

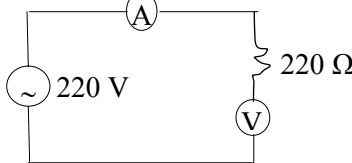
BUET Admission Test 2011-12
(MCQ)

- 01| For what value of C will the tangent of the curve $y = Cx(1+x)$ at the origin make an angle of 30° with the x-axis? [C-Gi gvb KZ ntj $y = Cx(1+x)$ e μ ti Lvi gj we $\`$ tZ Zvi $\`$ uk $\`$ At $\`$ i mt_ 30° tKvY Drcbaki te ?]
- (A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{2}{\sqrt{3}}$ (D) $\frac{\sqrt{3}}{2}$
- 02| The value of $\int \frac{e^x(1+x)}{\cos^2(xe^x)} dx$ is : [$\int \frac{e^x(1+x)}{\cos^2(xe^x)} dx$ Gi gvb nj -]
- (A) $\sin(xe^x) + C$ (B) $\cos(xe^x) + C$ (C) $\tan(xe^x) + C$ (D) $\cos^2(xe^x) + C$
- 03| If the sides of a triangle are $2x + 3$, $x^2 + 3x + 3$ and $x^2 + 2x$, then the greatest angle is: [tKvb w $\`$ f $\`$ Ri eU $\`$ uj $2x + 3$, $x^2 + 3x + 3$ Ges $x^2 + 2x$, ntj , en $\`$ Eg tKvYU nte-]
- (A) 90° (B) 120° (C) 60° (D) 180°
- 04| Given that $F(x) = \int_0^x \frac{t-3}{t^2+7} dt$. The value of x where F(x) attains its minimum value is: [t $\`$ qv AvtQ, $F(x) = \int_0^x \frac{t-3}{t^2+7} dt$ | x-Gi gvb KZ ntj F(x) b $\`$ bZg nte ?]
- (A) 3 (B) 0 (C) $\sqrt{7}$ (D) $-\sqrt{7}$
- 05| The probability of obtaining head and tail alternately in three successive tossing of a coin is: [GKUJ gy $\`$ t cici wZbevi Um Kiv ntj ch $\`$ q $\`$ mtg gy $\`$ tui tnW Ges tUBj cvevi m $\`$ te $\`$ Zv nte-]
- (A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{1}{8}$ (D) tKvbUB bq
- 06| A boat is rowed with twice the velocity of the current and at right angle with the direction of the current. The boat reaches the other bank 2.5 km down the point to which the boat was originally directed. What is the breadth of the river? [b $\`$ xi tm $\`$ tZi w $\`$ Y tetM tm $\`$ tZi mt_ j $\`$ f $\`$ vte GKUJ t $\`$ S $\`$ Kvi $\`$ wU Uvbn t $\`$ Q | t $\`$ S $\`$ KwU Aci Zti hv $\`$ v we $\`$ j wK weci xZ $\`$ vb t_ tK 2.5 wK.wg. f $\`$ wU tZ t $\`$ S $\`$ Qvj | b $\`$ xwU c $\`$ KZ ?]
- (A) 2.5 km (B) 4 km (C) 3 km (D) 5 km
- 07| The common acceleration of two masses attached to the ends of a light string passing over a fixed smooth pulley is 54.5 cm/s^2 . The ratio of the masses is: [GKUJ gm $\`$ Y c $\`$ ij i Dci w $\`$ t $\`$ q MgYKvi x GKUJ nij Kv i wki c $\`$ S $\`$ t $\`$ q msh $\`$ e $\`$ i m $\`$ vavi Y Zi Y 54.5 cm/s^2 ntj e $\`$ $\`$ ui f $\`$ i i Ab $\`$ c $\`$ vZ nte-]
- (A) 21:17 (B) 23:19 (C) 19:17 (D) 19:15

- 16| A hyperbola passes through the points (6,4) and (-3,1). Its centre is at the origin and transverse axis is along the x-axis. The length of the conjugate axis is: [GKw AwæĒ (6,4) Ges (-3,1) wæ` Mvgr | Gi tK` ^gj wæ` fZ Ges x- A¶] eivei Gi Avo A¶] Aew-Z | AbpUx A¶¶i ^`N`¶j -]
- (A) $\frac{36}{\sqrt{5}}$ (B) 8 (C) 2 (D) 4
- 17| For what values of k are the roots of the equation $(3k + 1)x^2 + (11+k)x + 9 = 0$ complex number? [k Gi gvb KZ ntj $(3k + 1)x^2 + (11+k)x + 9 = 0$ mgrKi tYi gj Øq Rulj mSL`v nte ?]
- (A) $k > 1$ (B) $k < 85$ (C) $k \geq 85$ (D) $1 < k < 85$
- 18| If A and B are any two sets and A' and B' are the complement of A and B respectively, then A-B is equal to: [A Ges B th tKvb` ¶U tmU, A' Ges B' h_vµtq A Ges B Gi cïK tmU ntj A-B Gi mgvb nte-]
- (A) $A' - B'$ (B) $B' - A'$ (C) $A' - B$ (D) $A - B'$
- 19| P is a point on the straight line $x - 3y - 2 = 0$ and is at equal distances from the points (2,3) and (6,-5). The coordinates of the point P is: [$x - 3y - 2 = 0$ ti Lvi Dci P GKw wæ` y Ges Zv (2,3) l (6,-5) wæ` y` ¶U ntZ mg` ïeZ¶] P wæ` ¶Uj ^`vbv¼ nj -]
- (A) (12, 4) (B) (14,4) (C) (14,4) (D) (16,4)
- 20| If $\tan \theta = \frac{5}{12}$ and $\cos \theta$ is positive, the value of $\frac{\sin \theta + \cos(-\theta)}{\sec(-\theta) + \tan \theta}$ is: [hw` $\tan \theta = \frac{5}{12}$ Ges $\cos \theta$ abvZK nq, Zte, $\frac{\sin \theta + \cos(-\theta)}{\sec(-\theta) + \tan \theta}$ Gi gvb nte t]
- (A) $\frac{34}{39}$ (B) $\frac{34}{40}$ (C) $\frac{30}{39}$ (D) $\frac{35}{50}$
- 21| Which smallest binary number added to $(101010)_2$ will give a sum exactly divisible by 15? [(101010)₂ Gi mvf_ tKvb&b-bZg w¶gK mSL`v thvM Ki tj thvMdj 15 w` tq wæfvR` nte ?]
- (A) $(11)_2$ (B) $(10)_2$ (C) $(101)_2$ (D) $(100)_2$
- 22| A particle is projected with a velocity v so that its range on a horizontal plane is 4 times the maximum height attained. What is the angle of projection? [GKw KYv V tetM wov¶]B ntj Zvi Abf¶gK cvj vj ä mte¶P D`PZvi 4 `Y nq | G¶¶tĀ c¶¶cY tKvY nte]
- (A) 90° (B) 60° (C) 30° (D) 45°
- 23| A man of 50 kg mass is standing on a lift moving with an acceleration of 327 cm/s^2 . The thrust on the floor of the lift while ascending is: [50 kg fti i GKrb tj vK 327 cm/s^2 Zi tY Pj gvb GKw wj dtU `wotq AvtQ | Dcti AvtinvYi mgq wj dtUi tqtSi l ci Avti mcZ Pvc nte |]
- (A) 101.1 N (B) 6.54 N (C) 65.4 N (D) 654 N
- 24| A man walks towards the north a distance of 12 km with a velocity of 3 km/hr. Then he walks towards the west a distance of 5 km in 150 minutes. The average velocity of the man is: [GK e`w³ NĒvq 3 km tetM DEi w` tK 12 km nuUvi ci cwĊg w` tK 150 wgvb tU 5 km c_ nuUj | e`w³ wUj Mo tetM nj -]
- (A) $\frac{14}{6}$ km/hr (B) $\frac{2}{3}$ km/hr (C) 2 km/hr (D) 2.5 km/hr

