

omeca

Engineering Admission Coaching

(ছাত্র-ছাত্রী কর্তৃক পূরণীয়)

Name						
College						
Roll No.						Batch No.
Branch						

01. If $A = [-1, 1]$ and $f_1 : A \rightarrow A, f_1(x) = x^3$ and $f_2 : A \rightarrow A, f_2(x) = \sin x$ then f_1 and f_2 are—
[হা $A = [-1, 1]$ Ges $f_1 : A \rightarrow A, f_1(x) = x^3$ Ges $f_2 : A \rightarrow A, f_2(x) = \sin x$ nq Zte f_1 Ges f_2 —]
- (A) both onto (Dfqb mweR) (B) f_1 is onto but f_2 is not (f_1 mweR, f_2 mweR bq)
(C) f_2 is onto but f_1 is not (f_2 mweR, f_1 mweR bq) (D) None of these (tKvbWUB bq)
02. The Domain and Range of $f(x) = \operatorname{cosec} x$ — [$f(x) = \operatorname{cosec} x$ Gi tWtgb l tiÄÑ]
- (A) Domain = \mathbb{R} , Range = \mathbb{R} (tWtgb = \mathbb{R} , tiÄ = \mathbb{R})
(B) Domain = \mathbb{R} , Range = $[-1, 1]$ (tWtgb = \mathbb{R} , tiÄ = $[-1, 1]$)
(C) Domain = $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$ Range = $\mathbb{R} - [-1, 1]$ (tWtgb = $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$; tiÄ = $\mathbb{R} - [-1, 1]$)
(D) Domain = $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$, Range = $\mathbb{R} - (-1, 1)$ (tWtgb = $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$; tiÄ = $\mathbb{R} - (-1, 1)$)
03. The square root of $1+i$ is [$1+i$ Gi eM@j]
- (A) $\pm \frac{1}{2} \left\{ (\sqrt{2}+1)^{1/2} + (\sqrt{2}-1)^{1/2} i \right\}$ (B) $\pm \frac{1}{\sqrt{2}} \left\{ (\sqrt{2}+1)^{1/2} i + (\sqrt{2}-1)^{1/2} \right\}$
(C) $\pm \frac{1}{\sqrt{2}} \left\{ (\sqrt{2}+1)^{1/2} + (\sqrt{2}-1)^{1/2} i \right\}$ (D) None of these (tKvbWUB bq)
04. If $i = \sqrt{-1}$ and n is a positive integer, then the value of $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is—
[হা $i = \sqrt{-1}$ Ges n th tKvb abvZK cY@msL v Zte $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ Gi gvb-]
- (A) 0 (B) i^n (C) i (D) 1
05. The number of real solution of the equation $x^2 - 3|x| + 2 = 0$ are— [$x^2 - 3|x| + 2 = 0$ mgxKi tYi ev e g#j i msL v-]
- (A) 2 (B) 3 (C) 4 (D) 1
06. The number of diagonals of a polygon of m sides is— [m ev@wekó euf#Ri KtY@ msL v-]
- (A) $\frac{m(m-1)}{2!}$ (B) $\frac{m(m-2)}{2!}$ (C) $\frac{m(m-3)}{2!}$ (D) $\frac{m(m-5)}{2!}$
07. Using the digits 1,2,3,4,5 more than once find the numbers to be formed of 3 digits in which each will carry the same digit more than once— [$1,2,3,4,5$ A¼, wj i c#Z K W th tKvb msL K evi vb tq wZb AsK wekó KZ, t j v msL v MVb Ki v hvq thLvfb GKB A¼ GKwaK evi vKte-]
- (A) 55 (B) 125 (C) 60 (D) 65
08. If A and B are co-efficient of x^n in the expansions of $(1+x)^{2n}$ and $(1+x)^{2n-1}$ respectively then— [হা $(1+x)^{2n}$ Ges $(1+x)^{2n-1}$ Gi we wZtZ A Ges B h_vµtg x^n Gi mnM nq ZteÑ]
- (A) $A = B$ (B) $2A = B$ (C) $A = 2B$ (D) $AB = 2$

09. The n th term of series $2.1! + 5.2! + 10.3! + \dots$ is—
 [2.1! + 5.2! + 10.3! + Gi n Zg c` KZ ?]
- (A) $(n+1)n!$ (B) $(n^2 + n)n!$ (C) $(n^2+1) n!$ (D) None
10. The sides of a triangle are $\sin\alpha$, $\cos\alpha$ and $\sqrt{1 + \sin\alpha\cos\alpha}$ where $0 < \alpha < \frac{\pi}{2}$; the greatest angle of the triangle is—
 [wî fîRi evû , t] v $\sin\alpha$, $\cos\alpha$ Ges $\sqrt{1 + \sin\alpha\cos\alpha}$ thLvfb, $0 < \alpha < \frac{\pi}{2}$; wî fîRi enËg tKvYi gvb-]
- (A) 120° (B) 90° (C) 60° (D) 150°
11. The trigonometric equation $\sin^{-1}x = 2\sin^{-1}a$ has a solution for—
 [wî tKvYvZK mgxKiY $\sin^{-1}x = 2\sin^{-1}a$ Gi mgvavb _vKte-]
- (A) $|a| \leq \frac{1}{\sqrt{2}}$ (B) $|a| \geq \frac{1}{2}$ (C) $\frac{1}{2} < |a| < \frac{1}{4}$ (D) all real values of a
12. The value of $\log \tan 1^\circ + \log \tan 2^\circ + \log \tan 3^\circ + \dots + \log \tan 89^\circ$ is—
 [log tan1° + log tan2° + log tan3° +log tan89° Gi gvb-]
- (A) 1 (B) 0 (C) $\tan 1^\circ$ (D) $\tan 89^\circ$
13. If x is positive, the first negative term in the expansion of $(1+x)^{27/5}$ is—
 [hw` x abvZK nq Zte, $(1+x)^{27/5}$ Gi we`wZtZ cûg FyVZK c` nte-]
- (A) 7th term (B) 5th term (C) 8th term (D) 6th term
14. The line joining points $(2, -3)$ and $(-5, 6)$ is divided by y -axis in the ratio of—
 [(2, -3) | (-5, 6) we` ðq msthvMKvi x mi j ti LvK y A¶] th AbyvtZ wef³ Kti -]
- (A) 2: 5 (B) 2:3 (C) 3 : 5 (D) 1: 2
15. If $ax^2 + 2(a^2+ab-16)xy + by^2 + 2ax + 2by - 4\sqrt{2} = 0$ is the equation of a circle, then the value of a and b is [hw` $ax^2 + 2(a^2+ab-16)xy + by^2 + 2ax + 2by - 4\sqrt{2} = 0$ e†Ëi mgxKiY nq Zte a | b Gi gvb-]
- (A) $a = 2\sqrt{2}$, $b = \sqrt{2}$ (B) $a = 0$, $b = 0$ (C) $a = b = 2\sqrt{2}$ (D) $a = b = \sqrt{2}$
16. The equation of the parabola, whose vertex is $(1, -2)$ and focus $(1, -1)$ is— [kxl®(1,-2) | DctK`³(1,-1)wekó cive†Ëi mgxKiY-]
- (A) $x^2 = 4(y+2)$ (B) $(x-1)^2 = 4(y+2)$ (C) $(x+1)^2 = 4(y-2)$ (D) $(x+1)^2 = 4(y+2)$
17. If the distance between the foci of an ellipse is equal to its minor axis, then the eccentricity of the ellipse is— [hw` Dce†Ëi DctK` ðtqi ga`eZx® tZ; ¶i t¶¶i ` N¶i mgvb nq Zte D³ Dce†Ëi DrtKw` KZvi gvb-]
- (A) $\frac{1}{\sqrt{2}}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{1}{\sqrt{4}}$ (D) $\frac{1}{\sqrt{6}}$
18. If the angle between two vectors $\vec{i} + \vec{k}$ and $\vec{i} - \vec{j} + a\vec{k}$ is $\frac{\pi}{3}$, then the value of a is— [hw` $\vec{i} + \vec{k}$ Ges $\vec{i} - \vec{j} + a\vec{k}$ t†±i ðtqi ga`eZx®KvY $\frac{\pi}{3}$ nq Zte a Gi gvb]
- (A) 2 (B) 4 (C) -2 (D) 0

