# SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR EAMCET
Time:

**DPP-26**

Date: 13-05-2020

## MATHS - A

**SYLLABUS : Probability Upto Addition Theorem**

1. A fair coin is tossed 100 times. The probability of getting tails an odd number of times is

   1) $\frac{1}{2}$ 2) $\frac{1}{8}$ 3) $\frac{3}{4}$ 4) $\frac{1}{6}$

2. An unbiased die with faces marked 1, 2, 3, 4, 5 & 6 is rolled 4-times. Out of 4 face values obtained, the probability that the minimum face value is not less than two and the maximum face value is not greater than 5 is

   1) $\frac{16}{81}$ 2) $\frac{1}{81}$ 3) $\frac{80}{81}$ 4) $\frac{65}{81}$

3. 15 persons among whom are A & B, sit down at random at a round table, the probability that there are 4 persons between A & B is

   1) $\frac{2}{17}$ 2) $\frac{1}{7}$ 3) $\frac{1}{2}$ 4) $\frac{1}{8}$

4. The probabilities of two events are 0.25 and 0.50. The total probability of both happening together is 0.14. Which of the following is the probability of none of the events happening?

   1) 0.39 2) 0.25 3) 0.11 4) none of these

5. If $P(A)=\frac{2}{3}, P(B)=\frac{1}{2}$ and $P(A\cup B)=\frac{5}{6}$, then the events A and B are

   1) mutually exclusive 2) independent
   3) independent as well as mutually exclusive 4) none of these

6. A fair coin is tossed n times. If the probabilities of getting 4, 5, 6 heads be in A.P, then n is equal to

   1) 12 2) 8 3) 15 4) 14

7. The probability that a rectangle picked up from a chessboard has the area $6cm^2$ where the distance between consecutive parallel lines on the board is 1 cm, is

   1) $\frac{3}{56}$ 2) $\frac{3}{28}$ 3) $\frac{9}{56}$ 4) $\frac{3}{28}$

8. The probability that in a year chosen at random there will be 53 Sunday is

   1) $\frac{1}{4}$ 2) $\frac{5}{28}$ 3) $\frac{1}{7}$ 4) $\frac{1}{2}$

9. In the quadratic equation $ax^2+bx+c=0$ the coefficients a, b, c take distinct values from the set {1, 2, 3}. The probability that roots of equation are real is

   1) $\frac{2}{3}$ 2) $\frac{1}{3}$ 3) $\frac{1}{4}$ 4) $\frac{1}{2}$

10. A set 'A' has n elements, let P be the power set of A i.e. set of subsets of A, one set is selected at random from A, the probability that it has two elements is

    1) $\frac{1}{2}$ 2) $\frac{1}{2^{n-1}}$ 3) $\frac{n(n-1)}{2^{n+1}}$ 4) 0

11. Two distinct digits are chosen at random from the set {1, 2, 3, ……., 8}. The probability of their sum being equal to 5 is

    1) $\frac{1}{14}$ 2) $\frac{3}{28}$ 3) $\frac{5}{8}$ 4) $\frac{1}{4}$

12. A and B stand in a line at random with 10 other people, the chance that there will be 3 people between them is

1) $\frac{2}{33}$ 2) $\frac{2}{99}$ 3) $\frac{4}{33}$ 4) $\frac{1}{33}$

13. Six boys and six girls sit in a row at random, then the probability that six girls sit together is

1) $\frac{1}{66}$ 2) $\frac{1}{132}$ 3) $\frac{1}{462}$ 4) $\frac{1}{32}$

14. A team of 12 married couples attend a party at which five persons are chosen for a prize. The chance that the selected persons are of the same sex is

1) $\frac{2\cdot {}^{12}C_5}{{}^{24}C_5}$ 2) $\frac{{}^{12}C_5}{{}^{24}C_5}$ 3) $\frac{1}{2}$ 4) $\frac{3\cdot {}^{12}C_5}{{}^{24}C_5}$

15. One boy can solve 60% of the problems in a book and another can solve 80%. The probability that at least one of the two can solve a problem chosen at random from the book is

