molecules :

Options :

70819154411. continuously lose their energy till it reaches wall.

70819154412. continuously stick to the walls of container.

70819154413. are attracted by the walls of container.

70819154414. suffer change in momentum when impinge on the walls of container.

Question Number : 6 Question Id : 70819116419 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

गैसों के गतिक सिद्धान्त के आधार पर कोई गैस दाब उत्पन्न करती है क्योंकि इसके कण :

Options :

70819154411. निरन्तर अपनी ऊर्जा की हानि करते है। जब तक वे दीवार तक नहीं पहुंच जाते।

70819154412. निरन्तर पात्र की दीवारों से चिपके रहते है।

70819154413. पात्र की दीवारों द्वारा आकर्षित किए जाते हैं।

70819154414. जब पात्र की दीवारों से टकराते हैं तो उनके संवेग में परिवर्तन होता है।

Question Number : 7 Question Id : 70819116420 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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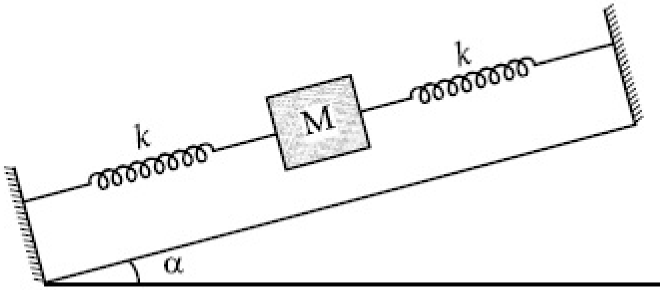
In the given figure, a body of mass M is held between two massless springs, on a smooth inclined plane. The free ends of the springs are attached to firm supports. If each spring has spring constant k, the frequency of oscillation of given body is :



Options :

70819154415. $\frac{1}{2\pi}\sqrt{\frac{k}{Mg\ \sin\alpha}}$

70819154416. $\frac{1}{2\pi}\sqrt{\frac{2k}{Mg\ \sin\alpha}}$

70819154417. $\frac{1}{2\pi}\sqrt{\frac{2k}{M}}$

70819154418. $\frac{1}{2\pi}\sqrt{\frac{k}{2M}}$

Question Number : 7 Question Id : 70819116420 Question Type : MCQ Option Shuffling : Yes Is Question Ma
Correct Marks : 4 Wrong Marks : 1

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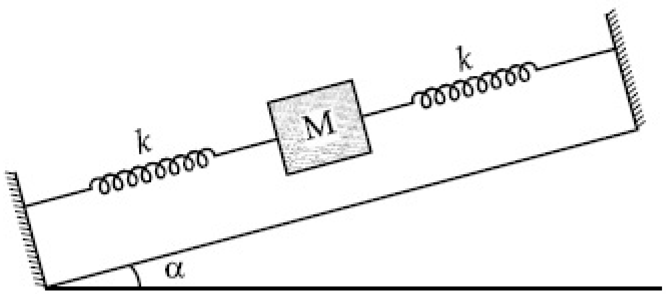
आरेख में दर्शाए अनुसार द्रव्यमान M का कोई पिण्ड दो द्रव्यमान हीन कमानियों के बीच किसी चिकने आनत तल रखा है। कमानियों के मुक्त सिरे दृढ़ टेकों से जुड़े हैं। यदि प्रत्येक कमानी का कमानी स्थिरांक k है, तो दिए गए पिण्ड के दोलन की आवृत्ति होगी :



Options :

70819154415. $\frac{1}{2\pi}\sqrt{\frac{k}{Mg\ \sin\alpha}}$

70819154416. $\frac{1}{2\pi}\sqrt{\frac{2k}{Mg\ \sin\alpha}}$

70819154417. $\frac{1}{2\pi}\sqrt{\frac{2k}{M}}$

70819154418. $\frac{1}{2\pi}\sqrt{\frac{k}{2M}}$

Question Number : 8 Question Id : 70819116421 Question Type : MCQ Option Shuffling : Yes Is Question Ma
Correct Marks : 4 Wrong Marks : 1

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When a particle executes SHM, the nature of graphical representation of velocity as a function of displacement is :

Options :

70819154419. circular

70819154420. elliptical

70819154421. parabolic

70819154422. straight line

Question Number : 8 Question Id : 70819116421 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जब कोई कण सरल आवर्त गति करता है तो विस्थापन के फलन के रूप में इसके वेग के ग्राफीय निरूपण की प्रकृति होती है :

Options :

70819154419. वृत्ताकार

70819154420. दीर्घवृत्तीय

70819154421. परवलीय

70819154422. सरल रेखा

Question Number : 9 Question Id : 70819116422 Question Type : MCQ Option Shuffling : Yes Is Question M... Correct Marks : 4 Wrong Marks : 1

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Which of the following equations represents a travelling wave ?

Options :

70819154423. $y = Ae^{x}\cos(\omega t - \theta)$

70819154424. $y = Ae^{-x^2}(\nu t + \theta)$

70819154425. $y = A\sin(15x - 2t)$

70819154426. $y = A\sin x\ \cos\omega t$

Question Number : 9 Question Id : 70819116422 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से कौन सी समीकरण प्रगामी तरंग का निरूपण करती है ?

Options :

70819154423. $y = Ae^{x}\cos(\omega t - \theta)$

70819154424. $y = Ae^{-x^2}(\nu t + \theta)$

70819154425. $y = A\sin(15x - 2t)$

70819154426. $y = A\sin x\ \cos\omega t$

Question Number : 10 Question Id : 70819116423 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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Two electrons each are fixed at a distance '2*d*'. A third charge proton placed at the midpoint is displaced slightly by a distance x ($x << d$) perpendicular to the line joining the two fixed charges. Proton will execute simple harmonic motion having angular frequency : (m = mass of charged particle)

Options :

70819154427. $\left(\frac{q^2}{2\pi\varepsilon_0 md^3}\right)^{\frac{1}{2}}$

70819154428. $\left(\frac{2q^2}{\pi\varepsilon_0 md^3}\right)^{\frac{1}{2}}$

70819154429. $\left(\frac{\pi\varepsilon_0 md^3}{2q^2}\right)^{\frac{1}{2}}$

70819154430. $\left(\frac{2\pi\varepsilon_0 md^3}{q^2}\right)^{\frac{1}{2}}$

Question Number : 10 Question Id : 70819116423 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

दो स्थिर इलेक्ट्रानों, जिनके बीच की दूरी '2*d*' है, के बीच इन्हें मिलाने वाली रेखा के मध्यबिन्दु पर तीसरा आवेश प्रोटॉन रखा है। इस प्रोटॉन को किसी लघु दूरी x ($x << d$) तक दोनों इलेक्ट्रॉनों को मिलाने वाली रेखा के लम्बवत् विस्थापित किया गया है। इसके कारण यह प्रोटॉन सरल आवर्त गति करने लगता है जिसकी कोणीय आवृत्ति होती है :

(m = आवेशित कण की संहति)

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Options :

70819154427. $\left(\frac{q^2}{2\pi\varepsilon_0 md^3}\right)^{\frac{1}{2}}$

70819154428. $\left(\frac{2q^2}{\pi\varepsilon_0 md^3}\right)^{\frac{1}{2}}$

70819154429. $\left(\frac{\pi\varepsilon_0 md^3}{2q^2}\right)^{\frac{1}{2}}$

70819154430. $\left(\frac{2\pi\varepsilon_0 md^3}{q^2}\right)^{\frac{1}{2}}$

Question Number : 11 Question Id : 70819116424 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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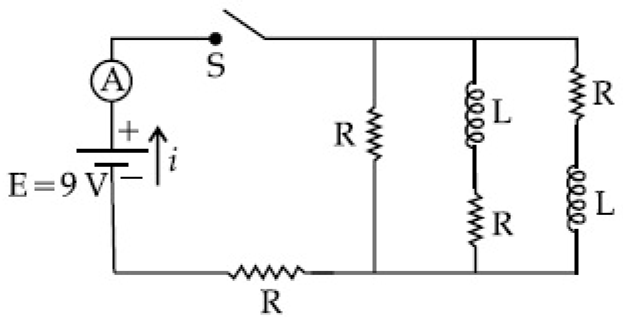
Figure shows a circuit that contains four identical resistors with resistance R = 2.0 Ω, two identical inductors with inductance L = 2.0 mH and an ideal battery with *emf* E = 9 V. The current '*i*' just after the switch 'S' is closed will be :



Options :

70819154431. 2.25 A

70819154432. 3.0 A

70819154433. 3.37 A

70819154434. 9 A

Question Number : 11 Question Id : 70819116424 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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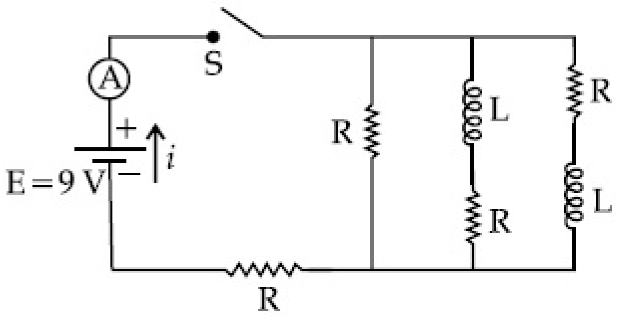
आरेख में दर्शाए परिपथ में, प्रतिरोध, R = 2.0 Ω के चार सर्वसम प्रतिरोधक, प्रेरकत्व L = 2.0 mH के दो सर्वसम प्रेरक तथा *emf*, E = 9 V की एक आदर्श बैटरी संयोजित है। स्विच 'S' को बन्द करने पर इससे प्रवाहित धारा होगी :



Options :

70819154431. 2.25 A

70819154432. 3.0 A

70819154433. 3.37 A

70819154434. 9 A

Question Number : 12 Question Id : 70819116425 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A soft ferromagnetic material is placed in an external magnetic field. The magnetic domains :

Options :

70819154435. increase in size but no change in orientation.

70819154436. decrease in size and changes orientation.

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70819154437. may increase or decrease in size and change its orientation.

70819154438. have no relation with external magnetic field.

Question Number : 12 Question Id : 70819116425 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी बाह्य चुम्बकीय क्षेत्र में कोई कोमल लौह चुम्बकीय पदार्थ रखा है। चुम्बकीय डोमेनों :

Options :

70819154435. के आकार में वृद्धि होगी परन्तु उनके अभिविन्यासों में परिवर्तन नहीं होगा।

70819154436. के आकार में कमी होगी और अभिविन्यासों में भी परिवर्तित होगा।

70819154437. के आकार में कमी और वृद्धि हो सकती है और उनके अभिविन्यासों में परिवर्तन होगा।

70819154438. का बाह्य चुम्बकीय क्षेत्र से कोई संबंध नहीं है।

Question Number : 13 Question Id : 70819116426 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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Match List - I with List - II.