- 25| If $\cot\theta = 2$, then the value of $10\sin 2\theta - 6\tan 2\theta$ is : [হাৎ $\cot\theta = 2$ নং, Z তে $10\sin 2\theta - 6\tan 2\theta$ গি গুব নতে-]
- (A) 1 (B) 3 (C) 2 (D) 0
- 26| How many numbers greater than 4000 can be formed with the digits 0, 3, 5, 6, 8 without repetition of any digit in any number? [0, 3, 5, 6, 8 A ৷, t j v w` tq tK v b A ৷ i c p i v e E b v K ti 4000 Gi t P q e o KZ , t j v m S L v M V b K i v h v q ?]
- (A) 144 (B) 192 (C) 168 (D) tK v b U J b q
- 27| The coefficient of x^{10} in the expansion of $\frac{1}{(1-x)(3-x)}$ is—
- [$\frac{1}{(1-x)(3-x)}$ Gi w e w Z t Z x^{10} Gi m n M নতে-]
- (A) $\frac{1}{2}[1+3^{-11}]$ (B) $\frac{1}{2}[1-3^{-11}]$ (C) $\frac{1}{2}[1-3^{10}]$ (D) $\frac{1}{2}[1+3^{10}]$
- 28| If $AX = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} y \\ -x \end{bmatrix}$, then XA^2 is : [হাৎ $AX = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} y \\ -x \end{bmatrix}$ নং, Z তে XA^2 নতে]
- (A) $\begin{bmatrix} -x \\ -y \end{bmatrix}$ (B) $\begin{bmatrix} -x \\ y \end{bmatrix}$ (C) $\begin{bmatrix} -y \\ -x \end{bmatrix}$ (D) tK v b U J b q
- 29| If $a = \frac{1+i}{\sqrt{2}}$, then the value of a^6 is— [হাৎ $a = \frac{1+i}{\sqrt{2}}$ নং, Z তে a^6 গি গুব নতে-]
- (A) -1 (B) i (C) 1 (D) -i
- 30| If $f(x) = \begin{cases} 3x-1, & x > 3 \\ x^2-2, & -2 \leq x \leq 3 \\ 2x+3, & x < -2 \end{cases}$, then the y-intercept of $f(x)$ is :
- হাৎ $f(x) = \begin{cases} 3x-1, & x > 3 \\ x^2-2, & -2 \leq x \leq 3 \\ 2x+3, & x < -2 \end{cases}$ নং, Z তে $f(x)$ গি y - A ৷ t q i L w U Z r s k নতে
- (A) -2 (B) 3 (C) -1 (D) 0
- 31| Two objects of weight 10.5 kg and 24.5 kg are hung from two ends of a light rod 5 meters long. A man wants to carry the rod horizontally along with the objects. Where does he hold the rod from the lighter weight? [5 w g U v i $`$ x N G K w n v j K v i t w i $`$ β c o t s -10.5 kg | 24.5 kg | R t b i $`$ y U e $`$ S j v t b A r t Q | G K R b t j v K e $`$ $`$ y U m t g Z i w U A b f w g K A e $`$ v q e n b K i t Z P v q | t m i w U i K g | R b S j v t b v $`$ v b t $`$ K Z $`$ $\#$ i a i t e ?]
- (A) 1.5 meter (B) 2 meter (C) 3.5 meter (D) 3 meter

- 32| The equation of the normal at the point on the curve $y(x-2)(x-3) - x+7 = 0$, where it meets the x-axis is: [y(x-2)(x-3) - x+7 = 0, eµti LwU th we` jZ x-A¶tk tQ` Kti, H we` jZ eµ ti LwUi Awfj tæf mgxKiY nj -]
- (A) $x + 20y - 7 = 0$ (B) $20x + y - 140 = 0$ (C) $20x + y + 140 = 0$ (D) $x - 20y - 7 = 0$
- 33| If $f(x) = 2^{-4x}$, then the value of $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ is- [hw` f(x) = 2^{-4x} nq, Zte $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ Gi gvb nte-]
- (A) $-4 \times 2^{-4x} \log_e 2$ (B) $4 \times 2^{-4x} \log_e 2$ (C) $2^{-4x} \log_e 2$ (D) $-4 \times 2^{-4x-1}$
- 34| The condition for which the straight line $x+y = 1$ touches the circle $x^2 + y^2 - 2ax = 0$ is: [th kZ^Q_{x+y=1} ti LwU $x^2 + y^2 - 2ax = 0$ eÆtk` úk^QKi te Zv nj -]
- (A) $a^2 - 2a = 1$ (B) $a^2 + 2a = -1$ (C) $a^2 + 2a = 1$ (D) $a^2 - 2a = -1$
- 35| The equation of the locus formed by the set of points which are at equal distances from the point (1, 0) and the straight line $x+1 = 0$ is- [(1, 0) we` yGes $x+1 = 0$ mij ti Lv t_{tk} mg` teZr^Qwe` jng#ni tmlU th mÁvi c_{MVb} Kti Zvi mgxKiY nte-]
- (A) $x^2 = 2y$ (B) $y^2 = 4x$ (C) $x^2 = 4y$ (D) $y^2 = 2x$
- 36| If $x = \sin \cos^{-1}y$, then the value of $x^2 + y^2$ is: [hw` $x = \sin \cos^{-1}y$ nq, Zte $x^2 + y^2$ Gi gvb nte-]
- (A) 2 (B) 1 (C) -1 (D) 0
- 37| The measurement of radiation from a distant star showed a decrease in the wavelength received. This could mean that the source had:
`teZ^Qb¶t_{tk} cÓB wek^Qi tYi Zi ½% N^QKg cvl qv hvq | Gi A_{DrmlU}-
- (A) moved further away from the earth (c_Uex t_{tk} Avi l` #i P_{tj} hw^Qj)
- (B) moved closer to the earth (c_Uexi Avi l K_vQ Avm^Qj)
- (C) expanded but its temperature remained unchanged (c_hwi Z n_tq^Qj, w^QŠ' Gi Zvcgv^Q v Acwi ewZ^Q w^Qj)
- (D) contracted but its temperature remained unchanged (msk^QpZ n_tq^Qj, w^QŠ' Gi Zvcgv^Q v Acwi ewZ^Q w^Qj)
- 38| The energy needed to lift a mass of 2.0 kg from the surface of a plane with mass of 5×10^{24} kg and a radius of 5.1×10^6 m in outer space is: (Given: $G = 6.7 \times 10^{-11} \text{ N gk}^{-2} \text{ m}^2$) [5×10^{24} kg fi Ges 5.1×10^6 m e^Qvmva^Qwek^Q GKwU M^Qni c_p n_tZ 2.0 kg f_ti GKwU e^Qtk grvk_tY^Q cvV_tZ c_QvRbxq kw³i cwi gvY nj - (t` l qv Av_tQ, $G = 6.7 \times 10^{-11} \text{ N gk}^{-2} \text{ m}^2$)]
- (A) 9.0 J (B) 2.2×10^8 J (C) 1.3×10^8 J (D) 1.1×10^6 J
- 39| The intensity of a wave is directly proportional to: [GKwU Zi t_zi ZxeZv mi vmi hvi mgvb_{pcw}ZK, Zv nj t]
- (A) amplitude of oscillation (u^Q t_{bi} we^Qhi)
- (B) square of the amplitude of oscillation (u^Q t_{bi} we^Qhi i eM^Q)
- (C) frequency of oscillation (u^Q t_{bi} K^Qúvsk)
- (D) the pitch (wCP)

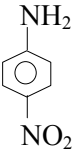
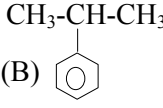
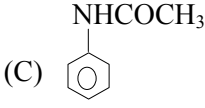
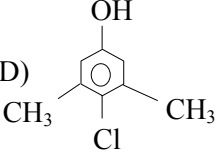