1) $\frac{2}{25}$ 2) $\frac{23}{25}$ 3) $\frac{4}{5}$ 4) $\frac{9}{10}$

16. Three dice are rolled. The probability that different numbers will appear on them is

1) $\frac{2}{3}$ 2) $\frac{4}{9}$ 3) $\frac{5}{9}$ 4) $\frac{2}{9}$

17. From a pack of 52 cards two cards are drawn at random, the probability that both cards are diamonds is

1) $\frac{1}{16}$ 2) $\frac{1}{17}$ 3) $\frac{1}{18}$ 4) $\frac{1}{19}$

18. Twenty-five coins are tossed simultaneously. The probability that the fifth coin will fall with head upwards, is

1) $\frac{5}{25}$ 2) $\frac{5}{2^{25}}$ 3) $\frac{1}{2}$ 4) $\frac{1}{4}$

19. If two squares are chosen at random on a chess board, the probability that they have a side in common is

1) $\frac{1}{9}$ 2) $\frac{4}{9}$ 3) $\frac{3}{7}$ 4) $\frac{1}{18}$

20. A number of six digits is written down at random. Probability that sum of digits of the number is even is

1) $\frac{1}{2}$ 2) $\frac{3}{8}$ 3) $\frac{3}{7}$ 4) $\frac{1}{4}$

## MATHS – B

**SYLLABUS: Indefinite Integral From Ex : 6.4 to end**

**21.** $\int e^x\left(\frac{x^4+x^2+1}{x^2+x+1}\right)dx =$

1) $e^x\left(x^4+x^2+1\right)+c$ 2) $e^x\left(x^2+x+1\right)+c$ 3) $e^x\left(x^2-3x+4\right)+c$ 4) $e^x\left(x^2-4x+5\right)+c$

**22.** $\int\left(\frac{f(x)g'(x)-f'(x)g(x)}{f(x)g(x)}\right).\left[\log(g(x))-\log\left[f(x)\right]\right]dx =$

1) $\log\frac{g(x)}{f(x)}+c$ 2) $\frac{1}{2}\left(\log\frac{g(x)}{f(x)}\right)^2+c$ 3) $\frac{g(x)}{f(x)}\log\left(\frac{g(x)}{fe(x)}\right)+c$ 4) $\frac{f(x)}{g(x)}\log\left(\frac{g(x)}{fe(x)}\right)+c$

**23.** $\int \tan^4 x\,dx =$ ____

1) $\frac{1}{3}\tan^3 x+\tan x-x+c$
2) $\tan^3 x-\frac{1}{3}\tan x+x+c$
3) $\frac{1}{3}\tan^3 x-\tan x+x+c$
4) $\tan^3 x+\tan x+x+c$

**24.** **If** $I_n=\int\frac{t^n}{1+t^2}dt$ then $I_6+I_4=$

1) $\frac{t^5}{5}$
2) $\frac{t^7}{7}$
3) $\frac{t^6}{6}$
4) $\frac{t^6}{6}$

**25.** $I_n=\int\frac{\cos nx}{\cos x}dx$ then $I_n=$

1) $-\frac{2}{(n-1)}\cos(n-1)x+I_{n-2}$
2) $\frac{2}{(n-1)}\cos(n-1)x+I_{n-2}$
3) $\frac{2}{(n-1)}\sin(n-1)x-I_{n-2}$
4) $-\frac{2}{(n-1)}\sin(n-1)x-I_{n-2}$

**26.** **The anti derivative** $f(x)=1+2^x\log 2$ is g(x) and curve y = g(x) passes though $\left(-1,\frac{1}{2}\right)$ then the curve y = g(x) meets the y – axis at

1) $(0,-2)$
2) $(0,-1)$
3) $(0,2)$
4) $(1,0)$

**27.** $\int\frac{d^2}{dx^2}\left(\tan^{-1}x\right)dx=$

1) $\frac{1}{1+x^2}+c$
2) $\tan^{-1}x+c$
3) $x\tan^{-1}x-\frac{1}{2}\log\left(1+x^2\right)$
4) $\frac{1}{\sqrt{1+x^2}}+c$