	List - I		List - II
(a)	Source of microwave frequency	(i)	Radioactive decay of nucleus
(b)	Source of infrared frequency	(ii)	Magnetron
(c)	Source of Gamma Rays	(iii)	Inner shell electrons
(d)	Source of X-rays	(iv)	Vibration of atoms and molecules
		(v)	LASER
		(vi)	RC circuit

Choose the correct answer from the options given below :

Options :

70819154439. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819154440. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819154441. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154442. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 13 Question Id : 70819116426 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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सूची - I को सूची - II से मिलाइए।

सूची - I		सूची - II	
(a)	सूक्ष्म तरंग आवृत्ति का स्रोत	(i)	नाभिक का रेडियोएक्टिव क्षय
(b)	अवरक्त आवृत्ति का स्रोत	(ii)	मैग्नेट्रॉन
(c)	गामा किरणों का स्रोत	(iii)	अंतरकक्षीय इलेक्ट्रॉन
(d)	X-किरणों का स्रोत	(iv)	परमाणुओं और अणुओं का कम्पन
		(v)	लेजर
		(vi)	RC परिपथ

नीचे दिए गए विकल्पों में से **सही** उत्तर चुनिए :

Options :

70819154439. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819154440. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819154441. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154442. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 14 Question Id : 70819116427 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If the source of light used in a Young's double slit experiment is changed from red to violet :

Options :

70819154443. the fringes will become brighter.

70819154444. consecutive fringe lines will come closer.

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70819154445. the intensity of minima will increase.

70819154446. the central bright fringe will become a dark fringe.

Question Number : 14 Question Id : 70819116427 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यदि किसी यंग के द्विझिरी प्रयोग में उपयोग किए गए प्रकाश स्रोत को लाल से बैंगनी कर दिया जाए तो :

Options :

70819154443. फ्रिंज और अधिक चमकीली हो जाएगी

70819154444. क्रमागत फ्रिंज रेखाएं निकट आ जाएगी

70819154445. निम्निष्ट की तीव्रता में वृद्धि हो जाएगी

70819154446. केन्द्रीय चमकीली फ्रिंज काली फ्रिंज हो जाएगी

Question Number : 15 Question Id : 70819116428 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

An X-ray tube is operated at 1.24 million volt. The shortest wavelength of the produced photon will be :

Options :

70819154447. 10^{-1} nm

70819154448. 10^{-2} nm

70819154449. 10^{-3} nm

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70819154450. 10^{-4} nm

Question Number : 15 Question Id : 70819116428 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी X-किरण नालिका का प्रचालन 1.24 मिलियन वोल्ट पर किया गया है। उत्पन्न फोटॉन की लघुतम तरंगदैर्घ्य होगी :

Options :

70819154447. 10^{-1} nm

70819154448. 10^{-2} nm

70819154449. 10^{-3} nm

70819154450. 10^{-4} nm

Question Number : 16 Question Id : 70819116429 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The de Broglie wavelength of a proton and α-particle are equal. The ratio of their velocities is :

Options :

70819154451. $4:1$

70819154452. $4:2$

70819154453. $4:3$

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70819154454. 1 : 4

Question Number : 16 Question Id : 70819116429 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी प्रोटॉन और किसी α-कण की दे ब्राग्ली (de Broglie) तरंगदैर्घ्य समान हैं। इनके वेगों का अनुपात होगा :

Options :

70819154451. 4 : 1

70819154452. 4 : 2

70819154453. 4 : 3

70819154454. 1 : 4

Question Number : 17 Question Id : 70819116430 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

According to Bohr atom model, in which of the following transitions will the frequency be maximum ?

Options :

70819154455. $n=2$ to $n=1$

70819154456. $n=3$ to $n=2$

70819154457. $n=4$ to $n=3$

70819154458. $n=5$ to $n=4$

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Question Number : 17 Question Id : 70819116430 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

बोर (Bohr) के परमाणु मॉडल के अनुसार नीचे दिए गए किस संक्रमण में आवृत्ति अधिकतम होगी ?

Options :

70819154455. n=2 से n=1

70819154456. n=3 से n=2

70819154457. n=4 से n=3

70819154458. n=5 से n=4

Question Number : 18 Question Id : 70819116431 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Zener breakdown occurs in a $p-n$ junction having p and n both :

Options :

70819154459. lightly doped and have narrow depletion layer.

70819154460. lightly doped and have wide depletion layer.

70819154461. heavily doped and have narrow depletion layer.

70819154462. heavily doped and have wide depletion layer.

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Question Number : 18 Question Id : 70819116431 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

किसी $p-n$ संधि में ज़ेनर भंजन तब होता है जब p और n :

Options :

70819154459. अल्प भारित होते है और उनका संकरा ह्रासी स्तर होता है।

70819154460. अल्प भारित होते है और उनका विस्तृत ह्रासी स्तर होता है।

70819154461. अत्यधिक भारित होते है और उनका संकरा ह्रासी स्तर होता है।

70819154462. अत्यधिक भारित होते है और उनका विस्तृत ह्रासी स्तर होता है।

Question Number : 19 Question Id : 70819116432 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : PN junction diodes can be used to function as transistor, simply by connecting two diodes, back to back, which acts as the base terminal.

Statement II : In the study of transistor, the amplification factor β indicates ratio of the collector current to the base current.

In the light of the above statements, choose the correct answer from the options given below.

Options :

70819154463. Both Statement I and Statement II are true

70819154464. Both Statement I and Statement II are false

70819154465. Statement I is true but Statement II is false

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70819154466. Statement I is false but Statement II is true

Question Number : 19 Question Id : 70819116432 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

नीचे दो कथन दिए गए हैं :

कथन I : दो समान डायोडों को जो आधार टर्मिनल के रूप में कार्य करते हैं, पश्च-पश्च संयोजित करके प्राप्त PN संधि डायोडों का उपयोग ट्रांजिस्टर की भांति करने के लिए किया जा सकता है।

कथन II : ट्रांजिस्टर के अध्ययन में प्रवर्धन-गुणांक β संग्राहक-धारा और आधार-धारा के अनुपात को इंगित करता है।

उपरोक्त कथनों के संदर्भ में नीचे दिए गए विकल्पों में से सबसे उचित उत्तर चुनिए :

Options :

70819154463. दोनों **कथन** I और **कथन** II सही हैं।

70819154464. दोनों **कथन** I और **कथन** II सही नहीं हैं।

70819154465. **कथन** I सही है परन्तु **कथन** II सही नहीं है।

70819154466. **कथन** I सही नहीं है परन्तु **कथन** II सही है।

Question Number : 20 Question Id : 70819116433 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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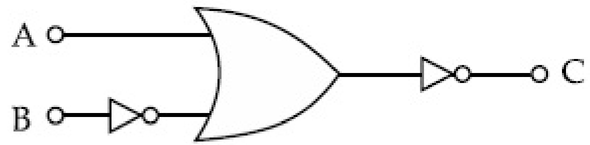
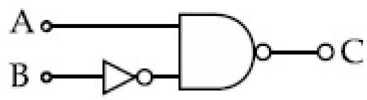
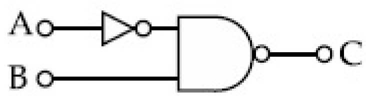
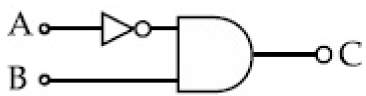


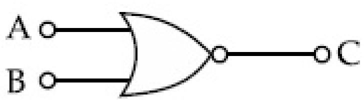
The logic circuit shown above is equivalent to :

Options :

70819154467. 

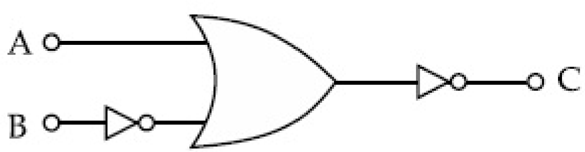
70819154468. 

70819154469. 

70819154470. 

Question Number : 20 Question Id : 70819116433 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

नीचे दिया गया लॉजिक परिपथ किसके तुल्य है ?



Options :

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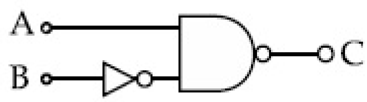
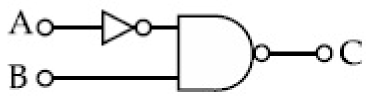
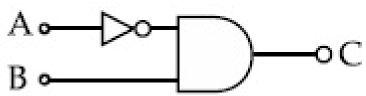
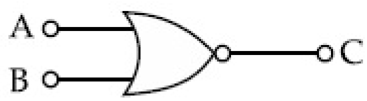
70819154467. 

70819154468. 

70819154469. 

70819154470. 

Physics Section B

Section Id :	708191635
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 :	708191915
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819116434 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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Two solids A and B of mass 1 kg and 2 kg respectively are moving with equal linear momentum. The ratio of their kinetic energies $(K.E.)_A : (K.E.)_B$ will be $\frac{A}{1}$, so the value of A will be ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 21 Question Id : 70819116434 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

दो ठोस A और B जिनके द्रव्यमान क्रमश: 1 kg और 2 kg है समान रैखिक संवेग से गतिमान हैं। यदि इनकी गतिज ऊर्जाओं का अनुपात, $(K.E.)_A : (K.E.)_B$ $\frac{A}{1}$ है तो A का मान ________ होगा।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 22 Question Id : 70819116435 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A uniform metallic wire is elongated by 0.04 m when subjected to a linear force F. The elongation, if its length and diameter is doubled and subjected to the same force will be ________ cm.

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

5 to 5.001

Question Number : 22 Question Id : 70819116435 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

एक रैखिक बल F लगाने पर किसी धातु के एकसमान तार में 0.04 m की वृद्धि हो जाती है। यदि तार की लम्बाई और व्यास दो गुने कर दिए जाएं तो समान बल लगाने पर लम्बाई में वृद्धि __________ cm होगी।

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

5 to 5.001

Question Number : 23 Question Id : 70819116436 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A uniform thin bar of mass 6 kg and length 2.4 meter is bent to make an equilateral hexagon. The moment of inertia about an axis passing through the centre of mass and perpendicular to the plane of hexagon is __________ $\times 10^{-1}$ kg m^2.

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

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5 to 5.001

Question Number : 23 Question Id : 70819116436 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

एकसमान पतली छड़ को जिसका द्रव्यमान 6 kg और लम्बाई 2.4 m है को एक नियमित षटभुज में मोड़ा गया है। इस षटभुज का इसके तल के लम्बवत् और इसके संहति केन्द्र से गुजरने वाले अक्ष के परितः जड़त्व आघूर्ण ________ $\times 10^{-1}$ kg m^2 होगा।

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

5 to 5.001

Question Number : 24 Question Id : 70819116437 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The root mean square speed of molecules of a given mass of a gas at 27°C and 1 atmosphere pressure is 200 ms^{-1}. The root mean square speed of molecules of the gas at 127°C and 2 atmosphere pressure is $\frac{x}{\sqrt{3}}$ ms^{-1}. The value of x will be ________.