- 40| What is the frequency of a simple harmonic motion in which acceleration a is related to the displacement x by the equation $a = -\omega^2 x$? [তবে $a = -\omega^2 x$ এর ক্ষেত্রে সরল হার্মোনিক গতির কম্পাঙ্ক কত?]
- (A) ω (B) $2\pi\omega$ (C) $\frac{\omega}{2\pi}$ (D) $\frac{2\pi}{\omega}$
- 41| A metal is known to emit photo-electron under certain conditions but does not emit any when a parallel beam of light falls upon it. It may be made to emit photo-electrons by:
 একটি ধাতু আলোকবিদ্যুৎ নির্গত করে কিন্তু একই ধাতু থেকে আলোকবিদ্যুৎ নির্গত হয় না। নিচের কোন বিকল্পে আলোকবিদ্যুৎ নির্গত করা যাবে?
 (A) increasing intensity of light (আলোর তীব্রতা বাড়ানো)
 (B) polarizing the light (আলোকে পোলারাইজ করা)
 (C) using light of much shorter wavelength (বেশ ছোট তরঙ্গদৈর্ঘ্যের আলো ব্যবহার করা)
 (D) using light of much longer wavelength (বেশ বড় তরঙ্গদৈর্ঘ্যের আলো ব্যবহার করা)
- 42| What thermodynamic temperature is equivalent to 501.85°C ?
 501.85°C তাপমাত্রার সমতুল্য তাপগতিবিদ্যিক তাপমাত্রা কত?
 (A) 775.01 K (B) 774.85 K (C) 775.00 K (D) 228.85 K
- 43| Which of the following statements is true for two wave trains of monochromatic light incident at a point on a screen if the wave trains are coherent?
 দুটি একবর্ণী আলোক তরঙ্গের একটি স্ক্রিনে একই বিন্দুতে পৌঁছানোর ক্ষেত্রে নিচের কোন বিবৃতি সত্য হবে?
 (A) they are in phase (তাদের পর্যায় একই হবে)
 (B) they have same optical path (তাদের অপটিক্যাল পথ সমান হবে)
 (C) they have almost same amplitude (তাদের প্রায় সমান বিস্তারিত হবে)
 (D) they have a constant phase difference (তাদের পর্যায়ের পার্থক্য স্থির থাকবে)
- 44| For the following circuit, the ammeter and voltmeter readings will be :
 নিচের সার্কিটের অ্যামিটার ও ভোল্টমিটারের পঠন কত হবে?

- (A) 1 Amp and 220 V (B) 1 Amp and 0 V (C) 0 Amp and 0 V (D) 0 Amp and 220 V
- 45| A lunar landing module is descending at a steady velocity of 10 ms^{-1} to the moon's surface. At a height of 120 m, a small object falls from its gear. Find the speed at which the object strikes the moon. (value of g for moon is 1.6 ms^{-2})
 চন্দ্রের পৃষ্ঠে অবতরণের জন্য একটি মডিউল 10 ms^{-1} স্থির বেগে নামছে। 120 m উচ্চতায় এর গিয়ার থেকে একটি ছোট বস্তু পড়তে শুরু করে। বস্তুটি চন্দ্রের পৃষ্ঠে আঘাত করার সময় বেগ কত হবে? (চন্দ্রের g এর মান 1.6 ms^{-2})
 (A) 22 ms^{-1} (B) 30 ms^{-1} (C) 17 ms^{-1} (D) 130 ms^{-1}

- 46| For a thermocouple, which of the following statement is incorrect ?
 †Kvb Zvc-hMjtj i Rb" wbtPi gŠe" ,tj vi gta" †KvbU mWVK bq ?
 (A) For a particular set of termocouple, the neautral temperature is fixed (†Kvb GKUJ wbow" † Zvc-hMj tmUti Rb" wbi tC¶ ZvcgvIv w"i _vK |
 (B) Neutral temperature does not depend on the temperature of the cold junction (wbi tC¶ ZvcgvIv kxZj msthvMti ZvcgvIv Dci wbfP Kti bv |
 (C) Inversion temperature does not depend on he temperature of thecold junction (Drµg ZvcgvIv kxZj msthvMti ZvcgvIv Dci wbfP Kti bv |
 (D) Mazimum thermo-e.m.f. is attained at the neutral temperature (wbi tC¶ ZvcgvIvq mtePP Zvcxq ZworPvj K kw³ (thermo-e.m.f) cvl qv hvq)
- 47| A converging lens of 4D is combined with a diverging lens of 3D. The focal length of the combination will be– [4D cvl qvti i GKUJ DEj tj tYi mvf_ GKUJ 3D cvl qvti i AeZj tj Y mshy³ Kiv nj | mgwSZ tj YwUj tcvKvm ` tZj nte–]
 (A) 25 cm (B) 50 cm (C) 100 cm (D) 200 cm
- 48| When a load is connected to a supply of 100 V line it absorbs 200 watt. If the load is connected to 200V line, the load will absorb a power of– [†Kvb tj wW 100V-Gi we`jr mAvj b j vBtb j vMvtj Zv 200 watt kw³ MhY Kti | D³ tj wWU 200V Gi we`jr mAvj b j vBtb j vMvtj KZ kw³ MhY Ki te ?]
 (A) 100W (B) 200W (C) 400 W (D) 800 W
- 49| Bolling water is changing into steam. Under this condition the specific heat of water is :
 dUŠ-cwb evt[®]ú cwiz n"Q, G Ae"vq cwbi AvtC¶¶K Zvc nte
 (A) zero (B) one (C) infinte (D) less than one
- 50| The momentum of a photon of wavelength 600 nm is:
 600 nm Zi % tN¶ GKUJ tcvUtb i fi teM nj
 (A) 3×10^{-34} kg-m-s⁻¹ (B) 2.3×10^{-26} kg-m-s⁻¹ (C) 1.1×10^{-27} kg-m-s⁻¹ (D) 3.1×10^{-28} kg-m-s⁻¹
- 51| Water can be made to boil at 0°C if the pressure of the surroundings is : [0°C ZvcgvIvq cwbtK ev[®]urFZ Kiv thtZ cvti , hw` cwiz cwK¶ Pvc nq]
 (A) 760 mm of Hg (B) 76 mm of Hg (C) 40 mm of Hg (D) 4 mm of Hg
- 52| If 'I' current is flowing in a potentiometer wire of length L and resistance R, then potential gradient will be: [L `N[®] Ges R tiva-wenkó GKUJ ctUbwkI wgvUvti i Zvti i gta" Zwor cEvtni gvI 'I' ntj , weftei cwiz tbi nvi nte]
 (A) $\frac{IR}{L}$ (B) IRL (C) $\frac{RL}{I}$ (D) $\frac{IL}{R}$
- 53| A wire of 3Ω is bont into an equilateral triangle. The resistance across one of the sides is: [3Ω tivtai GKUJ Zvi tK mgvú wI fRi AvKvti evKvtbv nj | Gi GKUJ evú cŠtqi ga"eZPtivtai gv b nte]
 (A) $\frac{2}{3}\Omega$ (B) $\frac{3}{2}\Omega$ (C) 1Ω (D) $\frac{7}{2}\Omega$