19. $\lim_{\alpha \rightarrow \beta} \left[\frac{\sin^2 \alpha - \sin^2 \beta}{\alpha^2 - \beta^2} \right] = ?$

- (A) 0 (B) 1 (C) $\frac{\sin \beta}{\beta}$ (D) $\frac{\sin 2\beta}{2\beta}$

20. $\lim_{x \rightarrow 0} \frac{\int_0^{x^2} \sec^2 t dt}{x \sin x} = ?$

- (A) 3 (B) 2 (C) 1 (D) 0

21. If $y = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \infty$ then the value of $\frac{dy}{dx}$ is

[hww y = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \infty nq Zte \frac{dy}{dx} Gi gvb-]

- (A) 0 (B) 2 (C) x (D) y

22. The differential co-efficient of $\tan^{-1} \frac{2x}{1-x^2}$ with respect to $\sin^{-1} \frac{2x}{1+x^2}$ is $[\sin^{-1} \frac{2x}{1+x^2}$ Gi mwtct¶¶] $\tan^{-1} \frac{2x}{1-x^2}$ Gi Aštk mnM-]

- (A) 0 (B) -1 (C) 1 (D) 2

23. The slope of the normal to the curve $xy^2 = 4$ at the point (1, -2) is $[xy^2 = 4$ eµti Lvi (1, -2) we` ‡Z Awfj ‡¶¶ Xij -]

- (A) 1 (B) -1 (C) 2 (D) -2

24. $\int e^{\sin^2 x} \sin 2x dx = ?$

- (A) $e^{\sin 2x} + C$ (B) $e^{\sin^2 x} + C$ (C) $\sin^2 x + C$ (D) $\sin 2x + C$

25. $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx = ?$

- (A) $\tan x + \cot x + C$ (B) $\operatorname{cosec} x + \sec x + C$ (C) $\tan x + \sec x + C$ (D) $\tan x + \operatorname{cosec} x + C$

26. $\int e^{3 \log x} (x^4 + 1)^{-1} dx = ?$

- (A) $\log (x^4 + 1) + C$ (B) $\frac{1}{4} \log (x^4 + 1) + C$ (C) $3 \log (x^4 + 1) + C$ (D) $-\log (x^4 + 1) + C$

27. The probability of a student getting 1st, 2nd and 3rd division in an examination are respectively $\frac{1}{10}, \frac{3}{5}$ and $\frac{1}{4}$. The probability, that a student fails in the examination is- [GKRb


Qv†i i GKwJ cix¶¶vq cŃg, wŃZxq Ges ZZxq wefv¶M DÈxY¶¶l qvi m¶¶ebv h_vµ¶g $\frac{1}{10}, \frac{3}{5}$ Ges $\frac{1}{4}$ | Qv†wJi cix¶¶vq AKZKvh¶¶l qvi m¶¶ebv-]

- (A) $\frac{197}{200}$ (B) $\frac{27}{100}$ (C) $\frac{83}{100}$ (D) $\frac{33}{200}$


28. Three ship A, B and C sail from Chittagong Port to Mongla Port. If the ration of their arriving safely are 2 : 5, 3: 7 and 6 : 11 respectively, then the probability of all the ships for arriving safely is– [wZbWU Rvnr A, B Ges C PÆMÓg e` i t_+K g½j v e` ti i Dfí k` t0to hvq| hw` Zvt` i Mšte` wbi vct` tcšQv+bi AbjcvZ h_vµtg 2 : 5, 3: 7 Ges 6 : 11 nq Zte me_+j v RvnrRi wbi vct` tcšQv+bi mæveb-]
- (A) $\frac{18}{595}$ (B) $\frac{6}{17}$ (C) $\frac{3}{10}$ (D) $\frac{2}{7}$
29. What is the value of Z? $(101011)_2 = (Z)_8$
- (A) 52 (B) 53 (C) 54 (D) 55
30. A given force F is resolved into two components P and Q along the directions which are equally inclined with the direction of the force F. Then– [F etj i `wJ Dcisk P Ges Q hw` F Gi mvt_ mgvb mgvb tKvY DrcbaKti Zvntj -]
- (A) $P = 2Q$ (B) $2P = Q$ (C) $P = Q$ (D) None
31. A sphere of radius r and weight w is settled on a point of a vertical wall with the help of a rope of length r and the rope is tied at a point of the sphere and another point of the wall. The reaction force of the wall is– [r e`vma`wekó w l R+bi GKwU tMvj K gmY Lvov t` l qvtj i mvt_ GKwU we` fZ tVwKtq r `N`wekó GKwU ink w tq tMvj tKi Dci ` GKwU we` fZ l t` qvtj i Ab` GKwU GKwU we` fZ mY` fZ evav AvtQ| t` qvtj i Dci cšZµqv ej -]
- (A) $\frac{w}{\sqrt{3}}$ (B) w (C) $w\sqrt{3}$ (D) None
32. The four forces of magnitudes 3N, 5N, 3N and 5N act along the four sides of a unit square. The moment of their resultant is – [GKwU GKK eMšfí+í Pvi evú eivei GKBµtg 3N, 5N, 3N Ges 5N ej µqv i Z| Gt` i j wä tgv+gU-]
- (A) 8 (B) 5 (C) 2 (D) None
33. The greatest height to which a man can throw a stone is h. The greatest distance through which can he throw the same stone, will be– [GKRb tj vK GKwU cv_i wbt`c Ki tj cv_i wU mefaK h D`PZvq DfV, GKB cv_i tK tj vKwU wbt`c Ki tj cv_i wU i mefaK cvj vnte-]
- (A) $\frac{h}{2}$ (B) h (C) 2h (D) 4h
34. A bullet of mass m moving with a velocity of u is stopped with in distance s of the target. The average resistance offered by the target is – [m fti i u tetM MwZkxj GKwU etj U j q`e` KZš evavcš nq j q`e` i wfZti s `+Z; AwZµg Kti t_tg hvq| j q`e` KZš evavcš ej -]
- (A) $\frac{mu^2}{s}$ (B) $\frac{mu^2}{2s}$ (C) $\frac{2mu^2}{s}$ (D) $\frac{2m^2u^2}{s}$
35. A bomb is released from a aircraft moving straight upwards with uniform velocity. It lands on the ground after 5 seconds. The height of the aircraft when the bomb lands on the ground is– [mgte+M Lvov Dašvq GKwU DtovRvnr n+Z GKwU tevgv t0to t` l qvi 5 tm ci Zv gwU+Z cto| tevgwU hLb gwU+Z cti ZLb DtovRvnrRi D`PZv-]
- (A) 122.5m (B) 96.04m (C) 9.8 m (D) None
36. If $A = \begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$ then the inverse matrix of A is– [hw` A = $\begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$ nq Zte A Gi Bbfvm`g`wU! -]
- (A) $\begin{bmatrix} -1 & -2 \\ 4 & 1 \end{bmatrix}$ (B) $\frac{1}{7} \begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$ (C) $\frac{1}{7} \begin{bmatrix} -1 & -2 \\ 4 & 1 \end{bmatrix}$ (D) $\frac{1}{9} \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$