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

5 to 5.001

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Question Number : 24 Question Id : 70819116437 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

27°C ताप और 1 वायुमंडलीय दाब पर किसी दिए गए द्रव्यमान की गैस के अणुओं की rms चाल 200 ms^{-1} है।

इस गैस की 127°C ताप और 2 वायुमण्डलीय दाब पर rms चाल $\frac{x}{\sqrt{3}}$ ms^{-1} है। x का मान ________ होगा।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 25 Question Id : 70819116438 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Two cars are approaching each other at an equal speed of 7.2 km/hr. When they see each other, both blow horns having frequency of 676 Hz. The beat frequency heard by each driver will be ________ Hz. [Velocity of sound in air is 340 m/s.]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 25 Question Id : 70819116438 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

दो कार 7.2 km/hr. की समान चाल से एकदूसरे की ओर गति कर रही हैं। जब वह एक दूसरे को देखती हैं तो 676 Hz आवृत्ति का हॉर्न बजाती हैं। दोनों कारों के ड्राइवरों द्वारा सुनी जाने वाली विस्पन्द आवृत्ति ________ Hz होगी। [वायु में ध्वनि का वेग 340 m/s है।]

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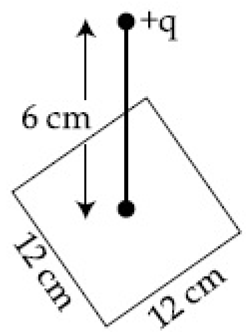
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 26 Question Id : 70819116439 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A point charge of $+12\ \mu C$ is at a distance 6 cm vertically above the centre of a square of side 12 cm as shown in figure. The magnitude of the electric flux through the square will be __________ $\times 10^3\ Nm^2/C$.



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 26 Question Id : 70819116439 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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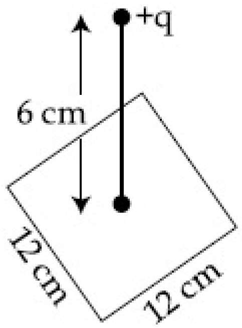
आरेख में दर्शाए अनुसार $+12\ \mu C$ का कोई बिन्दु आवेश 12 cm भुजा वाले किसी वर्ग के केन्द्र के ऊर्ध्वाधर ऊपर 6 cm दूरी पर स्थित है। इस वर्ग से गुजरने वाले विद्युत फ्लक्स का परिमाण ________ $\times 10^3\ Nm^2/C$ होगा।



Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 27 Question Id : 70819116440 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A cylindrical wire of radius 0.5 mm and conductivity 5×10^7 S/m is subjected to an electric field of 10 mV/m. The expected value of current in the wire will be $x^3\pi$ mA. The value of x is ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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Question Number : 27 Question Id : 70819116440 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

0.5 mm त्रिज्या और 5×10^7 S/m चालकता के किसी बेलनाकार तार पर 10 mV/m का विद्युत क्षेत्र आरोपित किया गया है। इस तार से प्रवाहित धारा का मान $x^3\pi$ mA है। x का मान _________ है।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 28 Question Id : 70819116441 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A series LCR circuit is designed to resonate at an angular frequency $\omega_0=10^5$ rad/s. The circuit draws 16 W power from 120 V source at resonance. The value of resistance 'R' in the circuit is _________Ω.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 28 Question Id : 70819116441 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

किसी श्रेणी LCR परिपथ को किसी कोणीय आवृत्ति $\omega_0=10^5$ rad/s पर अनुनाद करने के लिए तैयार किया गया है। यह परिपथ अनुनाद पर 120 V के स्रोत से 16 W शक्ति प्राप्त करता है। परिपथ में प्रतिरोधक 'R' का मान _________ Ω है।

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Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 29 Question Id : 70819116442 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

An electromagnetic wave of frequency 3 GHz enters a dielectric medium of relative electric permittivity 2.25 from vacuum. The wavelength of this wave in that medium will be __________ $\times 10^{-2}$ cm.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 29 Question Id : 70819116442 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

कोई 3 GHz आवृत्ति की विद्युत चुम्बकीय तरंग निर्वात से किसी परावैद्युत माध्यम जिसकी आपेक्षिक परावैद्युतांक 2.25 है में प्रवेश करती है। इस माध्यम में इस तरंग की तरंगदैर्ध्य __________ $\times 10^{-2}$ cm होगी।

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

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5 to 5.001

Question Number : 30 Question Id : 70819116443 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A signal of 0.1 kW is transmitted in a cable. The attenuation of cable is -5 dB per km and cable length is 20 km. The power received at receiver is 10^{-x} W. The value of x is ________.

[Gain in dB $= 10 \log_{10}\left(\frac{P_o}{P_i}\right)$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 30 Question Id : 70819116443 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

0.1 kW के किसी सिग्नल का किसी केबल में संचरण हो रहा है। केबल की लम्बाई 20 km है तथा केबल का क्षीणन -5 dB प्रति किलोमीटर है। अभिग्राही द्वारा प्राप्त शक्ति 10^{-x} W होगी। यहां x का मान ________ है।

[Gain in dB $= 10 \log_{10}\left(\frac{P_o}{P_i}\right)$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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Chemistry Section A

Section Id :	708191636
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 :	708191916
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 70819116444 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

According to Bohr's atomic theory :

(A) Kinetic energy of electron is $\propto \frac{Z^2}{n^2}$.

(B) The product of velocity (v) of electron and principal quantum number (n), 'vn' $\propto Z^2$.

(C) Frequency of revolution of electron in an orbit is $\propto \frac{Z^3}{n^3}$.

(D) Coulombic force of attraction on the electron is $\propto \frac{Z^3}{n^4}$.

Choose the most appropriate answer from the options given below :

Options :

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70819154481. (A), (C) and (D) only

70819154482. (A) and (D) only

70819154483. (C) only

70819154484. (A) only

Question Number : 31 Question Id : 70819116444 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

बोर के परमाण्विक सिद्धान्त के अनुसार :

(A) इलेक्ट्रॉन की गतिज ऊर्जा $\propto \frac{Z^2}{n^2}$ ।

(B) इलेक्ट्रॉन की गति (v) तथा मुख्य क्वांटम संख्या (n) का गुणनफल 'vn' $\propto Z^2$ ।

(C) एक कक्षा में इलेक्ट्रान के परिक्रमण की आवृत्ति $\propto \frac{Z^3}{n^3}$ ।

(D) इलेक्ट्रॉन पर कूलॉम आकर्षण बल $\propto \frac{Z^3}{n^4}$ ।

नीचे दिए विकल्पों में से सर्वाधिक उचित उत्तर चुनिए :

Options :

70819154481. (A), (C) तथा (D) केवल

70819154482. (A) तथा (D) केवल

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70819154483. (C) केवल

70819154484. (A) केवल

Question Number : 32 Question Id : 70819116445 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The correct shape and I – I – I bond angles respectively in I_3^- ion are :

Options :

70819154485. Linear; 180°

70819154486. Distorted trigonal planar; 135° and 90°

70819154487. T-shaped; 180° and 90°

70819154488. Trigonal planar; 120°

Question Number : 32 Question Id : 70819116445 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

I_3^- आयन की सही आकृति तथा I – I – I कोण हैं क्रमश :

Options :

70819154485. रैखिक; 180°

70819154486. विकृत त्रिकोणीय समतली; 135° तथा 90°

70819154487. T-जैसी आकृति; 180° तथा 90°

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70819154488. त्रिकोणीय समतली; 120°

Question Number : 33 Question Id : 70819116446 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Most suitable salt which can be used for efficient clotting of blood will be :

Options :

70819154489. $NaHCO_3$

70819154490. $Mg(HCO_3)_2$

70819154491. $FeCl_3$

70819154492. $FeSO_4$

Question Number : 33 Question Id : 70819116446 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

रक्त का थक्का प्रभावी रूप से बनाने में जो लवण सबसे अधिक उपयुक्त है, वह है :

Options :

70819154489. $NaHCO_3$

70819154490. $Mg(HCO_3)_2$

70819154491. $FeCl_3$

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70819154492. $FeSO_4$

Question Number : 34 Question Id : 70819116447 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The correct set from the following in which both pairs are in correct order of melting point is :

Options :

70819154493. LiCl > LiF ; MgO > NaCl

70819154494. LiF > LiCl ; MgO > NaCl

70819154495. LiCl > LiF ; NaCl > MgO

70819154496. LiF > LiCl ; NaCl > MgO

Question Number : 34 Question Id : 70819116447 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से सही सेट जिसमें दोनों जोड़े गलनांक के सही क्रम में हैं, वह है :

Options :

70819154493. LiCl > LiF ; MgO > NaCl

70819154494. LiF > LiCl ; MgO > NaCl

70819154495. LiCl > LiF ; NaCl > MgO

70819154496. LiF > LiCl ; NaCl > MgO

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Question Number : 35 Question Id : 70819116448 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

	List - I (Metal)		List - II (Ores)
(a)	Aluminium	(i)	Siderite
(b)	Iron	(ii)	Calamine
(c)	Copper	(iii)	Kaolinite
(d)	Zinc	(iv)	Malachite

Choose the correct answer from the options given below :

Options :

70819154497. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819154498. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154499. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154500. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Question Number : 35 Question Id : 70819116448 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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सूची - I से सूची - II का सुमेल कीजिए :

	सूची - I (धातु)		सूची - II (अयस्क)
(a)	ऐलुमिनियम	(i)	सिडेराइट
(b)	आयरन	(ii)	कैलामाइन
(c)	कॉपर	(iii)	केयोलिनाइट
(d)	जिन्क	(iv)	मेलाकाइट

नीचे दिए गये विकल्पों में से सही उत्तर चुनिए :

Options :

70819154497. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819154498. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154499. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819154500. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Question Number : 36 Question Id : 70819116449 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R.**

Assertion A : Hydrogen is the most abundant element in the Universe, but it is not the most abundant gas in the troposphere.

Reason R : Hydrogen is the lightest element.

In the light of the above statements, choose the **correct** answer from the options given below :

Options :

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70819154501. Both A and R are true and R is the correct explanation of A

70819154502. Both A and R are true but R is NOT the correct explanation of A

70819154503. A is true but R is false

70819154504. A is false but R is true

Question Number : 36 Question Id : 70819116449 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

नीचे दो कथन दिए गए हैं। एक **अभिकथन** A और दूसरा **कारण** R है।

अभिकथन A : हाइड्रोजन ब्रह्मांड का सर्वाधिक विद्यमान तत्व है परन्तु क्षोभमंडल में यह सर्वाधिक विद्यमान गैस नहीं है।

कारण R : हाइड्रोजन सबसे हल्का तत्व है।

उपरोक्त कथनों के संदर्भ में नीचे दिए गये विकल्पों में से सर्वाधिक सही उत्तर चुनिए :

Options :

70819154501. A तथा R दोनों सही हैं और R सही व्याख्या है A की।

70819154502. A तथा R दोनों सही हैं परन्तु R सही व्याख्या नहीं है A की।

70819154503. A सत्य है परन्तु R असत्य है।

70819154504. A असत्य है परन्तु R सत्य है।

Question Number : 37 Question Id : 70819116450 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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Match List - I with List - II.