- 54| A tuning fork of frequency 400 Hz is vibrated with 802 Hz. The number of beats heard is:
400 Hz K^uvstKi GKwU wDmbs dK^o802 Hz K^uvstKi mv_t _`u_w` Z ntj k^e extUi msL_v nq
(A) 402 (B) 20 (C) 2 (D) tKvbWJB bq
- 55| If there were no atmosphere in the earth, the duration of the day would:
c_w ex-c_toi l c_ti tKvb evqgUj bv _vK_tj GKwU w etmi mg_tqi e_wB
(A) decrease (nwm cv_te) (B) increase (e_wx cv_te)
(C) remain same (GKB _vK_te) (D) depend on weather (Avenl qvi l ci w_fP^o Ki_te)
- 56| A ball falls from a height of 80 m and 20% of its energy is lost on impact with the floor, it will rise to a height of: [80 m (80 w_g.) D^oPZv t_tK h_w GKwU ej t_gtS_tZ c_to Ges ej w_Ui 20% k_w³ t_gtSi mv_t _c_oZNv_tZ nwm cv_q, Z_te ej w_U t_gtS_tZ em_wo t_Ltq th D^oPZvq DV_te ?]
(A) 60 m (B) 64 m (C) 68 m (D) 72m
- 57| Two waves of intensities I and 4I are superposed. The mazimum and the minimum intensities are :
I Ges 4I Z_xeZ_v m_ub_we w_U Zi t_zi D_cwi cvZb ntj m_teP^o I m_ew_gb_wAv_tj vi Z_xeZ_v n_te-
(A) 5I, 3I (B) 9I, I (C) 9I, 3I (D) 5I, I
- 58| To what depth should a swimming pool of height h be filled with water so that it appears half filled?
h D^oPZvi GKwU m_Bugs c_tj i KZ M_fxi ch_S-c_wb w_tq c_Y^oKi_tj g_tb n_te th Z_v A_ta_R c_Y^ot_qt_o ?
(A) $\frac{3}{4}h$ (B) $\frac{2}{3}h$ (C) $\frac{5}{7}h$ (D) $\frac{3}{5}h$
- 59| If a big hole is made in a magnet, its magnetic moment will
GKwU P_rt_Ki g_ta GKwU ep_vK_vi w_o K_iv ntj Gi t_Ps_rK av_gt_Ki g_vb
(A) increase (e_wx cv_te) (B) decrease (nwm cv_te)
(C) remain same (Ac_wi em_ZZ_v _vK_te) (D) become zero (k_Y n_te)
- 60| The time period of a simle pendulum as seen by an astronaut in a spaceship is:
gnvK_vt_k GKRB b_tf_vP_vi xi K_vt_o GKwU mi j t_v j t_Ki t_v j b_Kvj n_te
(A) 84.6 min (B) 2 sec (C) ∞ (D) 0
- 61| Two small balls of same metal, one having the radius twice the other, are dropped in a tall jar filled with a liquid. The terminal velocity of the larger ball as compared to that of the smaller bail will be:
GKwU avZi ^Zi x`_oU t_Mvj K hv_t i GKwU i e_vmv_a^oAb_wU w_o Y_t t_Mvj K`_oU i Zi j c_v t_o c_Y^oGKwU j _w R_vt_i i t_fZi w_tq c_ot_Z t_o qv ntj t_ovU_wi Zi j bvq eo ej w_Ui c_os_teM-
(A) Same (GKB n_te) (B) Twice (w_o Y n_te)
(C) Four times (P_vi_o Y n_te) (D) Halved (A_ta_R n_te)

- 62| A bar magnet is moved towards a coil quickly (x) and slowly (y) then the induced e.m.f. is
 GKWU `Ü PæKtK tKvb KÜj xi w` tK `Z (x) l axi (y) Pvj bv Ki tj AvteKZ e.m.f. nte
 (A) larger in case (x) ((x)-Gi tñtñ eo)
 (B) smaller in case (x) ((x)-Gi tñtñ tQvU)
 (C) equal in both cases (DfQ tñtñ B mgvb)
 (D) larger or smaller depending on the radius of the coil (Ktqtj i e`vmtaP l ci wbfP Kti eo ev tQvU nte)
- 63| De Broglie wavelength of a 10 eV electron is: [GKWU 10 eV Btj KUñbi De Broglie Zi ½-% Nnte-]
 (A) 1240 Å (B) 1 Å (C) 3.88 Å (D) 0.55 Å
- 64| At what velocity the kinetic energy of a body is equal to its rest mass energy? [c = speed of light]
 KZ MwZtZ Pj tj tKvb e`i MwZkw³ Gi w`i fi kw³ i mgvb nte ? [c = Avtj vi MwZ]
 (A) $\sqrt{2} c$ (B) $\frac{c}{3}$ (C) $\frac{c}{2}$ (D) $\frac{\sqrt{3}}{2} c$
- 65| Velocity of earth around the sun is: [mñhP Pvi w` tK cW_xi MwZ nj -]
 (A) 300 km/sec (B) 3 km/sec (C) 30 km/sec (D) 3000 km/sec
- 66| A current in a solenoid produces a magnetizing field of 167 A/m. There is an iron core of magnetic susceptibility of 5000 inside the solenoid. The magnetic induction inside the solenoid is: [GKWU mwj bqñW cèvnZ we` jr cèvn 167 A/m gvñbi tPæK tñtñ mwó Kti | mwj bqñWi tFZi 5000 gvñbi tPæK cèk`Zv-wekó tj vnvi tKvi vKtj mwj bqñWi tFZti tPæK tñtñ i gvñ nte t]
 (A) 2 Tesla (B) 1.05 Tesla (C) 1.5 Tesla (D) 2.5 Tesla
- 67| Which of the following does not give p-type properties to a semiconductor when used as a dopant?
 [bxñPi tKvbUñK tWñcU wnmñe e`envi Ki tj p-UñBc Aaèwi evñxi ag`cvi qv hñte bv ?]
 (A) Aluminium (G`vj ygvbqv) (B) Antimony (GwUgv) (C) Gallium (tMwj qv) (D) Indium (BwUqv)
- 68| Each one of the following changes will increase the e.m.f. in a simple generator except: [bxñPi tKvb tñtñU Qrov evKx cèZñU ci eZñB mñavi Y we` jr Drcv` K htšj ZyorPvj K ej tK (e.m.f.) eñx Kti ?]
 (A) increase the number of turns in the armature coil (AvtgPvi KÉj xi cvK msL`v eñx Ki tj)
 (B) winding the coil on a soft iron armature (KÉj wU GKWU big tj vnvi Dci civPvtj)
 (C) increasing the size of the gap in which armature turns (AvtgPvti i NYñ` tj i duKv RvqMwU eñx Ki tj)
 (D) using strong magnetic field (D`P tPæK tñtñ e`envi Ki tj)
- 69| In a Carnot cycle the total change in entropy of the whole system is: [GKWU KvñY@Pñµ tgvU Gñtci cwi eZñ nj]
 (A) zero (B) $\frac{Q_1 - Q_2}{T_1 - T_2}$ (C) less than zero (D) greater than zero
- 70| An electrically charged object may be discharged by being held just above a flame. This is because:
 GKWU PñRZ e`tK AwMekLvi Dci añi ivLñj Zv APñRZ nq | Kvi Y-
 (A) the hot gases in the flame are ionized (AwMekLvi DÈB M`vm AvqvbZ nq etj)
 (B) the object become conducting when heated (DÈB Kiv nñj e`wU cwi evñtZ ifcññi Z nq etj)
 (C) the object is oppositely charged on the flame (e`wU AwMekLqv weci xZ PñR`PñRZ nq etj)
 (D) the hot gas bombard the object and remove its charge (DÈB M`vm e`wUñK AvñvZ Kti Ges Gi PñR`Acñvi Y Kti etj)