37. What is the velocity of sound in the liquid whose bulk modulus is $2.04 \times 10^9 \text{ Nm}^{-2}$ and density is 1000 kgm^{-3} . [tKvb Zij i AvqZb , Yv¼ $2.04 \times 10^9 \text{ Nm}^{-2}$ Ges NbgvÎv 1000 kgm^{-3} | Zij vWtZ ktâi teM KZ ?]
- (A) 1000 ms^{-1} (B) 1428.3 ms^{-1} (C) 1224 ms^{-1} (D) 1525.5 ms^{-1}
38. 4 minutes time is required to cool a liquid from 100°C to 70°C . How much time is required to cool the liquid further from 70°C to 40°C , if the environment temperature is 20°C ? [tKvb GKvW Zij tK 100°C t_tK 70°C -G kvZj Ki tZ 4 mins. mgq j vM | GB Zij tK Avevi 70°C t_tK 40°C -G kvZj Ki tZ KZ mgq j vM te hw` cwi tetskî ZvcgvÎv 20°C nq ?]
- (A) 4 mins. (B) more than 4 mins. (C) less than 4 mins. (D) None
39. A stone is thrown vertically upward at 10 m/sec from the top of a tower. It takes 10 seconds to reach the ground. The height of the tower is– [GKvW Uvl qvti i kvl e_tK GKvW cv_i 10 m/sec teM Lvov Dcti i v tK vbtq|c Kiv nj | GvW fvgtZ tcttZ 10 sec mgq vbtj Uvl qvi vLi D'PZv KZ ? ($g = 9.8 \text{ ms}^{-2}$)]
- (A) 490 m (B) 590 m (C) 390 m (D) None
40. A body of mass 2 kg is running at 2.5 ms^{-2} acceleration by applying a force 6N . What is its coefficient of friction? [2kg fti i GKvW e_i Dci 6N ej cqvM Kivq GvW 2.5 ms^{-1} mgZj tY Pj tQ | NI v , Yv¼ KZ ?]
- (A) 0.05 (B) 0.167 (C) 0.83 (D) 0.2
41. 20 Nm torque is required to get rpm of a circular disk from 300 to 500 in 5 second. What is its moment of inertia? [GKvW PpυKvi vW` Gi rpm 300 t_tK 500 tZ 5 sec-G vbtZ 20 Nm UK© cqvRb | Gi RoZvi avgK KZ ?]
- (A) 286.2 kgm^2 (B) 0.1 kgm^2 (C) 4.77 kgm^2 (D) 83.776 kgm^2
42. A river of 200 m wide is flowing at 2 m/sec . How much time is required for a boat to cross the river if its velocity is 4 ms^{-1} and moving at 60° angle with the current? [200m ckt` -GKvW b` tZ 2 m/sec teM tmZ cevngvb | tmZi mv_t 60° tKvY 4 m/s teM GKvW tbskv KZ mgtq b` vW cvi nte ?]
- (A) 57.7 sec (B) 4.47 sec (C) 50 sec (D) 3.78 sec
43. The difference between two temperatures is 20°C . What is the value of this difference in fahrenheit scale? [vW ZvcgvÎvi gta` cv_R` 20°C | dvti bnvBU t` tJ GB cv_R` i gvb KZ ?]
- (A) 36°F (B) 68°F (C) 16°F (D) None
44. What is the average kinetic energy of Helium atom at 27°C ? [27°C ZvcgvÎvq vWvj qvg AYj Mo MvZkv³ KZ ?]
- (A) $5.59 \times 10^{-20} \text{ J}$ (B) $4.14 \times 10^{-21} \text{ J}$ (C) $1.38 \times 10^{-23} \text{ J}$ (D) $6.21 \times 10^{-21} \text{ J}$
45. Compute C_v of CO_2 (Given $\gamma = 1.33$) [CO_2 Gi Rb` C_v vbyq Ki | (t` lqv AvtQ, $\gamma = 1.33$)]
- (A) $33.49 \text{ J mol}^{-1}\text{K}^{-1}$ (B) $25.18 \text{ J mol}^{-1} \text{ K}^{-1}$
(C) $11.05 \text{ J mol}^{-1}\text{K}^{-1}$ (D) None
46. A bullet of 20 gm mass and 280 ms^{-1} velocity enters into a stationary wooden block of 2kg mass. What is the final kinetic energy? [20 gm fti i GKvW etj U 280 ms^{-1} teM GKvW w`i KvVi etK ctek Kti | KvVi etKi fi 2kg ntj Pevš-MvZkv³ KZ ?]
- (A) 7.76 J (B) 784 J (C) 2851 J (D) None

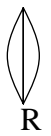
47. The ratio between the amplitudes of two superposing waves is 3:2. The ratio between the maximum and minimum intensities of the resultant wave will be— [ጽሑፍ ድምጽ ሁለት ገጽ ስርዓት ላይ ለሚገኙት ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) 9:4 (B) 25:1 (C) 13:5 (D) 5:1
48. Engine A is working between 450K to 350K and engine B is working between 400K to 300K. Which engine is of higher efficiency? [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) A (B) B (C) same efficiency (D) None
49. Compute the terminal velocity of a metallic sphere of radii 20 cm in a liquid of viscosity $0.003 \text{ kgm}^{-1}\text{s}^{-1}$. Given that the viscous force of the liquid is $2.37 \times 10^{-4} \text{ N}$. [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) $2.1 \times 10^{-2} \text{ ms}^{-1}$ (B) $3.5 \times 10^{-2} \text{ ms}^{-1}$ (C) $4.5 \times 10^{-2} \text{ ms}^{-1}$ (D) $3.5 \times 10^{-4} \text{ ms}^{-1}$
50. Under the same conditions of temperature and pressure, the velocity of sound in oxygen and hydrogen are V_0 and V_H . then— [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) $V_H = 4V_0$ (B) $V_0 = 4V_H$ (C) $V_H = 16V_0$ (D) $V_0 = V_H$
51. The weight of a body at the centre of the earth is— [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) zero (ጽዕን)
 (B) infinite (ሌላ)
 (C) same as on the surface of earth (ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ)
 (D) None
52. For a given velocity, a projectile has the same range R for two angles of projection. If t_1 and t_2 are the time of flight in two cases, then— [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) $t_1 t_2 \propto \frac{1}{R^2}$ (B) $t_1 t_2 \propto \frac{1}{R}$ (C) $t_1 t_2 \propto R$ (D) $t_1 t_2 \propto R^2$
53. A particle executing simple harmonic motion having an amplitude 0.01m and frequency 12Hz. What is its velocity at the displacement 0.005m? [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) 0.56 ms^{-1} (B) 0.65 ms^{-1} (C) 0.75 ms^{-1} (D) 0.85 ms^{-1}
54. If the intensity of a sound is doubled then the change in intensity level is— [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) 53dB (B) 20dB (C) 100dB (D) 3dB
55. The part of transistor which is heavily doped to produce large number of majority carriers is— [ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ]
- (A) emitter (ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ)
 (B) base (ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ)
 (C) collector (ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ)
 (D) any of the above depending upon the nature of transistor (ግንባታ ለ ለሁለት ገጽ ስርዓቶች ስርዓቱን ይጠቅሙ)