**28.** $\int\log(2-3x)dx=$

1) $\left(x-\frac{2}{3}\right)\log|2-3x|-x+c$
2) $(x-2)\log|2-3x|+3x+c$
3) $\frac{1}{3}(x-2)\log|2-3x|-3x+c$
4) $\frac{1}{3}(x-2)\log|2-3x|-3x+c$

**29.** **The integral** $\int x\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)dx\,(x>0)$, is equal to

1) $-x+\left(1+x^2\right)\tan^{-1}x+c$
2) $x-\left(1+x^2\right)\cot^{-1}x+c$
3) $-x+\left(1+x^2\right)\cot^{-1}x+c$
4) $x-\left(1+x^2\right)\cot^{-1}x+c$

**30.** **The integral** $\int\left[1+x-\frac{1}{x}\right]e^{x+\frac{1}{x}}dx$ is equal to

1) $(x+1)e^{x+\frac{1}{x}}+c$
2) $-xe^{x+\frac{1}{x}}+c$
3) $(x-1)e^{x+\frac{1}{x}}+c$
4) $x.e^{x+\frac{1}{x}}+c$

**31.** $\int\sin^5 x.\cos^{100}x\,dx=$

**1)** $\frac{\cos^{105}x}{105}+2\frac{\cos^{103}x}{103}+\frac{\cos^{101}x}{101}+c$
**2)** $-\frac{\cos^{105}x}{105}+2\frac{\cos^{103}x}{103}-\frac{\cos^{101}x}{101}+c$
**3)** $-\frac{\cos^{105}x}{105}-2\frac{\cos^{103}x}{103}+\frac{\cos^{101}x}{101}+c$
**4)** $\frac{\cos^{105}x}{105}-2\frac{\cos^{103}x}{103}+\frac{\cos^{101}x}{101}+c$

**32.** $\int \sqrt{\cos x}.\sin^3 x.dx$

**1)** $-\frac{2}{3}\cos^{3/2} x + \frac{2}{7}\cos^{7/2} x + c$ **2)** $\frac{2}{3}\cos^{3/2} x + \frac{2}{7}\cos^{7/2} x + c$

**3)** $\frac{1}{3}\cos^{3/2} x - \frac{2}{7}\cos^{7/2} x + c$ **4)** $\frac{1}{3}\cos^{3/2} x + \frac{2}{7}\cos^{7/2} x + c$

**33.** $\int e^x \left[\frac{x+4}{(x+6)^3}\right] dx =$

**1)** $\frac{e^x}{(x+6)^2} + c$ **2)** $e^x \frac{1}{(x+4)^2} + c$ **3)** $e^x \frac{x}{x+6} + c$ **4)** $e^x \frac{4}{(x+6)^2} + c$

**34.** $\int \sec^3 x\, dx =$

**1)** $\frac{1}{3}\sec^3 x - x + c$ **2)** $\frac{1}{2}\sec^2 x \tan x + x + c$

**3)** $\frac{1}{2}\tan x \sec x + \frac{1}{2}\log|\sec x + \tan x| + c$ **4)** $-\frac{1}{2}\tan x \sec x + \frac{1}{2}\log|\sec x + \tan x| + c$

**35.** $\int x^3 (\log x)^2 dx =$

**1)** $\frac{x^4}{4}\left[(\log x)^2 - \frac{\log x}{2} + \frac{1}{8}\right] + c$ **2)** $\frac{x^4}{4}\left[(\log x)^2 + \frac{\log x}{2} + \frac{1}{8}\right] + c$

**3)** $(\log x)^2 + 2\log x + 8 + c$ **4)** $\frac{x^4}{4}\left[(\log x)^2 - \frac{\log x}{2} - \frac{1}{8}\right] + c$

**36.** $\int xe^x dx =$

**1)** $xe^x + c$ **2)** $e^x(x-1) + c$ **3)** $e^x(x+1) + c$ **4)** $e^x(x+2) + c$

**37.** $\int \left(\frac{1}{\log x} - \frac{1}{(\log x)^2}\right) dx =$

**1)** $x \log x + c$ **2)** $\frac{x}{\log x} + c$ **3)** $x(\log x)^2 + c$ **4)** $\frac{x}{(\log x)^2} + c$

**38.** $\int \left(\frac{x}{2}\sec^2 \frac{x}{2} + \tan \frac{x}{2}\right) dx =$

**1)** $x \sec \frac{x}{2} + c$ **2)** $x \tan \frac{x}{2} + c$ **3)** $\sec \frac{x}{2} + \tan \frac{x}{2} + c$ **4)** $2x \tan \frac{x}{2} + c$