- 71| Which of the following physical processes is not exhibited by sound waves? [kã-Zi ½ bxtPi tKvb& tfsZ cùµqwu cù kù Kti bv ?]
 (A) refraction (cùZmi Y) (B) polarization (mgeZù) (C) diffraction (AceZù) (D) reflection (cùZdj b)
- 72| If the potential difference between the two parts of a thunder cloud is 10^8 V, what is the amount of energy given up during the passage of 20 coulombs? [GKuU eRtgñi `ùU Astki wefe cv_℞" hw` 10⁸ V nq, Zte 20 Kj s^PvR^AmZµgñyi dtj wK cwi gvY kw³ cwi Z³ nte ?]
 (A) 1.25×10^{28} J (B) 3.2×10^{10} J (C) 2×10^9 J (D) 3.2×10^{-10} J
- 73| What is the product when methylecyanides? [ug_vBj mivqvbw Av` ñetkw-Z ntj wK Drcbñq ?]
 (A) Methanol (ug_vb`vj) (B) Methanoic acid (ug_vbuqK GimW)
 (C) Formic acid (diugK GimW) (D) Ethanoic Acid (B_vbuqK GimW)
- 74| Which one of the following is used as a cathode in a dry cell? [bxtPi tKvbùU i`ù tKvtI K`vt_vw wnmvte e`eüZ nq ?]
 (A) Zinc (B) MnO_2 (C) Carbon (D) NH_4Cl
- 75| By which reaction Cumene is produced from benzene and propene? [tebwRb I tçùcb tKvb&weµµqv i ðvi v wKDngb DrcbñKti ?]
 (A) Coupling reaction (Kvcvj s weµµqv) (B) Friedel-Craft reaction (wctWj µvdu&weµµqv)
 (C) Condensation reaction (Nbrfeb weµµqv) (D) Raimar-taiman reaction (i vbgi -UvBg`vb weµµqv)
- 76| The reaction $A \div B$ is a first order reaction. Which plot will be linear? [$A \div B$ weµµqv cùg µg weµµqv tKvb&tj LwPùU mi j ti Lv nte ?]
 (A) $[A]$ vs. time (B) $\ln [A]$ vs. time (C) $\frac{1}{[A]^2}$ vs. time (D) $\frac{1}{[A]}$ vs. time
- 77| When a bomb calorimeter is used to determine the heat of reaction, which property of the system under investigation is kept constant? [hLb tevg K`vtj wivugUvi w`tq weµµqv Zvc wbyù Kiv nq, ZLb wnmùUtgj tKvb&emkó`w w`i titL cix`v Kiv nq ?]
 (A) Number of molecules (AYj msL`v) (B) Pressure (Pvc)
 (C) Temperature (Zvcgv`v) (D) Volume (AvqZb)
- 78| When the compounds of HF, H_2O , NH_3 and CH_4 are listed in the ascending order of boiling point, which of the following order is correct?
 ùUbv`i D`Pµg Abyn`i HF, H_2O , NH_3 Ges CH_4 thSMgñK Zvwj Kv³ Ki tñ wòtPi tKvbùU mivK nte ?
 (A) $CH_4 < NH_3 < H_2O < HF$ (B) $NH_3 < CH_4 < H_2O < HF$
 (C) $HF < CH_4 < NH_3 < H_2O$ (D) $CH_4 < NH_3 < HF < H_2O$
- 79| Which gas is non-flammable? [tKvb M`vm `vn` bq ?]
 (A) Butane (weDùb) (B) Hydrogen (nvBùWtRb) (C) Oxygen (Av` tRb) (D) Propane (tçùcb)

80. Which of the following compounds is Dettol? [bxfPi tKvb thSMUJ tWUJ wbt`R Kti ?]
- (A)  (B)  (C)  (D) 
- 4-bvBtUwclbvBj 4- tKti v-3.5 WvBvg_vBj tdbj
81. Which oxide, when mixed with water, produces the most acidic solution? [tKvb&A vBW cwbj mvt_ wgvvtj mefaK A`xq `eY `Zix Kti?]
- (A) CO (B) CO₂ (C) SiO₂ (D) P₂O₅
82. Which element is produced commercially by burning sea weeds? [mgy`akevj cjo tq ewWvR`Kfvte tKvb tgsj cT`Z Kiv nq ?]
- (A) Cl (B) Mg (C) Ca (D) I
83. What are the products of the thermal decomposition of magnesium nitrate? [g`vMtbwmgvg bvBtUUtK Zvc we tqvRb Kiti wK Drcv` cvl qv hvq ?]
- (A) Magnesium nitride and oxygen (g`vMtbwmgvg bvBUvBW I Av tRb)
 (B) Magnesium oxide and nitrogen (g`vMtbwmgvg A vBW, bvBtUUtRb)
 (C) Magnesium oxide, nitrogen and oxygen (g`vMtbwmgvg A vBW, bvBtUUtRb I Av tRb)
 (D) Magnesium oxide, nitrogen di-oxide and oxygen (g`vMtbwmgvg A vBW, bvBtUUtRb WvB-A vBW I Av tRb)
84. A garden fertilizer is said to have a phosphorous content of 30% as P₂O₅ which is soluble in water. What is the percentage of phosphorous in the fertilizer? [evMtb e`euZ GKw mvti 30% dmdim P₂O₅ wnmvte _vtK, hv cwb tZ `eYxq | D³ mvti dmdivtmi cwi gvY KZ ?]
- (A) 6.55% (B) 13.1 % (C) 26.2 % (D) 30.0%
85. The wavelength of a light is 540 nm. Which of the following should be its radiated colour? [GKw Avtj vi Zi 1/2-% N`nj 540 nm | bxfPi tKvbWU Gi wevKi tYi eY`bt`R Kti ?]
- (A) Violet (te_bx) (B) Yellow (nj j) (C) Green (meR) (D) Red (j vj)
86. Which of the following compounds is a liquid crystal? [bxfPi tKvb thSMUJ GKwU Zij cUUK ?]
- (A) CH₃-(CH₂)₄---CN (4'-tCvUvBj evBvclbvBj -4- KvtebvBUvBj)
 (B) Na₂SnO₃ (fmwWqvg ÷ vtBU)
 (C) -O- (WvB wclbvBj B_vi) (D) -COO- (wclbvBj tebRtqU)
87. Which of the following statements is true for Joule-Thompson effect? [Rj -_gmb cfvtei Rb bxfPi tKvb Dv³WU mwvK ?]
- (A) Volume of the gas contracts (M`vtmi AvqZb msKvPZ nq)
 (B) Temperature of the gas increases (M`vtmi Zvcgvv v evx cvq)
 (C) The attraction between the gas molecules increases (M`vtmi AY₂ t j vi gta` AvKI v evx cvq)
 (D) Gas molecules absorb heat from internal energy (M`vtmi AY₂ t j v Af`stxy kv³ ntZ Zvc tkv Y Kti)

- 88| Which of the following indicate the approximate composition of a colored glass ? [bxtPi tKvblU GKvlU i vOb Kvtpi AvbgvmbK mshy³ wbt` R Kti ?]
- (A) Na₂O, CaO, SiO₂ (B) Na₂O, K₂O, PbO, B₂O₃, SiO₂
(C) K₂O, PbO, CeO₂, SiO₂ (D) Na₂O, K₂O, CoO, SiO₂
- 89| Which of the following liquid-liquid pair shows positive deviation from Roults law ? [wbtPi tKvb Zij -Zij hMj i vDte i m t t_K avvZK wePivZ cD kB Kti ?]
- (A) H₂O–H₂SO₄ (B) C₂H₅OC₂H₅–CH₃COCH₃
(C) C₅H₅N–CH₃COOH (D) HBr–H₂O
- 90| When temperature is increased, which of the following statements is appropriate for the following equilibrium reaction? [ZvcgvI v ewx Ki tj wbtPi mgve v wePivUj Rb tKvb Dw³ vU h_vh_ ?]
- $$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$$
- (A) The value of K_p will remain unchanged (K_p -Gi gvb Acwi ewZ² _vKte)
(B) The value of K_p will increase. (K_p- Gi gvb ewx cvte)
(C) The value of K_p will decrease (K_p -Gi gvb nrm cvte)
(D) The value of K_p and K_c will be equal. (K_p Ges K_c Gi gvb mgvb nte)
- 91| The unit of the rate constant (k) for a zero reaction order ----- [kY^o μg wePivUj teca^oeK (k)-Gi GKK nj]
- (A) time⁻¹ (B) dm³. mol⁻¹. time⁻¹
(C) mol. dm⁻³. time (D) mol. dm⁻³. time⁻¹
92. K_p and K_c are affected by [K_p Ges K_c hv Øvi v cFvmeZ nq]
- (A) Temperature (ZvcgvI v) (B) Pressure (Pvc)
(C) Concentration (NbgvI v) (D) All of (A), (B) and (C) ((A), (B) l (C)-Gi me_s_tj v)
- 93| Which one of the following is used as solid lubricant? [bxtPi tKvblU Kvlb j weKvU nrmvte e'eüZ nq ?]
- (A) Aluminum dust (Al-PY^o) (B) Diamond dust (nxi K PY^o)
(C) Graphite (MödvBU) (D) Tar (cxP)
- 94| Which one of the following is used in the salt bridge of a cell? [bxtPi tKvblU Zvor tKvtl i j eb tmZtZ e'eüZ nq ?]
- (A) NH₄NO₃ (B) KCl
(C) KNO₃ (D) All of (A), (B) and (C) [(A), (B) l (C)-Gi me_s_tj v]
- 95| Which catalyst is used in the industrial production of CH₃OH? [CH₃OH-Gi wktf vrcv` tb tKvb cFveK e'eüZ nq ?]
- (A) Pt (B) V₂O₅ (C) ZnO + Cr₂O₃ (D) ZnCl₂ + CaO
- 96| The relationship between the half-life (t_{1/2}) of a second order reaction and the initial concentration is- [2q μg wePivUj Aa^oij cØi weK NbgvI vi -]
- (A) Inversely proportional (e'v` wbcvWZK) (B) Square (eM^o)
(C) Square root (eM^oij) (D) Directly proportional (mgvbcvWZK)