56. If the activity of a radioactive substance remains $(1/64)$ th of its original value in 60sec, then its half life will be— [hw` GKwU tZRw` t e`i weuKi tYi 60sec ci Gi cKZ gvtbi 1/64 Ask AenKó _vtK Zte Gi AafqyKZ ?]
- (A) 5sec (B) 10sec (C) 30sec (D) 20sec
57. The static mass of an atomic particle is 2.5×10^{-27} kg. When it is running at $0.9c$, compute its total energy— [tKvb cvi gvYweK KuYKvi wõj fi 2.5×10^{-27} kg | KuYKwU hLb $0.9c$ `wZtZ Pj gvb ZLb Gi tgvU kw³ tei Kiñ]
- (A) 1.4×10^9 eV (B) 2.25×10^{-10} J (C) 5.16×10^{-10} J (D) 1.4×10^{-9} J
58. Two coherent monochromatic light beams of intensities I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are— [ñU mmsMZ GKeYpAvtj vKi wKf hvt` i cõej` h_vvtg I Ges 4I, Dcwí cvZb nj | Gi dtj j ä Avtj vK i wKf m`e mteP I meõgacõej` nteñ]
- (A) $5I$ and I (B) $5I$ and $3I$ (C) $9I$ and I (D) $9I$ and $3I$
59. What would be the ratio of the equivalent focal length of the following combinations of the lenses of same radii of curvature? [GKB eµZvi e`vmvtaP tj Y`_tj vi wõg³ wfbæwfbæw`vfm Zj` tcvKvm` t tZi AbcVZ wK nte ?]
- 

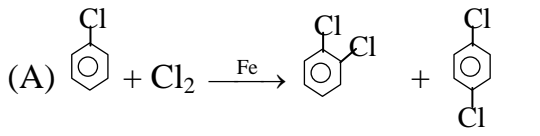
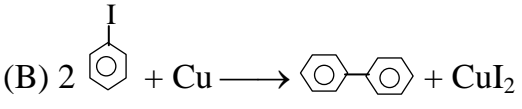
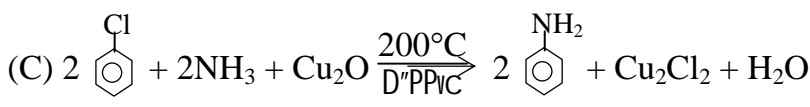
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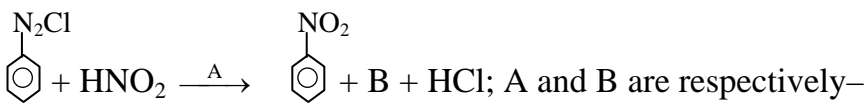
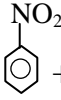


Q



R
- (A) 1:1:1 (B) 1:1:-1 (C) 1:-1:1 (D) 2:1:1
60. The charge density of a sphere of radius 20cm is 200 coulomb/m^2 . What is the voltage at the centre of the sphere? [20cm e`vmvtaP GKwU tMvj tKi PvtR P Zj gwí K NbZi 200 coulomb/m^2 . Gi tKt` wefe KZ ?]
- (A) zero (B) 4.524×10^{12} V (C) 453 kV (D) None
61. There is only one resistance R_1 in the circuit where supply voltage is 25V. If another resistance R_2 is connected in series with R_1 then current flow is 0.25A and if R_2 is connected in parallel with R_1 then current through R_2 is 1A. $R_1 = ?$ [25V mieivn eZõZ GKwU gwí tiva R_1 mshy³ | hw` Gi mv` R_2 tK tkYx msthM t` lqv nq Zte cõvn nq 0.25A Ges R_1 Gi mv` R_2 mgvš+vj msthM w` tj R_2 Gi ga`w` tq cõvn nq 1A. $R_1 = ?$]
- (A) 75Ω (B) 25Ω (C) 100Ω (D) 18.75Ω
62. Electrochemical equivalent of hydrogen is $1.05 \times 10^{-8} \text{ kgC}^{-1}$. If the atomic weight of copper is 63.5 then which one of the following is the electrochemical equivalent of copper? [nvBtWtRtbi Zwor i vmvqwbK Zj` vsK $1.05 \times 10^{-8} \text{ kgC}^{-1}$ | Zvgvi cvi gvbweK lRb 63.5 ntj Zvgvi Zwor i vmvqwbK Zj` vsK wõg³ tKvbwU ?]
- (A) $66.67 \times 10^{-8} \text{ kgC}^{-1}$ (B) $63.5 \times 10^{-8} \text{ kgC}^{-1}$ (C) $33.34 \times 10^{-8} \text{ kgC}^{-1}$ (D) None
63. If some one wants to convert a galvanometer to an ammeter he has to add with the galvanometer— [hw` tKD GKwU M`vj fv`bwgUvti tK A`wgUvti ifcvš+ Ki tZ Pvq Zte ZvtK M`vj fv`bwgUvti i mv` hy³ Ki tZ nteñ]
- (A) high resistance in series (tkYtZ D`P tiva) (B) high resistance in parallel (mgvš+vtj D`P tiva)
(C) low resistance in series (tkYtZ wõg³ tiva) (D) low resistance in parallel (mgvš+vtj wõg³ tiva)
64. The unit of magnetic permeability is— [tPšK cõek`Zvi GKKN]
- (A) $\text{Nm}^{-1}\text{A}^{-1}$ (B) $\text{JA}^{-1}\text{m}^{-2}$ (C) TmA^{-1} (D) it has no unit
65. In an A.C. generator the area of the rotor coil is $3 \times 10^{-2} \text{ m}^2$ and number of turns is 500. If it is running at 50 rps then what is the value of the generated voltage? The magnetic field intensity inside the generator is 0.5T. [GKwU G.wm. tRbvtiUti i tivUi KÙj xi tñÍdj $3 \times 10^{-2} \text{ m}^2$ Ges cvK msL`v 500 | hw` GUv 50 rps-G P tZ Zte tRbvtiUi õviv Drcbæwefteí gvb KZ ? tRbvtiUti i Af`š+ tPšK cõej` 0.5T.]
- (A) 1666V (B) 2356V (C) 0 (D) None