	List - I (Salt)		List - II (Flame colour wavelength)
(a)	LiCl	(i)	455.5 nm
(b)	NaCl	(ii)	670.8 nm
(c)	RbCl	(iii)	780.0 nm
(d)	CsCl	(iv)	589.2 nm

Choose the correct answer from the options given below :

Options :

70819154505. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819154506. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819154507. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819154508. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 37 Question Id : 70819116450 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

सूची - I से सूची - II का सुमेल कीजिए :

	सूची - I (लवण)		सूची - II (ज्वाला की तरंगदैर्ध्य)
(a)	LiCl	(i)	455.5 nm
(b)	NaCl	(ii)	670.8 nm
(c)	RbCl	(iii)	780.0 nm
(d)	CsCl	(iv)	589.2 nm

नीचे दिए गये विकल्पों में से सर्वाधिक सही उत्तर चुनिए :

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Options :

70819154505. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819154506. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819154507. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819154508. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 38 Question Id : 70819116451 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The incorrect statement among the following is :

Options :

70819154509. $VOSO_4$ is a reducing agent

70819154510. RuO_4 is an oxidizing agent

70819154511. Cr_2O_3 is an amphoteric oxide

70819154512. Red colour of ruby is due to the presence of Co^{3+}

Question Number : 38 Question Id : 70819116451 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से **असत्य** कथन है :

Options :

70819154509. $VOSO_4$ एक अपचायी कर्मक है

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70819154510. RuO_4 एक ऑक्सीकारक कर्मक है

70819154511. Cr_2O_3 एक उभयधर्मी ऑक्साइड है

70819154512. माणिक्य का लाल रंग का होने का कारण Co^{3+} की उपस्थिति है

Question Number : 39 Question Id : 70819116452 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

What is the correct order of the following elements with respect to their density ?

Options :

70819154513. Cr < Fe < Co < Cu < Zn

70819154514. Zn < Cr < Fe < Co < Cu

70819154515. Zn < Cu < Co < Fe < Cr

70819154516. Cr < Zn < Co < Cu < Fe

Question Number : 39 Question Id : 70819116452 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

निम्नलिखित तत्वों के घनत्वों के अनुसार सही क्रम क्या है ?

Options :

70819154513. Cr < Fe < Co < Cu < Zn

70819154514. Zn < Cr < Fe < Co < Cu

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70819154515. Zn < Cu < Co < Fe < Cr

70819154516. Cr < Zn < Co < Cu < Fe

Question Number : 40 Question Id : 70819116453 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The calculated magnetic moments (spin only value) for species $[FeCl_4]^{2-}$, $[Co(C_2O_4)_3]^{3-}$ and MnO_4^{2-} respectively are :

Options :

70819154517. 4.90, 0 and 1.73 BM

70819154518. 5.92, 4.90 and 0 BM

70819154519. 5.82, 0 and 0 BM

70819154520. 4.90, 0 and 2.83 BM

Question Number : 40 Question Id : 70819116453 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

स्पीशीज $[FeCl_4]^{2-}$, $[Co(C_2O_4)_3]^{3-}$ तथा MnO_4^{2-} के परिकलित चुम्बकीय आघूर्ण (केवल स्पिन मान) हैं क्रमश :

Options :

70819154517. 4.90, 0 तथा 1.73 BM

70819154518. 5.92, 4.90 तथा 0 BM

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70819154519. 5.82, 0 तथा 0 BM

70819154520. 4.90, 0 तथा 2.83 BM

Question Number : 41 Question Id : 70819116454 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : The value of the parameter "Biochemical Oxygen Demand (BOD)" is important for survival of aquatic life.

Statement II : The optimum value of BOD is 6.5 ppm.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options :

70819154521. Both **Statement I** and **Statement II** are true

70819154522. Both **Statement I** and **Statement II** are false

70819154523. **Statement I** is true but **Statement II** is false

70819154524. **Statement I** is false but **Statement II** is true

Question Number : 41 Question Id : 70819116454 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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नीचे दो कथन दिए गए हैं :

कथन I : पैरामीटर "जैवरासायनिक आक्सीजन मांग (BOD)" का मान जल के जीवों के जीवन के लिए महत्वपूर्ण है।

कथन II : BOD का इष्टतम मान है 6.5 ppm।

उपरोक्त कथनों के लिए नीचे दिये गये विकल्पों में से सर्वाधिक सही उत्तर का चुनाव कीजिए :

Options :

70819154521. दोनों **कथन** I तथा **कथन** II सत्य हैं

70819154522. दोनों **कथन** I तथा **कथन** II असत्य हैं

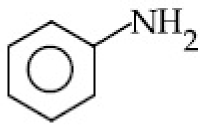
70819154523. **कथन** I सत्य है परन्तु **कथन** II असत्य है

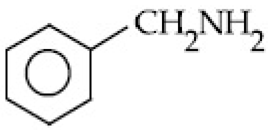
70819154524. **कथन** I असत्य है परन्तु **कथन** II सत्य है

Question Number : 42 Question Id : 70819116455 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The diazonium salt of which of the following compounds will form a coloured dye on reaction with β-Naphthol in NaOH ?

Options :

70819154525. 

70819154526. 

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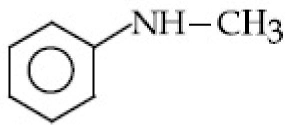
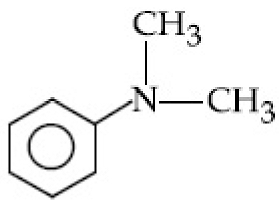
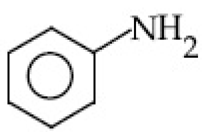
70819154527. 

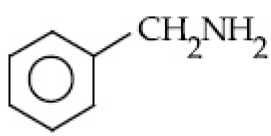
70819154528. 

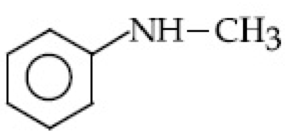
Question Number : 42 Question Id : 70819116455 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

निम्नलिखित में से किसका डाइऐज़ोनियम लवण, NaOH में β-नैफथॉल से अभिक्रिया करके रंगीन डाइ विरचित करेगा ?

Options :

70819154525. 

70819154526. 

70819154527. 

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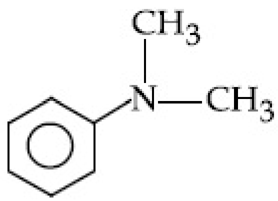
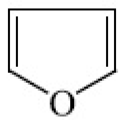
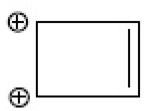
70819154528. 

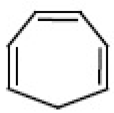
Question Number : 43 Question Id : 70819116456 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

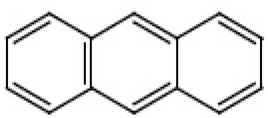
Which one of the following compounds is non-aromatic ?

Options :

70819154529. 

70819154530. 

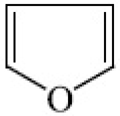
70819154531. 

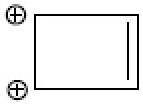
70819154532. 

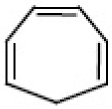
Question Number : 43 Question Id : 70819116456 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

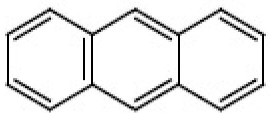
निम्नलिखित में से कौन-सा यौगिक एरोमैटिक नहीं हैं ?

Options :

70819154529. 

70819154530. 

70819154531. 

70819154532. 

Question Number : 44 Question Id : 70819116457 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Which one of the following carbonyl compounds cannot be prepared by addition of water on an alkyne in the presence of $HgSO_4$ and H_2SO_4 ?

Options :

70819154533. $CH_3-\overset{\overset{O}{\|}}{C}-H$

70819154534. $CH_3-\overset{\overset{O}{\|}}{C}-CH_2CH_3$

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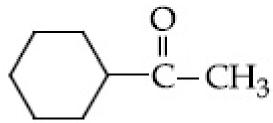
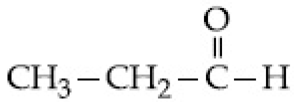
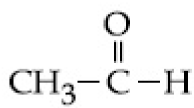
70819154535. 

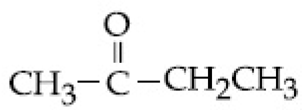
70819154536. 

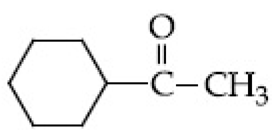
Question Number : 44 Question Id : 70819116457 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

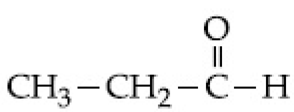
निम्नलिखित कार्बोनिल यौगिकों में से किस एक को ऐल्काइन पर जल का, $HgSO_4$ तथा H_2SO_4 की उपस्थित में, संकलन करने से **नहीं** बना सकते हैं ?

Options :

70819154533. 

70819154534. 

70819154535. 

70819154536. 