- 97 | Which one of the following is a reducing agent? [bxtPi tKvbWJ weRvi K ?]
 (A) FeCl_3 (B) KMnO_4 (C) I_2 (D) $\text{Na}_2\text{S}_2\text{O}_3$
- 98 | Which one of the following is false? [bxtPi tKvbWJ wj_v ?]
 (A) Ca and Ca^{+2} have same number of protons (Ca | Ca^{+2} Gi tCUB mL_v mgvb |
 (B) O_2 molecule has two covalent bonds. (O_2 AYtZ `WJ mgthvRx eÜb AvtQ)
 (C) Fe^{+2} and Fe^{+3} ions have equal number negative valency (Fe^{+2} | Fe^{+3} Avqtb mgvb mL`K Btj Kub AvtQ
 (D) Hydrogen can have both positive and negative valency (nvBtWtRtbi ciUJf | wbtMUF Dfq cKvi thvR`Zv ntZ cifti
- 99 | What does subsidiary quantum number show? [mnKvi x tKvqvÈvg mL_v wK cKvk Kti ?]
 (A) Direction (ir K) (B) Shape (AvKwZ) (C) Size (AvKvi) (D) None (tKvbWJ bq)
- 100 | Which one of the following is a primary standard substance? [bxtPi tKvbWJ cÜBgi x ÷`vÜw`c`v_?]
 (A) $\text{Na}_2\text{S}_2\text{O}_3$ (B) NaOH (C) FeSO_4 (D) $\text{K}_2\text{Cr}_2\text{O}_7$
- 101 | Which one of the following is not a buffer solution? [bxtPi tKvbWJ evdvi `èY bq ?]
 (A) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ (B) $\text{H}_2\text{CO}_3 + \text{NaHCO}_3$
 (C) $\text{HClO}_2 + \text{CH}_3\text{COOH}$ (D) $\text{NaH}_2\text{PO}_4 + \text{Na}_2\text{HPO}_4$
- 102 | Which one of the following is the strongest acid? [bxtPi tKvbWJ metPtq kw³ kvj x GumW ?]
 (A) HClO_4 (B) HCl (C) HClO_2 (D) HClO_3
- 103 | How many isomers for dibromobenzene ($\text{C}_6\text{H}_4\text{Br}_2$)? [WvBteftgvtewRb ($\text{C}_6\text{H}_4\text{Br}_2$)- Gi mgvYyKqW?]
 (A) One (GKwJ) (B) Two (WJ) (C) Three (wZwJ) (D) Four (Pvi wJ)
- 104 | An Fe catalyst is used in the Haber process in which gaseous N_2 and H_2 react to produce NH_3 . What is the role of this catalyst? [tnevi c`wZtZ Fe cFveK e`envi Kti N_2 | H_2 M`vtmi wepμqv NH_3 %Zwi nq | G cFveKwJi fvgKv wK ?]
 (A) It provides a reaction pathway with a lower activation energy (GwJ mμqb kw³ nvm Kti GKwJ wepμqv c_ mμó Kti)
 (B) It increases the equilibrium constant of the reaction (GwJ wepμqvi mvg`ve`vi a`eftKi gvb ewx Kti)
 (C) It raises the kinetic energies of the reactants (GwJ wepμqtKi MwZkw³ ewx Kti)
 (D) It interacts with NH_3 (GwJ NH_3 -Gi mvt_ wepμqv Kti)
- 105 | Concentrated H_2SO_4 is added to a beaker containing sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) to produce carbon. In this reaction the H_2SO_4 is acting primarily as a: [KveB `Zwi Kivi Rb` GKwJ weKvti mftμvtRi ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) gta` Nb H_2SO_4 thvM Kiv nj | G wepμqvi H_2SO_4 cÜwgKfvte Kx wnmvte KvR Kti ?]
 (A) Complexing agent (RiUj thSM mrvqK) (B) Dehydrating agent (wbi` K)
 (C) Oxidizing agent (Rvi K) (D) Precipitating agent (Aatt`c mrvqK)
- 106 | Which of the following compounds can exist as geometric isomers? [bxtPi tKvb thSMwJi R`wgiZK mgvYzv itqtQ ?]
 (A) 1,1-dichloroethane (1,1- WvBtKfti vBt_b) (B) 1,1-dichloroethene (1,1-WvBtKfti vBw_b)
 (C) 1,2-dichloroethane (1,2- WvBtKfti vBt_b) (D) 1,2-dichloroethene (1,2- WvBtKfti vBw_b)

- 107| Most of the enzymes are a type of: [CŃq me GbRvBgB GK cKvi]
 (A) Carbohydrate (KvteŃvBŃWU) (B) Lipid (vj wCW)
 (C) Nucleic acid (wbDwKK GmW) (D) Protein (tcŃUj)
- 108| A four-carbon alcohol was oxidized with acidified potassium dichromate to form a ketone. Which structure does represent the original alcohol? [Pvi KveŃhyŃ A`vj ŃKvnj A`vŃ cUwkcqg WvBŃµvŃGU w` Ńq Rwi Z KiŃj wKŃUvb DrcbŃŃq | bŃŃPi ŃKvb&msŃKZwU Aw` A`vj ŃKvnj wbŃ` R KŃi ?]
 (A) CH₃CH₂CH₂OH (B) H₂C = CHCH₂CH₂OH
 (C) CH₃C(CH₃)OHCH₃ (D) CH₃CH₂CH(OH)CH₃
- For question nos. 109–112, each sentence has four underlined words of phrases. The four underlined parts of the sentence are marked (A), (B), (C) and (D). Identify the one underlined word or phrase that must be changed in order to make the sentence correct.
- 109| The new computer chip is the smallest one than has ever been developed.
 A B C D
- 110| A census of the island revealed a population of only 10,000 people.
 A B C D
- 111| It is normal for students to be nervous when they were preparing for a new school year.
 A B C D
- 112| Either the teacher or the students writes on the blackboard.
 A B C D
- For question nos. 113–116, choose the correct option that will complete the corresponding sentences.
- 113| The engineers _____ a serious problem in the project proposal.
 (A) sat in on (B) worked out (C) came close to (D) on and on
- 114| Nobody knows why _____ postponed until next week.
 (A) the meeting (B) did the meeting (C) was the meeting (D) the meeting was
- 115| Successful teachers _____ a lot of work to educate their students well.
 (A) make out (B) come in (C) go through (D) keep from
- 116| Would you mind _____ simply a cup of tea?
 (A) to take (B) for taking (C) for having taken (D) taking
- Read the following passage and select the correct word to fill in the gap for the question nos. 117–120.
 Bangladesh is a small country but has a huge population. Most people here live below the poverty line and cannot therefore afford to educate their children. Many poor children dropout of school after just a few years or simply do not go to school at all. Despite this situation we have far too many students to educate compared to the number of institution available. Bangladesh needs more schools, college and universities to provide for the increasing number of students.
- 117| The number of students in Bangladesh is _____ day by day.
 (A) reducing (B) growing (C) more (D) increase
- 118| We need to _____ educational institutions.
 (A) raise (B) increase (C) more (D) rising

- 119| Many people cannot give their children any education for _____ source of income.
 (A) less (B) few (C) insufficient (D) smaller
- 120| Bangladesh is a _____ country.
 (A) popular (B) populous (C) familiar (D) population

Written-Part
 (MmYZ + c`v_@+ imiqb + BstiwR)