66. LASER stands for– [LASER -hvi msv¶¶β bygÑ]
- (A) Large Amplification of Stimulated Emitted Radiation
 (B) Light Amplification by Stimulated Emission of Radiation
 (C) Light Amplification by Standard Electronic Radiation
 (D) None of the above
67. The focal length of objective lens of an astronomical telescope is 50cm and that of its eye lens is 5cm. Which is its magnification in case of LVD focusing. [GKñU btfv ` ì ex¶¶Y htšj Awfj ¶¶ I Awf¶bt¶ i tdivKvm ` ì Zjh_vµtg 50cm Ges 5cm | `úó ` kß tdivKvms-Gi t¶¶¶ Gi weeaß KZ ?]
- (A) 12 (B) 10 (C) 60 (D) 8
68. Which is true for convex mirror? [DËj ` c¶¶Yi Rb` tKvbñU mZ` ?]
- (A) both virtual and real image can be created (Aj xK Ges ev` e Dfq cKvi cßZwe`¶¶WVZ n¶Z cvti)
 (B) $|m| > 1$
 (C) for reflection it can cover wider area than concave mirror (cßZdj tbi Rb` GUv AeZj ` c¶¶ n¶Z tekk Gj vKv vbtZ cvti)
 (D) None of the above (Dc¶i i tKvbñU bq)
69. Two charges of 10C and $-15C$ are placed 1m apart from each other. For this how much work has to be done? [10C I $-15C$ gv¶bi ` ¶U PvR`ci `úi 1m ` ì Zj ` vcb Kiv nj | Gi Rb` ¶K cwi gvY KvR nj ?]
- (A) $10 \times 9 \times 10^9$ J (B) $-15 \times 9 \times 10^9$ J (C) $-150 \times 9 \times 10^9$ J (D) 0 J
70. The dip angle in a vertical plane perpendicular to magnetic meridian will be– [tPš`K ga`Ztj i mv¶_j ¶^ Dj ¶^Ztj webñZ tKv¶¶Yi gvbn]
- (A) 0° (B) 45° (C) 90° (D) any angle (th tKvb tKvY)
71. A convex and a concave lens of same focal length made of glass are taken into water. What will happen to the focal length of convex and concave lens respectively? [GKB tdivKvm ` ì Zj GKñU DËj I GKñU AeZj tj Ý tbqv nj hv Kvt¶i `Zwi | Gt` itK cwb¶Z vbtj DËj I AeZj tj ¶¶Yi tdivKvm ` ì Zjh_vµtgñ]
- (A) increase and decrease (evote I Kgtë) (B) decrease and decrease (Kgtë I Kgtë)
 (C) decrease and increase (Kgtë I evote) (D) increase and increase (evote I evote)
72. Which color of the following indicates the highest temperature of a star among these? [vbt¶Pi is_vj i gta` tKvb isñU GKñU Zvi Kvi Rb` mte¶¶ Zvcgv¶ vbt` R Kti ?]
- (A) blue (bxj) (B) red (jvj) (C) green (meR) (D) yellow (nj j)
73. Which one is the transition compound for producing Hexane 1, 6 Di oic acid from cyclohexanol? [vbt¶Pi tKvbñU mvBtKv¶n· vbj t_¶K tn· b 1, 6 WvB AwqK GumW Drcv` tbi t¶¶¶ ga`eZ¶thSM ?]
- (A) cyclohexine (mvBtKv¶n· b) (B) hexin-1 (tn· b-1)
 (C) cyclohexanoite (mvBtKv¶n· vbtqU) (D) cyclohexyne (mvBtKv¶n· vBb)
74. Which of the following is Ullmann reaction? [vbt¶Pi tKvbñU Dj ¶¶v¶bi we¶¶qv ?]
- (A)  (B) 
- (C) 
- (D) None

75. Iodoform test is given by– [AvtqvtWvd i g wepμqv t` qN̄]
- (A) Propanal (tĉŃcvb`vj) (B) 3-Pentanone (3-tĉ>Uvfbvb)
(C) 2-Butanol (2-weDUvbj) (D) 1-Butanol (1-weDUvbj)
76. Which one of the following is also known as pyrene? [wb̄Pi tKvbWJ cvBwi b bv̄tgi cwi wPZ ?]
- (A) COCl₂ (B) CCl₃NO₂ (C) C₆H₃Cl₃ (D) CCl₄
77. The number of optically active isomers of the compound C₇H₁₆ are: [C₇H₁₆ th̄st̄Mi Avtj vK m̄pμq mgvYj msL`vN̄]
- (A) 2 (B) 4 (C) 5 (D) 6
78. The Prussian blue color in the test of nitrogen identification by Lassaigne's solution is due to– [bvB̄Ūt̄Rb mbv³Ki t̄Yi t̄q̄t̄ t̄j m̄vBb `ē̄t̄Y c̄k̄k̄qv̄b bx̄j ēt̄ȲP̄ Rb` `vq̄x̄N̄]
- (A) Na₄[Fe(CN)₆] (B) Fe₄[Fe(CN)₆]₃ (C) Fe(SCN)₃ (D) None
79. Which one is the raw material for car's tyre? [tKvbWJ M̄vwi Uvq̄t̄i i KuPvgvj ?]
- (A) Sibasic acid (imevwmK GimW) (B) Decanoic acid (tWKvbvqK GimW)
(C) Cyclic amid (P̄v̄μK A`vgvBW) (D) Cyclic anhydride (P̄v̄μK A`vbnvBW̄BW)
80.  + HNO₂ \xrightarrow{A}  + B + HCl; A and B are respectively–
- (A) Cu, NO (B) Cu₂O, NO (C) CuO, N₂ (D) Cu₂O, N₂
81. Which is the octane number of n-Nonane? [tKvbWJ n-Nonane Gi AKt̄Ub bv̄v̄i ?]
- (A) – 45 (B) 60 (C) 75 (D) 25
82. Friedel Craft's alkylation of benzene is an example of– [teb̄R̄t̄bi w̄d̄t̄w̄j μ̄v̄d̄U A`vj KvB̄t̄j kb t̄KvbWJi D`vni Y?]
- (A) Nucleophilic substitution reaction (tK>̄ t̄K̄l̄P̄c̄t̄Z`vc̄b wepμqv)
(B) Electrophilic substitution reaction (B̄t̄j KŪbv̄KĪP̄c̄t̄Z`vc̄b wepμqv)
(C) Electrophilic addition reaction (B̄t̄j KŪbv̄KĪP̄ms̄t̄hv̄Rb wepμqv)
(D) None
83. Which one is used for making small devices in radio? [ti w̄w̄l Gi q̄i` h̄š̄ȳsk `Zwi t̄Z t̄KvbWJ e`eüZ nq?]
- (A) Patronite (tĉt̄Ūbv̄BU) (B) Rutile (i`UvBj)
(C) Ilmenite (Bj t̄gbv̄BU) (D) Carnotite (Kvi t̄bv̄Uv̄BU)
84. Which of the following is true? [wb̄Pi tKvbWJ mZ` ?]
- (A) 4P (white) + 3O₂ (limited) \longrightarrow 2P₂O₃ + P₂O₅ (small amount)
(B) 4P (white) + 3O₂ (unlimited) \longrightarrow 2P₂O₃
(C) 4P (red) + 3O₂ (unlimited) \longrightarrow 2P₂O₅
(D) None
85. How much percentage of I₂ is present in Calitchi? [K`w̄j w̄P̄t̄Z kZKiv KZ f̄v̄M I₂ `v̄t̄K ?]
- (A) 0.5% (B) 0.4% (C) 0.62% (D) 0.2%
86. The alkyne which will react with KMnO₄ to give pyruvic acid is– [th A`vj KvB̄w̄J KMnO₄ Gi m̄v̄t̄_ wepμqv K̄t̄i cvBi `wf̄K GimW Drcb̄K̄t̄i Zv nj N̄]
- (A) Ethyne (B_vBb) (B) Propyne (tĉŃcvBb) (C) Butyne (weDUvBb) (D) 2-Pentyne (2-tĉ>UvBb)