Question Number : 45 Question Id : 70819116458 Question Type : MCQ Option Shuffling : Yes Is Question M

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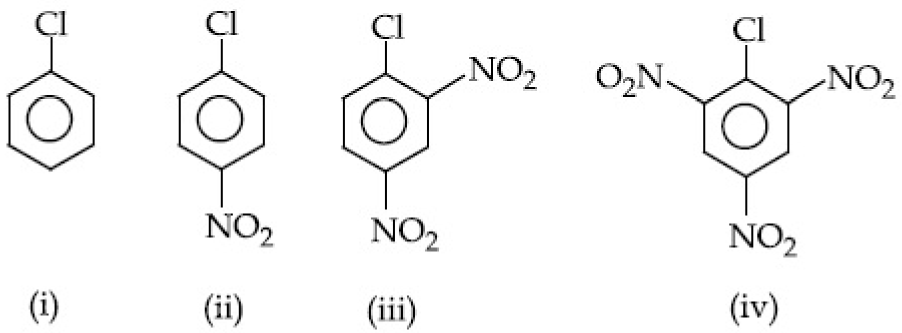
Correct Marks : 4 Wrong Marks : 1

The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :



Options :

70819154537. (iv) < (iii) < (ii) < (i)

70819154538. (iv) < (i) < (iii) < (ii)

70819154539. (i) < (ii) < (iii) < (iv)

70819154540. (iv) < (i) < (ii) < (iii)

Question Number : 45 Question Id : 70819116458 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

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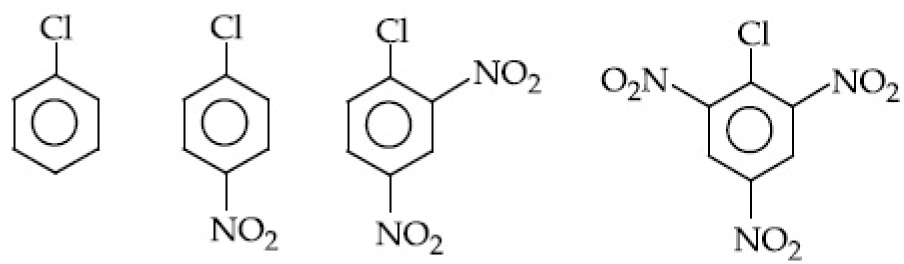
निम्नलिखित यौगिकों का, नाभिक स्नेही प्रतिस्थापन अभिक्रिया के लिए दर बढने का सही क्रम है :



(i) (ii) (iii) (iv)

Options :

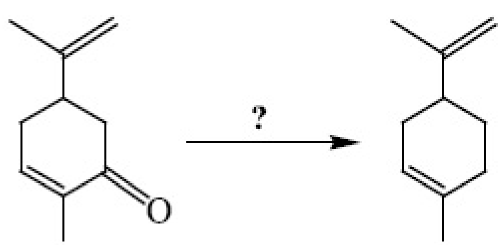
70819154537. (iv) < (iii) < (ii) < (i)

70819154538. (iv) < (i) < (iii) < (ii)

70819154539. (i) < (ii) < (iii) < (iv)

70819154540. (iv) < (i) < (ii) < (iii)

Question Number : 46 Question Id : 70819116459 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



Which of the following reagent is suitable for the preparation of the product in the above reaction ?

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Options :

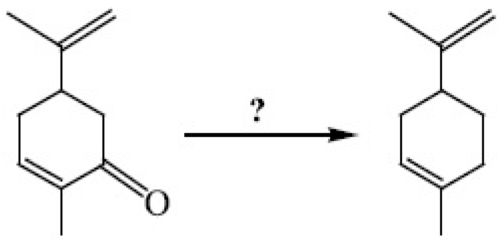
70819154541. $NaBH_4$

70819154542. $NH_2-NH_2/C_2H_5\overset{\ominus}{O}\overset{\oplus}{Na}$

70819154543. Ni/H_2

70819154544. Red $P+Cl_2$

Question Number : 46 Question Id : 70819116459 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



निम्नलिखित में से कौन-सा अभिकर्मक उपरोक्त अभिक्रिया में उत्पाद में विरचन के लिए उपयुक्त है?

Options :

70819154541. $NaBH_4$

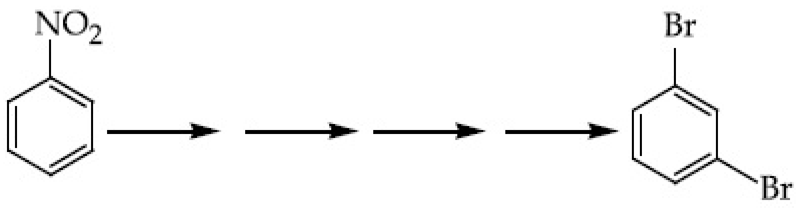
70819154542. $NH_2-NH_2/C_2H_5\overset{\ominus}{O}\overset{\oplus}{Na}$

70819154543. Ni/H_2

70819154544. लाल $P+Cl_2$

Question Number : 47 Question Id : 70819116460 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

What is the correct sequence of reagents used for converting nitrobenzene into *m*-dibromobenzene ?



Options :

70819154545. $\xrightarrow{Sn/HCl}$ / $\xrightarrow{KBr}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{H^+}$

70819154546. $\xrightarrow{NaNO_2}$ / $\xrightarrow{HCl}$ / $\xrightarrow{KBr}$ / $\xrightarrow{H^+}$

70819154547. $\xrightarrow{Sn/HCl}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{NaNO_2}$ / $\xrightarrow{NaBr}$

70819154548. $\xrightarrow{Br_2/Fe}$ / $\xrightarrow{Sn/HCl}$ / $\xrightarrow{NaNO_2/HCl}$ / $\xrightarrow{CuBr/HBr}$

Question Number : 47 Question Id : 70819116460 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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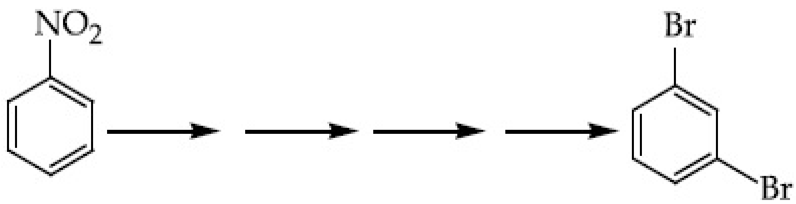
नाइट्रोबेन्जीन को *m*-डाइब्रोमोबेन्जीन में परिवर्तित करने के लिए उपयोग किये जाने वाले अभिकर्मक का सही क्रम क्या है?



Options :

70819154545. $\xrightarrow{Sn/HCl} / \xrightarrow{KBr} / \xrightarrow{Br_2} / \xrightarrow{H^+}$

70819154546. $\xrightarrow{NaNO_2} / \xrightarrow{HCl} / \xrightarrow{KBr} / \xrightarrow{H^+}$

70819154547. $\xrightarrow{Sn/HCl} / \xrightarrow{Br_2} / \xrightarrow{NaNO_2} / \xrightarrow{NaBr}$

70819154548. $\xrightarrow{Br_2/Fe} / \xrightarrow{Sn/HCl} / \xrightarrow{NaNO_2/HCl} / \xrightarrow{CuBr/HBr}$

Question Number : 48 Question Id : 70819116461 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

In polymer Buna-S : 'S' stands for :

Options :

70819154549. Sulphur

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70819154550. Strength

70819154551. Styrene

70819154552. Sulphonation

Question Number : 48 Question Id : 70819116461 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

बहुलक ब्यूना–S में 'S' जिसके लिए है, वह है :

Options :

70819154549. सल्फर

70819154550. शक्ति

70819154551. स्टाइरीन

70819154552. सल्फोनीकरण

Question Number : 49 Question Id : 70819116462 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I and List - II.

	List - I		List - II
(a)	Valium	(i)	Antifertility drug
(b)	Morphine	(ii)	Pernicious anaemia
(c)	Norethindrone	(iii)	Analgesic
(d)	Vitamin B_{12}	(iv)	Tranquilizer

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Options :

70819154553. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819154554. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154555. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819154556. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

Question Number : 49 Question Id : 70819116462 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

सूची - I से सूची - II का सुमेल कीजिए :

	सूची - I		सूची - II
(a)	वैलियम	(i)	प्रजनन विरोधी औषधि (Anti fertility drug)
(b)	मॉर्फीन	(ii)	प्रणाशी रक्ताल्पता
(c)	नॉरएथिनड्रान	(iii)	ऐनेल्जेसिक (पीड़ाहारी)
(d)	विटामिन B_{12}	(iv)	प्रशांतक

Options :

70819154553. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819154554. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819154555. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819154556. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

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Question Number : 50 Question Id : 70819116463 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I and List - II.

	List - I		List - II
(a)	$R-\overset{\overset{O}{\|}}{C}-Cl \rightarrow R-CHO$	(i)	$Br_2/NaOH$
(b)	$R-CH_2-COOH \rightarrow R-\underset{\underset{Cl}{\|}}{CH}-COOH$	(ii)	$H_2/Pd-BaSO_4$
(c)	$R-\overset{\overset{O}{\|}}{C}-NH_2 \rightarrow R-NH_2$	(iii)	$Zn(Hg)$/Conc. HCl
(d)	$R-\overset{\overset{O}{\|}}{C}-CH_3 \rightarrow R-CH_2-CH_3$	(iv)	Cl_2/Red P, H_2O

Choose the correct answer from the options given below :

Options :

70819154557. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819154558. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819154559. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819154560. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

Question Number : 50 Question Id : 70819116463 Question Type : MCQ Option Shuffling : Yes Is Question M

Correct Marks : 4 Wrong Marks : 1

सूची - I से सूची - II का सुमेल कीजिए :

सूची - I		सूची - II	
(a)	$R-\overset{\overset{O}{\|\|}}{C}-Cl \rightarrow R-CHO$	(i)	$Br_2/NaOH$
(b)	$R-CH_2-COOH \rightarrow R-\underset{\underset{Cl}{\|}}{CH}-COOH$	(ii)	$H_2/Pd-BaSO_4$
(c)	$R-\overset{\overset{O}{\|\|}}{C}-NH_2 \rightarrow R-NH_2$	(iii)	$Zn(Hg)/$ सान्द्र HCl
(d)	$R-\overset{\overset{O}{\|\|}}{C}-CH_3 \rightarrow R-CH_2-CH_3$	(iv)	$Cl_2/$लाल P, H_2O

नीचे दिए गये विकल्पों में से **सही** उत्तर चुनिए :

Options :

70819154557. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819154558. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819154559. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819154560. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

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Chemistry Section B

Section Id :	708191637
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 :	708191917
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819116464 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The formula of a gaseous hydrocarbon which requires 6 times of its own volume of O_2 for complete oxidation and produces 4 times its own volume of CO_2 is C_xH_y. The value of y is ________.

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

5 to 5.001

Question Number : 51 Question Id : 70819116464 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

गैसीय हाइड्रोकार्बन जिसके संपूर्ण ऑक्सीकरण के लिए उसके अपने आयतन से 6 गुनी O_2 की आवश्यकता होती है और अपने आयतन से 4 गुनी CO_2 उत्पन्न होती है, वह C_xH_y है जहाँ y का मान है ________ ।

Response Type : Numeric

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Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 52 Question Id : 70819116465 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The volume occupied by 4.75 g of acetylene gas at 50°C and 740 mmHg pressure is ________ L. (Rounded off to the nearest integer)
[Given $R = 0.0826$ L atm K^{-1} mol^{-1}]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 52 Question Id : 70819116465 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

50°C तथा 740 mmHg दाब पर 4.75 g ऐसीटिलीन गैस द्वारा अध्यासित आयतन, L में, है ________।
(निकटतम पूर्णांक)
[दिया है : $R = 0.0826$ L atm K^{-1} mol^{-1}]

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

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5 to 5.001

Question Number : 53 Question Id : 70819116466 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Assuming ideal behaviour, the magnitude of log K for the following reaction at 25°C is $x \times 10^{-1}$. The value of x is ________. (Integer answer)

$$3HC \equiv CH_{(g)} \rightleftharpoons C_6H_{6(l)}$$

[Given : $\Delta_f G^\circ(HC \equiv CH) = -2.04 \times 10^5 \text{ J mol}^{-1}$; $\Delta_f G^\circ(C_6H_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$; $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 53 Question Id : 70819116466 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

आदर्श व्यवहार मानकर, निम्नलिखित अभिक्रिया के लिए 25°C पर log K का मान $x \times 10^{-1}$ है। x का मान है ________। (पूर्णांक उत्तर)

$$3HC \equiv CH_{(g)} \rightleftharpoons C_6H_{6(l)}$$

[दिया है : $\Delta_f G^\circ(HC \equiv CH) = -2.04 \times 10^5 \text{ J mol}^{-1}$; $\Delta_f G^\circ(C_6H_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$; $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

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

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Possible Answers :

5 to 5.001

Question Number : 54 Question Id : 70819116467 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

C_6H_6 freezes at 5.5°C. The temperature at which a solution of 10 g of C_4H_{10} in 200 g of C_6H_6 freeze is __________ °C. (The molal freezing point depression constant of C_6H_6 is 5.12°C/m.)