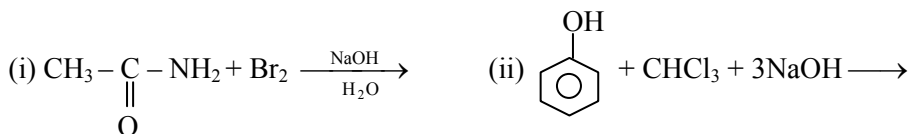
- 01| If the sides of an equilateral triangle increase by $\sqrt{3}$ cm per second and its area increases by 12 sq.cm per second, then find the length of the side of the equilateral triangle. [hw` tKvb mgevü wı fRi evü cÖZ tmKtÜ $\sqrt{3}$ tm. wq. Ges t¶İdj cÖZ tmKtÜ 12 em¶m. wq. ep× cvq, Zte mgevü wı fRi evüi `N°wbY¶ Ki |]
- 02| A train stopping at two stations 2 km apart takes 4 minutes on the journey from one station to the other. If the train runs with uniform acceleration x in the first part of its journey and then have uniform retardation y in the second part of the journey, find the value of $\frac{1}{x} + \frac{1}{y}$. [GKwı tıj Mvov GK t÷kb ntZ tÖto wqwb ci 2 km `¶i Aew`Z Aci t÷k÷b _vtg| Mvovwı Zvi MwZc÷i cÖgısk x mgZı tb Ges wÖZxqvstk y mgg`÷ tb Pj tj, $\frac{1}{x} + \frac{1}{y}$ Gi gvb wbY¶ Ki |]
- 03| The resultant of two forces P and Q (P>Q) acting at a point makes an angle of 60° with the direction of P. If P is doubled, the angle becomes 30°. Find the angle between the two forces. [tKvb wv`÷Z wıqvı Z P I Q (P>Q) gv¶bi `¶wı etj i j wä P etj i w`¶ki mvt_ 60° tKvY DrcbwKti | P ej w¶K wÖ_Y Ki tj D³ tKvY 30° nq| ej `¶wı AŞf¶ tKvY wbY¶ Ki |]
- 04| If $\theta = \frac{\pi}{20}$, find the value of $\cot\theta \cdot \cot 3\theta \cdot \cot 5\theta \dots \cot 19\theta$. [hw` $\theta = \frac{\pi}{20}$ nq, Zte $\cot\theta \cdot \cot 3\theta \cdot \cot 5\theta \dots \cot 19\theta$ Gi gvb wbY¶ Ki |]
- 05| Find the equation of the circle which touches the x-axis at the point (4, 0) and cuts off a cord of length 6 units from the y-axis. [GKwı etEi mgıkiY wbY¶ Ki hv x-A¶ıK (4, 0) wv`÷Z `ük¶ti Ges y-A¶ı ntZ 6 GKK `xwGKwı R`v LuEZ Kti |]
- 06| Two machines A and B produce bolts, but the machine A produces twice the amount that the machine B produces in a given time. It is known that the machines A and B produce 2% and 1% defective bolts, respectively. On test a bolt was found defective. What is the probability, that the bolt was produced by the machine A? [A I B tgvkb `¶wı tevë cÖZ Kti, wKŞ GKwı wıwı ¶ mgıq A tgvkbwı, B tgvkb-Gı wÖ_Y tevë `Zix Kti | Rıv AvtÖ th, A I B tgvkb `¶wı h_vıtg 2% I 1% İwCv¶tevë `Zwi Kti | GKwı tevë cıx¶ıv Kti t`Lv tıj th, tevëwı İwCv¶ tevëwı A tgvk÷b cÖZ nevi m¶te`Zv KZ ?]
- 07| A cricket team of 11 players is to be selected from two groups of 6 and 8 players. In how many ways can the selection be made so that at least 4 players are taken from the group of 6? [6 Rb I 8 (8) Rb tLıj vqıtoı `¶wı `j t_ıK 11 Rb tLıj vqıtoı GKwı wıwı¶KU wıg MvB Ki tZ nte hvıZ 6 Rıbi `j t_ıK AŞZ 4 Rb tLıj vqıo H wıtg _vtK| wıwı¶KU wıgıwı tgvı KZ cKıvı MvB Kiv thıZ cvıı ?]
- 08| Find the value of $\int_{\pi/3}^{\pi/2} \frac{dx}{1 + \sin x - \cos x}$
 $\int_{\pi/3}^{\pi/2} \frac{dx}{1 + \sin x - \cos x}$ Gi gvb wbY¶ Ki |

- 09| The axes of an ellipse lie along the axes of coordinates. The ellipse intersects the straight line $\frac{x}{9} + \frac{y}{4} = 1$ on the x-axis and the straight line $\frac{x}{2} + \frac{y}{3} = 1$ on the y-axis. Find its equation, the eccentricity and the coordinates of the foci. [GKw DcefEi Aq0q vbr4i Aq0q eivei AewZ| DceEw $\frac{x}{9} + \frac{y}{4} = 1$ ti LvK x-Aq0i Dci Ges $\frac{x}{2} + \frac{y}{3} = 1$ ti LvK y-Aq0i Dci tQ` Kti | DceEwJi mgxKiY, DrfKw`KZv Ges DctK`'`mJi vbr4 wYq Ki |]
- 10| A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2m/s^2 . He reaches the ground with a speed of 3 m/s. At what height did he bail out? [GKRb c'viviU Avti vnx gp` ntq evavnb fite 50 m wtp cwZZ ntqtQ| hLb c'viviUw Lfj tQ ZLb MwZ ntfmi nvi nj 2m/s^2 Ges tm 3m/s MwZtZ gwUtZ Gtm tcttQ| KZ D'PZvq tm gp` ntqQj ?]
- 11| A bullet can exactly penetrate 2 pieces of wood of 5 cm thickness each and also can penetrate 20cm of a particular wall independently. If one of the above wood is fixed on the wall, determine, how much the bullet can penetrate inside the wall. [GKw ivBtdtj i wj c0Zw 5cm cjtZj` Bw KvUi Z3vtK tf` Kitz cti Ges c_Kfite tkv GKw t`qtj i gta` 20cm tf` Kitz cti | wj w t`qtj i gta` KZUKztf` Kitz cti te hw Dti wZ Z3vi GKw Z3v t`qtj i mgtb mshp` Kiv_vtk?]
- 12| Determine the change in entropy to raise the temperature of 5 kg of water from 10°C to 100°C . [10°C Zvcgivi 5 kg cwbtK 100°C Zvcgiviq DbwZ Kitz Gwici cw eZb wYq Ki |]
- 13| A sound of frequency 660 Hz was created by a source from a depth of the sea water can reach 1 km above the sea level in 3.33 sec. Find the position of the source of the sound. (The difference in wavelengths of sound of frequency 660 Hz in air and in water is 1.85 m. The speed of sound in air is 330 m/sec.) [mgf` 1 Zj t` tk tkv Drm ntZ 660 Hz K'ustKi m0 ka Zi 1/2 mgj` cp ntZ 1 km D'PZvq tctQvZ 3.33 sec mgq j vMij ktai Drmw mgf` 1 Zj t` tk KZ Mfxti Ae`vb KitzQ wYq Ki | (evq| cwbtZ 660 Hz K'ustKi ka Zi 1/2-%tNq cv`R` 1.85 m Ges evZvfm ktai teM 330 m/sec)]
- 14| At the age of 40 a woman requires eyeglasses with lenses of 2 diopters power in order to read a book at 25 cm away. At 45, she finds that while wearing these glasses she must hold a book 40 cm away. What power lenses does she require at 45 to read a similar book at 25 cm away? [GKRb gvnj vi eqm hLb 40 ermi ZLb wZb 25 cm `ti ti tL GKw eB cw`vi fite covi Rb` 2 diopter wwk0 GKw Pkgv e`envi Ktib| Zui eqm hLb 45 ermi, ZLb wZb j` Ktib th cw`vi fite covi Rb` GLb ZvK eBw 40 cm `ti ivLtz nt`Q| 45 ermi eqtm ZvK cteP b`q 25 cm `ti GKB aitbi eB cw`vi fite covi Rb` KZ power-Gi Pkgv e`envi Kitz nte?]
- 15| A certain strain of bacteria doubles in number each 20 days. Two of these bacteria are placed in a spaceship and sent away from the earth for 1000 earth days. During this time, the speed of ship was 0.995 times the speed of light. How many bacteria would be aboard when the ship lands on the earth? [tkv GK aitbi RxeYycvZ 20 w`tb Zvi msL'v ep` Kti w0_Y nq| GB aitvi` Bw RxeYyK GKw btfvhtb Kti gnvKvK cvWtbr nj Ges 1000 w`b cti c_wextZ wdw tq Avbr nj | hw` btfvhtbwi MwZ tmKtU Avtj vi Mwzi 0.995_Y nq, Zte btfvhtbwi c_wextZ wdti Avmvi ci GtZ KZ_tj v RxeYycvI qv hvte?]