87. Which will complete substitution reaction of OH by Cl in the absence of $ZnCl_2$? [†KvbWU ZnCl₂ Gi Abcpw̄ wZ†Zl Cl Øvi v OH Gi cØZ̄ vcb wewµqv cY©Ki †e ?]
- (A) 1° Alcohol (B) 2° Alcohol (C) 3° Alcohol (D) Tertiary Alcohol
88. Which one is true for the laboratory method of preparation of carbonyl compounds? [KveØj thŠtMi cix¶vMvi cØZ̄ c×wZi †¶††† †KvbWU mZ̄ ?]
- (A) Preparation temperature of carbonyl compounds $\leq T_b$ (alcohol) (KveØj thŠtMi cØwZ ZvcgvÎv $\leq T_b$ (A'vj †Kvnj))
- (B) Preparation temperature of carbonyl compounds $\geq T_b$ (alcohol) (KveØj thŠtMi cØwZ ZvcgvÎv $\geq T_b$ (A'vj †Kvnj))
- (C) Preparation temperature of carbonyl compounds $< T_b$ (alcohol) (KveØj thŠtMi cØwZ ZvcgvÎv $< T_b$ (A'vj †Kvnj))
- (D) Preparation temperature of carbonyl compounds $> T_b$ (alcohol) (KveØj thŠtMi cØwZ ZvcgvÎv $> T_b$ (A'vj †Kvnj))
89. Which one is used for identifying amino-acids? [†KvbWU A'vqvB†bv Gmw mbv³ i †Y e'euZ nq ?]
- (A) Gas chromatography (M'vm †µvqv†UvMØdx)
- (B) Vapour phase chromatography (ev'úxq gva'tg †µvqv†UvMØdx)
- (C) Electrolysis (ZwØr we†k†Y)
- (D) None
90. Which one is the iso-electric pH of glycine? [MvBm†bi AvB†mv-B†j KwJK pH †KvbWU ?]
- (A) 6.0 (B) 9.7 (C) 6.1 (D) 2.8
91. Which one can explain metallic bond? [†KvbWU avZe eÜb e'vL'v Ki†Z cv†i ?]
- (A) Fazan's rule (dvhv†bi bwnZ) (B) Band model (e'vÛ g†Wj)
- (C) Keesom's theory (wKR†gi gZev`) (D) None
92. Which is the correct geometrical arrangement for IF_7 ? [wØ†Pi †KvbWU IF₇ Gi Rb'' mwK R'wgvZK web'vm ?]
- (A) Trigonal bipyramidal (w† †KvYxq wØwci wgvW)
- (B) Pentagonal bipyramidal (cÂ†KvYxq wØ-wci wgvW)
- (C) Octahedral (AóZj Kxq)
- (D) None
93. Which of the following is not the example of Dobereiner's Triads? [wØ†Pi †KvbWU †Wvewi bvi †qx Gi D`vniY bq ?]
- (A) Li – Na – K (B) Cl – Br – I (C) Ca – Sr – Ba (D) Mn – Re – Bh
94. The de-Broglie wavelength of a particle having momentum of $3.3 \times 10^{-19} \text{ gcm s}^{-1}$ will be— [3.3×10⁻¹⁹gcm s⁻¹ fi †eM wewkó KYvi wv-emij Zi ½ ^ N©nj Ñ]
- (A) $2 \times 10^{-8} \text{ cm}$ (B) $2 \times 10^{-15} \text{ m}$ (C) 0.5 Å (D) None
95. XeO_2F_2 gets hydrolyzed to—
- (A) XeF_4 (B) XeO_3 (C) $XeOF_2$ (D) XeO_4

105. Which is the characteristic of activated complex compound? [mwwuqZ RvUj thStMi`eukO` tKvbWU ?]
- (A) Activated complex has lower energy than reactant (mwwuqZ RvUjt i kw³ wewuqtki t_tK Kg)
 (B) Activated complex always is in equilibrium with product (mwwuqZ RvUj me^ov Drcvt` i mvt_ mvg`ve`vq_vtK)
 (C) Activated complex is stable (mwwuqZ RvUj `vqx)
 (D) None
106. Which of the following is false? [wbtpi tKvbWU wq_v ?]
- (A) $\Delta G = -nFE$ (B) $E = E_0 - \frac{RT}{nF} \log K_c$
 (C) $E_{\text{cell}} = E_{\text{ox (anode)}} + E_{\text{red (cathode)}}$ (D) None
107. In diamond, How far the two C atom centres stay? [nixiK KveB cigvY0q Gi tK`^kZ `ti Ae`vb Kti ?]
- (A) 0.77Å (B) 1.54Å (C) 1.76Å (D) 0.99Å
108. In Schrodinger's equation, Ψ denotes— [tmWwAvti i mgxKi tY Ψ cKvk Kti N]
- (A) Amplitude (w^{-h}) (B) Energy (kw^3)
 (C) Wave function ($Zi \frac{1}{2} d\text{vskb}$) (D) None
109. All traffic was held _____ for one hour.
- (A) forth (B) up (C) off (D) back
110. Rahul has hopes of success. (Complex)
- (A) Rahul is hopeful of success.
 (B) Rahul is hoping to succeed.
 (C) Rahul hopes and that's why he will succeed.
 (D) Rahul hopes that he will succeed.
111. I got my rice _____ (cook).
- (A) to be cooked (B) have been cooking (C) cooked (D) cook
112. A _____ like you cannot shine in life.
- (A) sleeping partner (B) dark horse (C) Yeoman's service (D) slow coach
113. The correct passive form of –‘A hare and a tortoise ran a race’ is—
- (A) A race was run between a hare and a tortoise.
 (B) A race was ran by a hare and a tortoise.
 (C) A race was ran between a hare and a tortoise.
 (D) A race was run by a hare and a tortoise.
114. The correct indirect speech of— He said, “Alas! How helpless I am” is—
- (A) He told sorrowfully that he was completely helpless.
 (B) He said sadly that he is helpless.
 (C) He exclaimed with sorrow that he was completely helpless.
 (D) None of the above.

115. He was censured _____ his misconduct.

- (A) about (B) on (C) of (D) for

116. Can anyone put up with such conduct? (Affirmative)

- (A) No one can put up with such conduct.
(B) How can one put up with such conduct?
(C) It is not possible to put up with such conduct.
(D) None of the above

117. The correct indirect speech of— My friend said, “Where are you staying next week” is—.

- (A) My friend asked where I was staying next week.
(B) My friend wanted to know where I was staying the following week.
(C) My friend told me that where I am going to stay the following week.
(D) My friend asked that where I am going to stay next week.

118. There are no _____ rules in this matter.

- (A) high and mighty (B) hard and fast
(C) high and dry (D) head and front

119. The correct passive form of ‘Father sent for a doctor’ is—

- (A) The doctor was called for. (B) The doctor was send by father
(C) The doctor was sent for by father. (D) By the father the doctor was called.