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

5 to 5.001

Question Number : 54 Question Id : 70819116467 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

C_6H_6, 5.5°C पर जमती है। वह ताप जिस पर 10 g, C_4H_{10} का 200 g C_6H_6 में विलयन जम जाता है वह है __________°C. (C_6H_6 का मोलल हिमांक अवनमन स्थिरांक 5.12°C/m है।)

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

5 to 5.001

Question Number : 55 Question Id : 70819116468 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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The solubility product of PbI_2 is 8.0×10^{-9}. The solubility of lead iodide in 0.1 molar solution of lead nitrate is $x \times 10^{-6}$ mol/L. The value of x is __________. (Rounded off to the nearest integer)

[Given $\sqrt{2} = 1.41$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 55 Question Id : 70819116468 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

PbI_2 का विलेयता गुणनफल 8.0×10^{-9} है। लेड आयोडाइड की विलेयता 0.1 मोलर लेड नाइट्रेट विलयन में $x \times 10^{-6}$ mol/L है। x का मान है __________. (पूर्णांक उत्तर)

[दिया है : $\sqrt{2} = 1.41$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 56 Question Id : 70819116469 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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The magnitude of the change in oxidising power of the MnO_4^-/Mn^{2+} couple is $x \times 10^{-4}$ V, if the H^+ concentration is decreased from 1 M to 10^{-4} M at 25°C. (Assume concentration of MnO_4^- and Mn^{2+} to be same on change in H^+ concentration). The value of x is ________. (Rounded off to the nearest integer)

$$\left[\text{Given : } \frac{2.303\,RT}{F} = 0.059\right]$$

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

5 to 5.001

Question Number : 56 Question Id : 70819116469 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

MnO_4^-/Mn^{2+} युग्म की ऑक्सीकरण शक्ति परिवर्तित होने का परिमाण $x \times 10^{-4}$ V है, यदि H^+ आयन की सांद्रता 25°C पर, 1 M से 10^{-4} M तक घटा दी जाए, x का मान है ________। (निकटतम पूर्णांक)

(H^+ आयन की सांद्रता परिवर्तित होने पर MnO_4^- तथा Mn^{2+} की सांद्रता समान मान लीजिए)।

$$\left[\text{दिया है : } \frac{2.303\,RT}{F} = 0.059\right]$$

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

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5 to 5.001

Question Number : 57 Question Id : 70819116470 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Sucrose hydrolyses in acid solution into glucose and fructose following first order rate law with a half-life of 3.33 h at 25°C. After 9 h, the fraction of sucrose remaining is f. The value of $\log_{10}\left(\frac{1}{f}\right)$ is ________ $\times 10^{-2}$. (Rounded off to the nearest integer)

[Assume : ln 10 = 2.303, ln 2 = 0.693]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 57 Question Id : 70819116470 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

अम्लीय विलयन में सुक्रोस का ग्लूकोस तथा फ्रुक्टोज़ में 25°C पर अपघटन प्रथम कोटि के दर नियम का अनुसरण 3.33 h की अर्ध आयु के साथ करता है। 9 h के पश्चात बचे हुए सुक्रोस का अंश f है। $\log_{10}\left(\frac{1}{f}\right)$ का मान है ________ $\times 10^{-2}$। (निकटतम पूर्णांक)

[मान लीजिए : ln 10 = 2.303, ln 2 = 0.693]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range

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Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 58 Question Id : 70819116471 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Among the following allotropic forms of sulphur, the number of allotropic forms, which will show paramagnetism is ________.

(A) α-sulphur (B) β-sulphur (C) S_2-form

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 58 Question Id : 70819116471 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

निम्नलिखित सल्फर के अपररूप में से

(A) α-सल्फर (B) β-सल्फर (C) S_2-form

उन अपररूपों की संख्या जो अनुचुम्बकत्व दर्शाते हैं, है ________।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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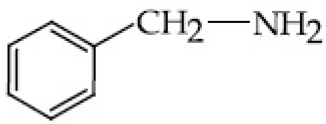
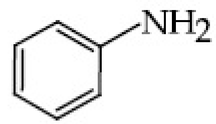
Question Number : 59 Question Id : 70819116472 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The total number of amines among the following which can be synthesized by Gabriel synthesis is ________.

(A) $(CH_3)_2CH-CH_2-NH_2$ (B) $CH_3CH_2NH_2$

(C) 

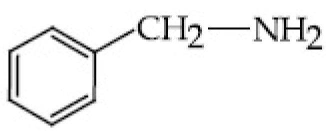
(D) 

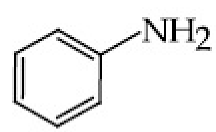
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 59 Question Id : 70819116472 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

निम्नलिखित में से उन ऐमीनों की संख्या, जिनका संश्लेषण गैब्रएल संश्लेषण से कर सकते हैं, है ________ ।

(A) $(CH_3)_2CH-CH_2-NH_2$ (B) $CH_3CH_2NH_2$

(C) 

(D) 

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range

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Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 60 Question Id : 70819116473 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

1.86 g of aniline completely reacts to form acetanilide. 10% of the product is lost during purification. Amount of acetanilide obtained after purification (in g) is _________ $\times 10^{-2}$.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 60 Question Id : 70819116473 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

1.86 g ऐनिलीन पूर्णरूप से अभिक्रिया करके ऐसिटेनिलाइड बनाती है। उत्पाद का 10% शुद्धिकरण में खत्म हो जाता है। प्राप्त, ऐसिटेनिलाइड की मात्रा (g में) है _________ $\times 10^{-2}$।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Mathematics Section A

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Section Id :	708191638
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 :	708191918
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 70819116474 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let a, b $\in \mathbb{R}$. If the mirror image of the point P(a, 6, 9) with respect to the line $\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9}$ is (20, b, $-a-9$), then $|a+b|$ is equal to :

Options :

70819154571. 84

70819154572. 86

70819154573. 88

70819154574. 90

Question Number : 61 Question Id : 70819116474 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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माना a, b∈**R**. यदि बिन्दु P(a, 6, 9) का रेखा, $\frac{x-3}{7}=\frac{y-2}{5}=\frac{z-1}{-9}$ में दर्पण प्रतिबिम्ब (20, b, $-a-9$)

है, तो $|a+b|$ बराबर है :

Options :

70819154571. 84

70819154572. 86

70819154573. 88

70819154574. 90

Question Number : 62 Question Id : 70819116475 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let a, b, c be in arithmetic progression. Let the centroid of the triangle with vertices (a, c), (2, b) and (a, b) be $\left(\frac{10}{3}, \frac{7}{3}\right)$. If α, β are the roots of the equation $ax^2+bx+1=0$, then the value of $\alpha^2+\beta^2-\alpha\beta$ is :

Options :

70819154575. $-\frac{69}{256}$

70819154576. $-\frac{71}{256}$

70819154577. $\frac{69}{256}$

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70819154578. $\frac{71}{256}$

Question Number : 62 Question Id : 70819116475 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

माना a, b, c एक समान्तर श्रेढ़ी में हैं। माना त्रिभुज जिसके शीर्ष बिन्दु (a, c), (2, b) तथा (a, b) हैं, का केन्द्रक $\left(\frac{10}{3}, \frac{7}{3}\right)$ है। यदि समीकरण, $ax^2+bx+1=0$ के मूल α तथा β हैं, तो $\alpha^2+\beta^2-\alpha\beta$ का मान है :

Options :

70819154575. $-\frac{69}{256}$

70819154576. $-\frac{71}{256}$

70819154577. $\frac{69}{256}$

70819154578. $\frac{71}{256}$

Question Number : 63 Question Id : 70819116476 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If P is a point on the parabola $y=x^2+4$ which is closest to the straight line $y=4x-1$, then the co-ordinates of P are :

Options :

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70819154579. (3, 13)

70819154580. (2, 8)

70819154581. (−2, 8)

70819154582. (1, 5)

Question Number : 63 Question Id : 70819116476 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यदि P परवलय, $y = x^2 + 4$ पर एक ऐसा बिन्दु हैं जो सरलरेखा, $y = 4x - 1$ के निकटतम है, तो P के निर्देशांक हैं :

Options :

70819154579. (3, 13)

70819154580. (2, 8)

70819154581. (−2, 8)

70819154582. (1, 5)

Question Number : 64 Question Id : 70819116477 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

For which of the following curves, the line $x + \sqrt{3}y = 2\sqrt{3}$ is the tangent at the point $\left(\frac{3\sqrt{3}}{2}, \frac{1}{2}\right)$?

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Options :

70819154583. $x^2+y^2=7$

70819154584. $x^2+9y^2=9$

70819154585. $y^2=\frac{1}{6\sqrt{3}}x$

70819154586. $2x^2-18y^2=9$

Question Number : 64 Question Id : 70819116477 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

बिन्दु $\left(\frac{3\sqrt{3}}{2}, \frac{1}{2}\right)$ पर, रेखा $x+\sqrt{3}y=2\sqrt{3}$, निम्न में से किस वक्र को स्पर्श करती है?