- 16| A train is running at a speed of 90 km/hr on two parallel rails 1.0 m apart. Calculate the value of induced e.m.f. between the rails. (Assume the horizontal component of earth's magnetic field is 0.3×10^{-4} wb/m² and the angle of dip is 60°.) [GKw tUb 1.0 m e'eatfb Aew-Z`wJ mgvS+vj titj i Dci 90 km/hr MwZtZ Pj tQ|`wJ titj i ga`Kvi Avfekiq ZworPij K kir³ i gvb KZ wbyq Ki | (AbfingK f-tpS=k t`it i gvb 0.3×10^{-4} wb/m² Ges webwZ tKiv 60° aitZ nte|]
- 17| Twenty seven drops of rain water of same size are charged at 220 V each. If they coalesce to form a bigger drop. Calculate the potential of the bigger drop. [GKB gvtci 27wJ epoi tclUvi cOZ`KuUtZ 220V Ovi v PmRZ Kiv nj | epoi tclUv,tjv GKwZ nq GKw eo tclUvq cwi YZ ntj ep`vKvi tclUvi wefe wbyq Ki |]
- 18| A 6V battery having 0.25 Ω internal resistance is connected in parallel to a battery of 3V having internal resistance of 0.5 Ω. Find the terminal voltage of the combination. [6V Gi GKw evUvixi Af`S+Y tiva 0.25 Ω| Ab` GKw 0.5 Ω Af`S+Y tivawekó 3V evUvixi mv` mgvS+vj msthM Kitj D³ mgertqi cOStqi wefe cv`R` wbyq Ki |]
- 19| In an electrochemical cell, an iron bar is to be electroplated with nickel. In this respect, answer the following questions: [GKw Zwor ivmqubK tKvtl GKw tJn`ÊtK wbtKj w`tq Zwor cOj cb KitZ nte| G m`umKZ wbtPi ckgjtji DEi`vl |]
- (i) Which metal should be used as cathode? (tKvb avZwJ K`vt`wW wnmvte e`envi KitZ nte)
- (ii) Which metal should be used as anode? (tKvb avZwJ A`vtbwW wnmvte e`envi KitZ nte)
- (iii) From which electrode, electron should flow to the external circuit? (tKvb Btj KtUwW t`tK eunt` mwkKw Btj KUb cOwvZ nte?)
- (iv) Write the electrode reaction to be occurred at the anode. (A`vtbwWi Btj KtUwW wep,qwL wj L|)
- (v) Write the electrode reaction to be occurred at the cathode. (K`vt`wWi Btj KtUwW wep,qwL wj L|)
- 20| How does a tree take nitrogen from urea fertilizer? Explain with the help of chemical reactions. [BDwi qv mvi t`tK GKw MwO Kxfvte bvBtUtRb MbY Kti? ivmqubK wep,qvi mrvth` e`vL`v Ki |]
- 21| The half life of a first order reaction is 50 sec. Calculate the time that will be required to complete 75% of the reaction. [cOg µg wep,qvi Aafqy 50 tmKÊ| 75% wep,qv tkl KitZ KZ mgq j vMte?]
- 22| Phenol is used for the preservation of trees. A gardener is provided with three bottles containing different chemicals including phenol. How will he identify the bottle containing phenol by using FeCl₃? Write down the equation involved and name of the compound formed. [tdbj MwOcyj v i`Yvte`itY e`euZ nq| GKRB gjj xtK wZbwJ tevZtj wefbei Kg ivmqubK c`v`q` qv nj , hvi GKwZ tdbj itqtQ| tm FeCl₃ e`envi Kti tKvb tevZtj tdbj AvtQ Zv Kxfvte mbv³ Ki te? wep,qwL wj L Ges Drcw` Z thSMwJi biv wj L |]
- 23| 0.20 g of copper was deposited by passing a current of 0.20 A in 50 minutes. Calculate the electrochemical equivalent of copper. [50 wjbu ati 0.20 G`w`uqvi we`jr cOwvZ nl qvq 0.20 MwG Kcvi Rgv nq| Kcvti i ivmqubK Zj` I Rb wbyq Ki |]
- 24| What is PVC? How can it be prepared from limestone? Mention the reactions. [w.wf.wm. wk? Pbvci_i t`tK Kxfvte GuJ`Zix Kiv hvq? wep,qvmgn Dtj L-Ki |]

- 25] Write with the help of chemical equation what happens when: [Kx NtU i vmvqubK mgxKiYi mvrvtH` wj Lt]
- (i) Benzene diazonium chloride is boiled with potassium iodide: (tebuRb WvqvRmbqvq tKwi vBWtK cUmkqvq AvtqWvBWmn dYvtj t)
- (ii) Nitrobenzene is treated with ammonium chloride in presence of zinc: (`w Dcw`wZtZ bvBtUttebuRbtK G`vtgmbqvq tKwi vBtWi mvt_ wevqvq NUvtj t)
- (iii) Acetamide is treated with bromine and sodium hydroxide solution: (G`vmmUvqvBtWi mvt_ tevgb l tmvWqvq nvBtWv vBtWi `tbi wevqvq NUvtj t)
- (iv) Chlorine is passed into acetaldehyde in presence of calcium carbonate: (K`vj vmqvq Kvte#btUi Dcw`wZtZ GvmUvj wvrvBtWi gta` tKwi b Pj bv Ki t j t)

- 26] (a) Write the main products of the following reactions with their names. [wbtpi wevqvq,tj vi gj Drcv` bvg mn wj L.]



- (b) Write the chemical formulae of the following compounds. [wbtpi thSM,tj vi i vmvqubK mstKZ wj L.]
- (i) Menthol (ii) Glycin (iii) Uracil (iv) Freon 12

- 27] Mention a chemical test for the identification of each of the following compounds: [wbtpi thSM,tj v mbr³KiYi Rb` GKwU Kti i vmvqubK cixv Dti L-Kit]

- (i) Protein (ii) Chloroform

Read the following passage and answer the questions number 28 – 29 that follow:

Electronic mail, popularly known as ‘e-mail’ is the communication of textual messages via electronic means. Although telex communication is also electronic in nature, there are difference between a telex and an e-mail. While telex communication is terminal-to-terminal, electronic mail communication is user-to-user. In telex, message destined to a number of users are sent to the same terminal from where it is distributed in printed form by an operator. On the other hand, e-mail is delivered to individual electronic mail boxes based in computer.

An important advantage of e-mail is its ability to reduce the consumption of paper in the office. Internal memos and reports can be exchanged electronically without using paper. Being a computer-based messaging system, files prepared on computers can be instantly copied and easily exchanged as e-mail. This facility has the potential of improving office efficiency considerably.

Being a person-to-person communication, e-mail turns out to be a cheaper alternative to telephone conversation and eliminates the time spent in establishing phone calls. Privacy is ensured as the mail is delivered to an individual’s mail box which can be accessed or opened only by the intended recipient.

E-mail has brought about a revolution in modern communication. Messages can be transmitted from one country to another within seconds. It is far cheaper than telephone calls. Trade and commerce has become greatly dependant on this mode of communication.

- 8] (a) Mention three advantages of using e-mail according to the passage.
 (b) How is privacy maintained through an e-mail?
 (c) What is the principal disadvantage of using ‘Telex’?

- 29| Fill in the gaps with the correct form of words in the brackets. Add any preposition if necessary.
- (a) E-mail system is (difference) _____ telex system in several respects.
 - (b) E-mail has brought about a (revolution) _____ change in modern communication.
- 30| Correct the following sentences.
- (a) He as well as his brother were present in the meeting.
 - (b) He offered me a fresh basket of flowers.
 - (c) I was absent at the meeting.
 - (d) The three boys divided the mangoes between themselves.
 - (e) Until you are idle, you will not prosper.