120. I would help him if he _____ (want).

- (A) want (B) wants (C) would wanted (D) wanted

01. If $z = \frac{a+ib}{a-ib}$ then prove that $(a^2+b^2)z^2 + (a^2-b^2) = 2(a^2-b^2)z$

[hw` $z = \frac{a+ib}{a-ib}$ nq Zte c`vY Ki th, $(a^2+b^2)z^2 + (a^2-b^2) = 2(a^2-b^2)z$]

02. If the roots of equation $x^2 + px + q = 0$ are α, β then show that the roots of the equation

$qx^2 + p(1+q)x + (1+q)^2 = 0$ are $\alpha + \frac{1}{\beta}$ and $\beta + \frac{1}{\alpha}$ [$x^2 + px + q = 0$ Gi gj 0q α, β n`j t` Lvl

th, $qx^2 + p(1+q)x + (1+q)^2 = 0$ Gi gj $\alpha + \frac{1}{\beta}$ Ges $\beta + \frac{1}{\alpha}$ nte |]

03. If the coefficients of 5th, 6th and 7th term in the expansion of $(1+x)^n$ be in A.P. then find the value of n. [hw` $(1+x)^n$ Gi we`wZtZ 5g, 60 Ges 7g c` i mn, t`j v mgvŠt c`Mgbfj nq Zte n Gi gvb wby` Ki |]

04. $1 + \frac{2^3}{2!} + \frac{3^3}{3!} + \frac{4^3}{4!} + \dots \infty = ?$

05. If in triangle ABC, $\cos A : \cos B = b : a$ where b and a are the opposite side of $\angle B$ and $\angle A$ respectively, then prove that the triangle is equilateral or right angled [h \hat{w} ABC w \hat{i} f \hat{r} i $\cos A : \cos B = b : a$ nq thLv \hat{t} b b l a h \hat{v} μtg $\angle B$ l $\angle A$ tKv \hat{t} Yi weciXZ ev \hat{u} , Z \hat{t} e c \hat{u} vY Ki th, w \hat{i} f \hat{r} iU mgw \hat{u} ev \hat{u} ev mg \hat{t} KvYx |]

06. If $y = \sin px$ and y_n is the nth derivative of y. Then find the value of $\begin{vmatrix} y & y_1 & y_2 \\ y_3 & y_4 & y_5 \\ y_6 & y_7 & y_8 \end{vmatrix}$

[h \hat{w} $y = \sin px$ nq Ges y Gi nth derivative y_n nq, Z \hat{t} e $\begin{vmatrix} y & y_1 & y_2 \\ y_3 & y_4 & y_5 \\ y_6 & y_7 & y_8 \end{vmatrix}$ Gi gv \hat{b} w \hat{b} Y \hat{q} Ki |]

07. $\int (\sqrt{\tan x} + \sqrt{\cot x}) dx$

08. In a class, there are 125 students. 70 passed in Mathematics, 55 in Statistics and 30 in both. What is the probability that a student selected at random from the class who has passed in only one subject? [GKIJ Kijm 125 Rb QvI i tqIQ | 70 Rb MijYZ, 55 Rb cwi msL vtb Ges 30 Rb Dfq vel tq KZKih^h tqIQ | ^` efvte GKRB QvI tK wbePZ Ki tj QvI wI i agvI GKIJ vel tq cik Kivi mtebv KZ ?]

09. The greater mass of the two hung over a smooth pulley is M, whose uniform acceleration is f downwards. How much mass must be removed from M, so that it will now go upward, with the same acceleration? [GKIJ gmY cij i `Bcvtk mZv w tq Sj Š- yU e- i epEi wI fi M, hv f mgZi tY wbgjLx | M nZ wK cwi gvY fi Acwiy Ki tj Gi Zi Y f DaYgJLx nte ?]

13. The length and diameter of the Nicrome filament of an electric heater is 0.5 and 60 μm respectively. The power of the heater is 60W. If the radiation from the heater is 80% of that of the ideal black body, then compute the temperature of the filament (Given $\sigma = 5.7 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$)
 [GKwU ^e` ywZK Pj x+ bvBtμvg w dj vtgU Gi ^` N© 0.5m Ges e`vm 60μm | Pj wU i ¶gZv 60W | Pj wU t_†K weWkiY hw` Av` k©K,òKvqvi 80% nq Zte w dj vtg†U i ZvcgvÎv KZ ? (†` l qv Av†Q, $\sigma = 5.7 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$)]
14. The equations of two progressive waves are $y = \sin 100 \pi t$ and $y = \sin (90\pi t - \frac{\pi x}{3})$. Compute the number of beat generated and wave length of first wave if both the wave have same velocity (All are in SI units). [wU AMWvgx Zi †½i mgxKiY $y = \sin 100\pi t$ Ges $y = \sin(90\pi t - \frac{\pi x}{3})$ | G†` i Øvi v Drcbæx†Ui msL`v Ges cŰg Zi †½i Zi½ ^` N©wbYq Ki, hw` Dfq Zi †½i teM GKB nq | (meKwU i wk SI GK†K cKwkZ)]
15. In a horizontal plane there is a magnetic field of value 5T and an electric field of $6 \times 10^7 \text{ NC}^{-1}$ acting simultaneously by perpendicular to each other. In that plane an electron enters perpendicularly to the magnetic field at the velocity 10^7 ms^{-1} . If the charge of the electron is $1.6 \times 10^{-19} \text{ C}$, then compute the resultant force on the electron [GKwU AbfıgK Z†j GKB mv†_ 5T gv†bi tPŠxK t¶† Ges $6 \times 10^7 \text{ NC}^{-1}$ gv†bi Zwor t¶† ci`úi mg†Kv†Y we`gvb | GB Z†j GKwU B†j KUb 10^7 ms^{-1} te†M tPŠxK t¶†† i mv†_ mg†Kv†Y cœek Kij | B†j KUbwU Avavb $1.6 \times 10^{-19} \text{ C}$ n†j Gi Dci j wä ej KZ ?]

16. Two capacitors of $50 \mu\text{F}$ and $30 \mu\text{F}$ are connected in series against a battery of 12 V . Suddenly the battery is disconnected and those two capacitors are connected parallelly. After equilibrium how much energy will be lost? [$50\mu\text{F}$ | $30\mu\text{F}$ Gi `U avI K 12 V e`vUvi xi weci xZ tkYx mgev tq h β | nVr e`vUvi x L β tdtj avI K `U β K mgvŠ β vtj h β Kiv nj | w`Zve`vq Avm β Z KZ k β b β n β ?]
17. What will be maximum supply voltage for two bulbs $100\text{W}-220\text{V}$ and $60\text{W}-220\text{V}$ connected in series so that no bulb will be damaged? (They can not sustain individually at more than 220V) [$100\text{W}-220\text{V}$ Ges $60\text{W}-220\text{V}$ Gi `U ewZ β K tkYxZ msthM w` tq mte β P KZ tfv β mieivn Kiv th β Z cv β h β Z tKvb ewZ b β n β bv ? (Zviv Avj v`rfv β 220V Gi Av β K wef β K β R K β |)]
18. A body is placed on axis at 12 cm distance of a convex lens of 10 cm focal distance. There is a convex mirror at 10 cm apart on the other side of the lens. The image is concurrent with body. Find the focus of the mirror. [GK β 10 cm tdvKvm ` β Z β D β j tj β Yi A β | Dci H β Y n β Z 12 cm ` β GK β e` Av β | H tj β Yi Aci cv β k tj Y n β Z 10 cm ` β GK β D β j `c β Av β | tj Y | `c β Yi mgevq β viv MwZ c β Z we β e` i m β w β Z n β q β | D β j `c β Yi tdvKvm ` β Z β w β Y β Ki |]

19. (i) The equilibrium constant for $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ is 550 at 700°C temperature. If the primary concentration of each reactant is 2.55 mol L^{-1} , then determine the concentration of reactant and product at equilibrium.