Options :

70819154583. $x^2+y^2=7$

70819154584. $x^2+9y^2=9$

70819154585. $y^2=\frac{1}{6\sqrt{3}}x$

70819154586. $2x^2-18y^2=9$

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Question Number : 65 Question Id : 70819116478 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The value of the integral, $\int_1^3 [x^2 - 2x - 2]dx$, where $[x]$ denotes the greatest integer less than or equal to x, is :

Options :

70819154587. -5

70819154588. -4

70819154589. $-\sqrt{2} - \sqrt{3} - 1$

70819154590. $-\sqrt{2} - \sqrt{3} + 1$

Question Number : 65 Question Id : 70819116478 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

समाकलन $\int_1^3 [x^2 - 2x - 2]dx$ का मान, जबकि $[x]$, महत्तम पूर्णांक $\leq x$ है, है :

Options :

70819154587. -5

70819154588. -4

70819154589. $-\sqrt{2} - \sqrt{3} - 1$

70819154590. $-\sqrt{2} - \sqrt{3} + 1$

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Question Number : 66 Question Id : 70819116479 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The negation of the statement

$\sim p \wedge (p \vee q)$ is :

Options :

70819154591. $\sim p \vee q$

70819154592. $\sim p \wedge q$

70819154593. $p \wedge \sim q$

70819154594. $p \vee \sim q$

Question Number : 66 Question Id : 70819116479 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

कथन $\sim p \wedge (p \vee q)$ का निषेधन है :

Options :

70819154591. $\sim p \vee q$

70819154592. $\sim p \wedge q$

70819154593. $p \wedge \sim q$

70819154594. $p \vee \sim q$

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Question Number : 67 Question Id : 70819116480 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let A and B be 3×3 real matrices such that A is symmetric matrix and B is skew-symmetric matrix. Then the system of linear equations $(A^2B^2 - B^2A^2)\,X = O$, where X is a 3×1 column matrix of unknown variables and O is a 3×1 null matrix, has :

Options :

70819154595. no solution

70819154596. a unique solution

70819154597. exactly two solutions

70819154598. infinitely many solutions

Question Number : 67 Question Id : 70819116480 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

माना A तथा B दो 3×3 वास्तिवक आव्यूह हैं जबकि A सममित आव्यूह है तथा B विषम सममित आव्यूह है। तो रैखिक समीकरण निकाय, $(A^2B^2 - B^2A^2)\,X = O$, जबकि X, एक 3×1 अज्ञात चरों का स्तम्भ आव्यूह है तथा O, एक 3×1 शून्य आव्यूह है :

Options :

70819154595. का कोई भी हल नहीं है

70819154596. का केवल एक हल है

70819154597. के ठीक दो हल हैं

70819154598. के अनन्त हल हैं

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Question Number : 68 Question Id : 70819116481 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let $f(x)$ be a differentiable function defined on $[0, 2]$ such that $f'(x) = f'(2-x)$ for all $x \in (0, 2)$, $f(0) = 1$ and $f(2) = e^2$. Then the value of $\int_0^2 f(x)\, dx$ is :

Options :

70819154599. $1 - e^2$

70819154600. $1 + e^2$

70819154601. $2(1 + e^2)$

70819154602. $2(1 - e^2)$

Question Number : 68 Question Id : 70819116481 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

माना $[0, 2]$ में $f(x)$ एक अवकलनीय फलन है, जिसके लिए $f'(x) = f'(2-x)$, $\forall\ x \in (0, 2)$, $f(0) = 1$ तथा $f(2) = e^2$ हैं। तो $\int_0^2 f(x)dx$ का मान है :

Options :

70819154599. $1 - e^2$

70819154600. $1 + e^2$

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70819154601. $2(1+e^2)$

70819154602. $2(1-e^2)$

Question Number : 69 Question Id : 70819116482 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let f be a twice differentiable function defined on $\mathbf{R}$ such that $f(0)=1$, $f'(0)=2$ and $f'(x) \neq 0$ for all $x \in \mathbf{R}$. If $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0$, for all $x \in \mathbf{R}$, then the value of $f(1)$ lies in the interval :

Options :

70819154603. $(0, 3)$

70819154604. $(3, 6)$

70819154605. $(6, 9)$

70819154606. $(9, 12)$

Question Number : 69 Question Id : 70819116482 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

माना $\mathbf{R}$ पर एक फलन f दो बार अवकलनीय है, जिसके लिए $f(0)=1, f'(0)=2$ तथा $f'(x) \neq 0, \forall x \in \mathbf{R}$ हैं। यदि $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0, \forall x \in \mathbf{R}$ है, तो $f(1)$ का मान जिस अन्तराल में है, वह है :

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Options :

70819154603. $(0, 3)$

70819154604. $(3, 6)$

70819154605. $(6, 9)$

70819154606. $(9, 12)$

Question Number : 70 Question Id : 70819116483 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If the curve $y = ax^2 + bx + c, x \in \mathbf{R}$, passes through the point (1, 2) and the tangent line to this curve at origin is $y = x$, then the possible values of a, b, c are :

Options :

70819154607. $a=1, b=1, c=0$

70819154608. $a=1, b=0, c=1$

70819154609. $a=-1, b=1, c=1$

70819154610. $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

Question Number : 70 Question Id : 70819116483 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यदि वक्र $y = ax^2 + bx + c, x \in \mathbf{R}$, बिन्दु (1, 2) से होकर जाता है तथा मूलबिन्दु पर इसकी स्पर्श रेखा, $y = x$ है, तो a, b, c के संभावित मान हैं :

Options :

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70819154607. $a=1,\ b=1,\ c=0$

70819154608. $a=1,\ b=0,\ c=1$

70819154609. $a=-1,\ b=1,\ c=1$

70819154610. $a=\frac{1}{2},\ b=\frac{1}{2},\ c=1$

Question Number : 71 Question Id : 70819116484 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If $n \geqslant 2$ is a positive integer, then the sum of the series

$^{n+1}C_2 + 2\left(^{2}C_2 + {}^{3}C_2 + {}^{4}C_2 + \dots + {}^{n}C_2\right)$ is :

Options :

70819154611. $\frac{n(n-1)(2n+1)}{6}$

70819154612. $\frac{n(n+1)(2n+1)}{6}$

70819154613. $\frac{n(2n+1)(3n+1)}{6}$

70819154614. $\frac{n(n+1)^2(n+2)}{12}$

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Question Number : 71 Question Id : 70819116484 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यदि $n \geqslant 2$ एक धनात्मक पूर्णांक है, तो श्रेणी

$^{n+1}C_2 + 2\left(^2C_2 + {}^3C_2 + {}^4C_2 + ... + {}^nC_2\right)$ का योग है :

Options :

70819154611. $\frac{n(n-1)(2n+1)}{6}$

70819154612. $\frac{n(n+1)(2n+1)}{6}$

70819154613. $\frac{n(2n+1)(3n+1)}{6}$

70819154614. $\frac{n(n+1)^2(n+2)}{12}$

Question Number : 72 Question Id : 70819116485 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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For the system of linear equations :

$x-2y=1,\ x-y+kz=-2,\ ky+4z=6,\ k\in\mathbf{R}$,

consider the following statements :

(A) The system has unique solution if $k\neq 2, k\neq -2$.

(B) The system has unique solution if $k=-2$.

(C) The system has unique solution if $k=2$.

(D) The system has no-solution if $k=2$.

(E) The system has infinite number of solutions if $k\neq -2$.

Which of the following statements are correct ?

Options :

70819154615. (A) and (D) only

70819154616. (A) and (E) only

70819154617. (C) and (D) only

70819154618. (B) and (E) only

Question Number : 72 Question Id : 70819116485 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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रैखिक समीकरण निकाय

$x-2y=1,\ x-y+kz=-2,\ ky+4z=6,\ k\in \mathbf{R}$,

के लिए, नीचे दिए कथनों पर विचार कीजिए :

(A) निकाय का केवल एक हल है, यदि $k\neq 2, k\neq -2$ है।

(B) निकाय का केवल एक हल है, यदि $k=-2$ है।

(C) निकाय का केवल एक हल है, यदि $k=2$ है।

(D) निकाय का कोई हल नहीं है, यदि $k=2$ है।

(E) निकाय के अनन्त हल हैं, यदि $k\neq -2$ है।

तो निम्न कथनों में कौन से **सत्य** हैं?

Options :

70819154615. केवल (A) तथा (D)

70819154616. केवल (A) तथा (E)

70819154617. केवल (C) तथा (D)

70819154618. केवल (B) तथा (E)

Question Number : 73 Question Id : 70819116486 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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Let $f: \mathbf{R} \rightarrow \mathbf{R}$ be defined as

$$f(x) = \begin{cases} -55x, & \text{if } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{if } -5 \leq x \leq 4 \\ 2x^3 - 3x^2 - 36x - 336, & \text{if } x > 4, \end{cases}$$

Let A = $\{x \in \mathbf{R} : f$ is increasing$\}$. Then A is equal to :

Options :

70819154619. $(-\infty, -5) \cup (4, \infty)$

70819154620. $(-5, -4) \cup (4, \infty)$

70819154621. $(-\infty, -5) \cup (-4, \infty)$

70819154622. $(-5, \infty)$

Question Number : 73 Question Id : 70819116486 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

माना $f: \mathbf{R} \rightarrow \mathbf{R}$

$$f(x) = \begin{cases} -55x, & \text{यदि } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{यदि } -5 \leq x \leq 4 \\ 2x^3 - 3x^2 - 36x - 336, & \text{यदि } x > 4, \end{cases}$$

द्वारा परिभाषित है। माना A = $\{x \in \mathbf{R} : f$ वर्धमान है$\}$। तो A बराबर है :

Options :

70819154619. $(-\infty, -5) \cup (4, \infty)$

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70819154620. $(-5, -4) \cup (4, \infty)$

70819154621. $(-\infty, -5) \cup (-4, \infty)$

70819154622. $(-5, \infty)$

Question Number : 74 Question Id : 70819116487 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A possible value of $\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$ is :

Options :

70819154623. $\frac{1}{\sqrt{7}}$

70819154624. $\frac{1}{2\sqrt{2}}$

70819154625. $\sqrt{7} - 1$

70819154626. $2\sqrt{2} - 1$

Question Number : 74 Question Id : 70819116487 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$ का एक सम्भावित मान है :

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Options :

70819154623. $\frac{1}{\sqrt{7}}$

70819154624. $\frac{1}{2\sqrt{2}}$

70819154625. $\sqrt{7} - 1$

70819154626. $2\sqrt{2} - 1$

Question Number : 75 Question Id : 70819116488 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 20 seconds at the speed of 432 km/hour, the angle of elevation changes to 30°. If the jet plane is flying at a constant height, then its height is :

Options :

70819154627. $3600\sqrt{3}$ m

70819154628. $2400\sqrt{3}$ m

70819154629. $1800\sqrt{3}$ m

70819154630. $1200\sqrt{3}$ m

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Question Number : 75 Question Id : 70819116488 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

धरती पर एक बिन्दु A से एक जैट का उन्नयन कोण 60° है। 432 km/hr की गति से 20 सैंकेड की उड़ान के बाद उन्नयन कोण 30° हो जाता है। यदि जेट एक स्थिर ऊँचाई पर उड़ रहा है, तो उसकी ऊँचाई है :

Options :

70819154627. $3600\sqrt{3}$ m

70819154628. $2400\sqrt{3}$ m

70819154629. $1800\sqrt{3}$ m

70819154630. $1200\sqrt{3}$ m

Question Number : 76 Question Id : 70819116489 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The vector equation of the plane passing through the intersection of the planes $\vec{r}\cdot(\hat{i}+\hat{j}+\hat{k})=1$ and $\vec{r}\cdot(\hat{i}-2\hat{j})=-2$, and the point (1, 0, 2) is :

Options :

70819154631. $\vec{r}\cdot(3\hat{i}+7\hat{j}+3\hat{k})=7$

70819154632. $\vec{r}\cdot(\hat{i}+7\hat{j}+3\hat{k})=7$

70819154633. $\vec{r}\cdot(\hat{i}-7\hat{j}+3\hat{k})=\frac{7}{3}$

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70819154634. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

Question Number : 76 Question Id : 70819116489 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

समतलों $\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$ तथा $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$ के प्रतिच्छेदन से तथा बिन्दु (1, 0, 2) से होकर जाने वाले समतल का सदिश समीकरण है :

Options :

70819154631. $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154632. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819154633. $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819154634. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

Question Number : 77 Question Id : 70819116490 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

For the statements p and q, consider the following compound statements :

(a) $(\sim q \wedge (p \to q)) \to \sim p$

(b) $((p \vee q) \wedge \sim p) \to q$

Then which of the following statements is correct ?