[700°C Zvcgv $\hat{\text{v}}$ q $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ we μ q $\hat{\text{v}}$ l $\hat{\text{v}}$ mvg $\hat{\text{v}}$ a $\hat{\text{e}}$ K 550 | hw $\hat{\text{v}}$ H_2 | I_2 Gi c $\hat{\text{O}}$ Z $\hat{\text{v}}$ †Ki c $\hat{\text{O}}$ i w $\hat{\text{e}}$ K Nbgv $\hat{\text{v}}$ 2.55 mol/L nq, Z $\hat{\text{f}}$ e mvg $\hat{\text{v}}$ e $\hat{\text{v}}$ vq we μ q $\hat{\text{v}}$ K | Drcv $\hat{\text{v}}$ † i Nbgv $\hat{\text{v}}$ v w $\hat{\text{b}}$ Y $\hat{\text{e}}$ Ki |]

- (ii) When 4.5 gm PCl_5 dissociates completely at 250°C , then the volume of the generated steam is 1.7 dm^3 at 100 kPa. Determine k_p and degree of dissociation at this temperature.

[250°C Zvcgv $\hat{\text{v}}$ q 4.5 gm PCl_5 m $\hat{\text{a}}$ úY $\hat{\text{f}}$ †c we $\hat{\text{t}}$ qv $\hat{\text{v}}$ RZ n $\hat{\text{t}}$ j 100 kPa Pv $\hat{\text{t}}$ c D $\hat{\text{m}}$ Z ev $\hat{\text{t}}$ úi AvqZb 1.7 dm^3 nq | GB Zvcgv $\hat{\text{v}}$ q we $\hat{\text{t}}$ qv $\hat{\text{v}}$ Rb gv $\hat{\text{v}}$ | k_p w $\hat{\text{b}}$ Y $\hat{\text{e}}$ Ki |]

20. (i) At 15°C and 770 mm Hg 100cc H_2 , 50 cc N_2 and 50 cc O_2 are mixed in a container of 250cc. At 20°C , what is the pressure of mixture? [15°C Zvcgv $\hat{\text{v}}$ q | 770mm Hg Pv $\hat{\text{t}}$ c 100cc H_2 , 50 cc N_2 Ges 50cc O_2 †K GK $\hat{\text{v}}$ 250 cc cv $\hat{\text{t}}$ † w $\hat{\text{g}}$ kv $\hat{\text{t}}$ bv nj | 20°C Zvcgv $\hat{\text{v}}$ q H w $\hat{\text{g}}$ k $\hat{\text{t}}$ Yi Pv $\hat{\text{c}}$ KZ ?]

- (ii) The E_{cell}° for the cell reaction: $\text{Cu} + 2\text{Ag}^+ \rightleftharpoons \text{Cu}^{2+} + 2\text{Ag}$ is 0.46V. What is its equilibrium constant? [$\text{Cu} + 2\text{Ag}^+ \rightleftharpoons \text{Cu}^{2+} + 2\text{Ag}$ †K $\hat{\text{v}}$ l we μ qv $\hat{\text{v}}$ Rb $\hat{\text{v}}$ E_{cell}° Gi gvb 0.46V | mvg $\hat{\text{v}}$ a $\hat{\text{e}}$ †Ki gvb KZ ?]

21. According to Vand Hoff's process develop a equation which expresses the relation between order of reaction and primary concentration for the reaction which has order of reaction 'n'. And also show the graph. What is the problem of this process? ['n' μ †gi GK $\hat{\text{v}}$ we μ qv $\hat{\text{v}}$ Rb $\hat{\text{v}}$ f $\hat{\text{v}}$ Un $\hat{\text{t}}$ di c $\hat{\text{x}}$ w $\hat{\text{z}}$ †Z GK $\hat{\text{v}}$ mgxKiY c $\hat{\text{O}}$ Z $\hat{\text{O}}$ v Ki hv we μ qv $\hat{\text{v}}$ μ g | c $\hat{\text{O}}$ w $\hat{\text{g}}$ K Nbgv $\hat{\text{v}}$ vi m $\hat{\text{a}}$ úK $\hat{\text{v}}$ † $\hat{\text{v}}$ R K $\hat{\text{t}}$ i Ges Gi M $\hat{\text{O}}$ d Av $\hat{\text{K}}$ | GB c $\hat{\text{x}}$ w $\hat{\text{z}}$ i Am $\hat{\text{y}}$ ea $\hat{\text{v}}$ w $\hat{\text{K}}$?]

Read the following passage and answer the question numbers 28–30 that follow:

One question of active interest to historians is why the **industrial revolution** occurred in Europe and not in other parts of the world in the 18th century, particularly China, India, and the Middle East, or at other times like in Classical Antiquity or the Middle Ages. Numerous factors have been suggested, including ecology, government, and culture. However, most historians contest the assertion that Europe and China were roughly equal because modern estimates of per capita income on Western Europe in the late 18th century are of roughly 1,500 dollars in purchasing power parity (and Britain had a per capita income of nearly 2,000 dollars) whereas China, by comparison, had only 450 dollars. Also, the average interest rate was about 5% in Britain and over 30% in China, which illustrates how capital was much more abundant in Britain. Some historians such as David Landes and Max Weber credit the different belief systems in China and Europe with dictating where the revolution occurred. The religion and beliefs of Europe were largely products of Judaeo-Christianity, and Greek thought. Conversely, Chinese society was founded on men like Confucius, Mencius, Han Feizi (Legalism), Lao Tzu (Taoism), and Buddha (Buddhism). Whereas the Europeans believed that the universe was governed by rational and eternal laws, the East, believed that the universe was in constant flux and, for Buddhists and Taoists, not capable of being rationally understood.

28. (i) Indic, whether the following statements are true or false. If false, give the correct information.

- (A) During **ate** mid 18th century Britain had a per capita income of nearly 2,000 dollars.
- (B) According to Taoists it is possible to understand the universe logically.
- (C) Europe was influenced by Greek beliefs during industrial revolution.
- (D) Industrial revolution took place in Europe in Middle Ages.
- (E) The average interest rate was more in China than Britain.

(ii) Fill in the blanks with appropriate words from the given passage.

- (A) _____ was the religious belief of Europe during the period industrial revolution.
- (B) _____ is the founder of Legalism.
- (C) _____ believed that the universe was in continuous fluctuation.
- (D) Taoism was established by _____.
- (E) According to _____ and _____ different religious beliefs dictated where the revolution would occur.

29. Fill in the gaps with right forms of verb.

- (A) Fifty miles _____ (be) long way.
- (B) He talks as if he _____ (be) a leader.
- (C) He _____ (reach) Dhaka by now.
- (D) You had better _____ (go) home.
- (E) Have you ever _____ to Dhaka?

30. Change the following direct speeches to indirect speeches .

- (A) The boy said to the teacher, "Let me go home".
- (B) He said to me, "Please lend me some money".
- (C) The boy said, "Could I but get that reward".
- (D) I said to my son, "Don't eat this".
- (E) He said to his friend, "I live here in Dhaka".

ivd