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Options :

70819154635. (a) is a tautology but not (b).

70819154636. (b) is a tautology but not (a).

70819154637. (a) and (b) both are tautologies.

70819154638. (a) and (b) both are not tautologies.

Question Number : 77 Question Id : 70819116490 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

कथनों p तथा q के लिए, निम्न मिश्र कथनों पर विचार कीजिए :

(a) $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$

(b) $((p \vee q) \wedge \sim p) \rightarrow q$

तो निम्न कथनों में से कौन-सा कथन **सत्य** है ?

Options :

70819154635. (a) एक पुनरुक्ति है, परन्तु (b) नहीं है

70819154636. (b) एक पुनरुक्ति है, परन्तु (a) नहीं है

70819154637. (a) तथा (b) दोनों पुनरुक्तियाँ हैं

70819154638. (a) तथा (b) दोनों पुनरुक्तियाँ नहीं है

Question Number : 78 Question Id : 70819116491 Question Type : MCQ Option Shuffling : Yes Is Question M

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Correct Marks : 4 Wrong Marks : 1

If a curve $y=f(x)$ passes through the point (1, 2) and satisfies $x\frac{dy}{dx} + y = bx^4$, then for what value of b, $\int_1^2 f(x)dx = \frac{62}{5}$?

Options :

70819154639. 10

70819154640. $\frac{31}{5}$

70819154641. 5

70819154642. $\frac{62}{5}$

Question Number : 78 Question Id : 70819116491 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यदि एक वक्र $y=f(x)$ बिन्दु (1, 2) से होकर जाता है तथा $x\frac{dy}{dx} + y = bx^4$ को संतुष्ट करता है, तो b के किस मान के लिए $\int_1^2 f(x)dx = \frac{62}{5}$ है?

Options :

70819154639. 10

70819154640. $\frac{31}{5}$

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70819154641. 5

70819154642. $\frac{62}{5}$

Question Number : 79 Question Id : 70819116492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The probability that two randomly selected subsets of the set {1, 2, 3, 4, 5} have exactly two elements in their intersection, is :

Options :

70819154643. $\frac{65}{2^7}$

70819154644. $\frac{65}{2^8}$

70819154645. $\frac{135}{2^9}$

70819154646. $\frac{35}{2^7}$

Question Number : 79 Question Id : 70819116492 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

समुच्चय {1, 2, 3, 4, 5} से दो यादृच्छिक चुने गए उपसमुच्चयों के सर्वनिष्ठ में ठीक दो अवयव होने की प्रायिकता है :

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Options :

70819154643. $\frac{65}{2^7}$

70819154644. $\frac{65}{2^8}$

70819154645. $\frac{135}{2^9}$

70819154646. $\frac{35}{2^7}$

Question Number : 80 Question Id : 70819116493 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The area of the region : $R = \{(x, y) : 5x^2 \le y \le 2x^2 + 9\}$ is :

Options :

70819154647. $6\sqrt{3}$ square units

70819154648. $9\sqrt{3}$ square units

70819154649. $11\sqrt{3}$ square units

70819154650. $12\sqrt{3}$ square units

Question Number : 80 Question Id : 70819116493 Question Type : MCQ Option Shuffling : Yes Is Question M
Correct Marks : 4 Wrong Marks : 1

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क्षेत्र $R = \{ (x, y) : 5x^2 \leq y \leq 2x^2+9 \}$ का क्षेत्रफल है :

Options :

70819154647. $6\sqrt{3}$ वर्ग इकाई

70819154648. $9\sqrt{3}$ वर्ग इकाई

70819154649. $11\sqrt{3}$ वर्ग इकाई

70819154650. $12\sqrt{3}$ वर्ग इकाई

Mathematics Section B

Section Id :	708191639
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 :	708191919
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819116494 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the variance of 10 natural numbers 1, 1, 1, ..., 1, k is less than 10, then the maximum possible value of k is ________.

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Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 81 Question Id : 70819116494 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि दस धन पूर्णांकों 1, 1, 1, ..., 1, k का प्रसरण 10 से कम है, तो k का अधिकतम संभावित मान है __________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 82 Question Id : 70819116495 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let a point P be such that its distance from the point (5, 0) is thrice the distance of P from the point $(-5, 0)$. If the locus of the point P is a circle of radius r, then $4r^2$ is equal to __________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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Question Number : 82 Question Id : 70819116495 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

माना एक बिन्दु P इस प्रकार है कि इसकी बिन्दु $(5, 0)$ से दूरी, बिन्दु $(-5, 0)$ से दूरी का तीन गुना है। यदि बिंदु P का बिन्दुपथ एक वृत्त है जिसकी त्रिज्या r है, तो $4r^2$ बराबर है ________ ।

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

5 to 5.001

Question Number : 83 Question Id : 70819116496 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If the area of the triangle formed by the positive x-axis, the normal and the tangent to the circle $(x-2)^2+(y-3)^2=25$ at the point $(5, 7)$ is A, then 24A is equal to ________.

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

5 to 5.001

Question Number : 83 Question Id : 70819116496 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि त्रिभुज, जो धनात्मक x-अक्ष तथा वृत्त $(x-2)^2+(y-3)^2=25$ के बिन्दु $(5, 7)$ पर खींचे गए अभिलम्ब तथा स्पर्श रेखा द्वारा बनता है, का क्षेत्रफल A है, तो 24A बराबर है ________ ।

Response Type : Numeric

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Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 84 Question Id : 70819116497 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let $i = \sqrt{-1}$. If $\dfrac{\left(-1+i\sqrt{3}\right)^{21}}{(1-i)^{24}} + \dfrac{\left(1+i\sqrt{3}\right)^{21}}{(1+i)^{24}} = k$, and $n = [|k|]$ be the greatest integral part of $|k|$. Then $\sum_{j=0}^{n+5}(j+5)^2 - \sum_{j=0}^{n+5}(j+5)$ is equal to ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 84 Question Id : 70819116497 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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माना $i=\sqrt{-1}$ है। यदि $\frac{\left(-1+i\sqrt{3}\right)^{21}}{(1-i)^{24}}+\frac{\left(1+i\sqrt{3}\right)^{21}}{(1+i)^{24}}=k$ है, तथा n=[|k|], |k| का महत्तम पूर्णांक भाग

है, तो $\sum_{j=0}^{n+5}(j+5)^2-\sum_{j=0}^{n+5}(j+5)$ बराबर है __________ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 Question Id : 70819116498 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The students $S_1, S_2, \ldots, S_{10}$ are to be divided into 3 groups A, B and C such that each group has at least one student and the group C has at most 3 students. Then the total number of possibilities of forming such groups is __________.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 Question Id : 70819116498 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

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छात्रों, $S_1, S_2, \ldots, S_{10}$ को तीन समूहों A, B तथा C में इस प्रकार विभाजित करना है कि प्रत्येक समूह में कम से कम एक छात्र हो तथा समूह C में अधिक से अधिक 3 छात्र हों। तो इस प्रकार समूह बनाने की कुल संभावनायें हैं __________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 86 Question Id : 70819116499 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

For integers n and r, let $\binom{n}{r} = \begin{cases} {}^nC_r, & \text{if } n \geq r \geq 0 \\ 0, & \text{otherwise} \end{cases}$

The maximum value of k for which the sum

$\sum_{i=0}^{k} \binom{10}{i}\binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i}\binom{13}{k+1-i}$ exists, is equal to _______.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 86 Question Id : 70819116499 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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पूर्णांकों n तथा r के लिए, माना $\binom{n}{r} = \begin{cases} {}^nC_r, & \text{यदि } n \geq r \geq 0 \\ 0, & \text{अन्यथा} \end{cases}$

तो k का वह अधिकतम मान, जिसके लिए, योगफल

$\sum_{i=0}^{k} \binom{10}{i}\binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i}\binom{13}{k+1-i}$ का अस्तित्व है, ________ है।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 87 Question Id : 70819116500 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If $a + \alpha = 1$, $b + \beta = 2$ and $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$, $x \neq 0$, then the value of the expression

$\dfrac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}}$ is__________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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Question Number : 87 Question Id : 70819116500 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

यदि $a+\alpha=1,\ b+\beta=2$ तथा $af(x)+\alpha f\left(\frac{1}{x}\right)=bx+\frac{\beta}{x},\ x\neq 0$ हैं, तो $\dfrac{f(x)+f\left(\frac{1}{x}\right)}{x+\frac{1}{x}}$ बराबर

है__________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 88 Question Id : 70819116501 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let λ be an integer. If the shortest distance between the lines $x-\lambda=2y-1=-2z$ and $x=y+2\lambda=z-\lambda$ is $\frac{\sqrt{7}}{2\sqrt{2}}$, then the value of $|\lambda|$ is _________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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Question Number : 88 Question Id : 70819116501 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

माना λ एक पूर्णांक है। यदि रेखाओं $x-\lambda=2y-1=-2z$ तथा $x=y+2\lambda=z-\lambda$ के बीच की न्यूनतम दूरी $\frac{\sqrt{7}}{2\sqrt{2}}$ है, तो $|\lambda|$ बराबर है__________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 89 Question Id : 70819116502 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The sum of first four terms of a geometric progression (G.P.) is $\frac{65}{12}$ and the sum of their respective reciprocals is $\frac{65}{18}$. If the product of first three terms of the G.P. is 1, and the third term is α, then 2α is _________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 89 Question Id : 70819116502 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

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एक गुणोत्तर श्रेढ़ी के पहले चार पदों का योग $\frac{65}{12}$ है तथा उनके व्युत्क्रमों का योग $\frac{65}{18}$ है। यदि इसके पहले तीन पदों का गुणनफल 1 हो और तीसरा पद α हो, तो 2α बराबर है ________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 90 Question Id : 70819116503 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The number of the real roots of the equation $(x+1)^2+|x-5|=\frac{27}{4}$ is ________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 90 Question Id : 70819116503 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

समीकरण $(x+1)^2+|x-5|=\frac{27}{4}$ के वास्तविक मूलों की संख्या है ________ ।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes

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Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

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