**39.** $\int \frac{e^x(1+\sin x)}{1+\cos x} dx =$

**1)** $e^x \tan x + c$ **2)** $e^x \sec^2 \frac{x}{2} + c$ **3)** $e^x \tan \frac{x}{2} + c$ **4)** $\frac{1}{2} e^x \tan \frac{x}{2} + c$

**40.** $\int \cos \sqrt{x}\, dx =$

**1)** $2\left(\sqrt{x}\sin\sqrt{x} + \cos\sqrt{x}\right) + c$ **2)** $2\left(\sqrt{x}\sin\sqrt{x} - \cos\sqrt{x}\right) + c$

**3)** $2\left(\sqrt{x}\cos\sqrt{x} + \sin\sqrt{x}\right) + c$ **4)** $2\left(\sqrt{x}\cos\sqrt{x} - \sin\sqrt{x}\right) + c$

## PHYSICS

**SYLLABUS: Electro Magnetic Waves , Communication systems**

**41.** **The voltage between the plates of a parallel plate condenser of capacity $2.0\mu F$ is charging at a rate of $10Vs^{-1}$. The displacement current is**

1) 2 mA 2) $2\mu A$ 3) $20\mu A$ 4) 2A

**42. A condenser has two conducting plates of radius 10cm separated by a distance of 5mm. It is charged with a constant current of 1.15A. The magnetic field at a point 2cm from the axis in the gap is**

1) $6\times10^{-8}T$ 2) $3\times10^{-8}T$ 3) $6\times10^{-6}T$ 4) $3\times10^{-6}T$

**43. Light with energy flux of $18\,Wcm^{-2}$ falls on a non reflecting surface of area $20\,cm^2$ at normal incidence the momemtum delivered in 30 minutes is**

1) $1.2\times10^{-6}kgms^{-1}$ 2) $2.16\times10^{-3}kgms^{-1}$ 3) $1.8\times10^{-3}kgms^{-1}$ 4) $3.2\times10^{-3}kgms^{-1}$

**44. A condenser is charged using a constant current. The ratio of the magnetic fields at a distance of $\frac{R}{2}$ and R from the axis is ( R is the radius of plate )**

1) 1 : 1 2) 2 : 1 3) 1 : 2 4) 1 : 4

**45. The intensity of electromagnetic wave at a distance of 1km from a source of power 12.56 KW is**

1) $10^{-3}Wm^{-2}$ 2) $4\times10^{-3}Wm^{-2}$ 3) $12.56\times10^{-3}Wm^{-2}$ 4) $1.256\times10^{-3}Wm^{-2}$

**46. A plane electromagnetic wave travels in free space along the X-direction. The electric field component of the wave at a particular point of space and time is $E=6Vm^{-1}$ along Y direction. Its corresponding magnetic field component, B would be**

1) $2\times10^{-8}T$ along Z-direction 2) $6\times10^{-8}T$ along X-direction
3) $6\times10^{-8}T$ along Z-direction 4) $2\times10^{-8}T$ along Y-direction

**47. $50Wm^{-2}$ energy density is normally incident on the surface of a solar panel. Some part of incident energy ( 25%) is reflected from the surface and the rest is absorbed. The force exerted on $1\,m^2$ surface area will be close to $\left(C=3\times10^8ms^{-1}\right)$**

1) $35\times10^{-8}N$ 2) $20\times10^{-8}N$ 3) $10\times10^{-8}N$ 4) $15\times10^{-8}N$

**48. Light is incident normally on a completely absorbing surface with an energy flux of $25Wcm^{-2}$. If the surface has an area of $25cm^{-2}$ the momentum transferred to the surface in 40 minutes time duration will be**

1) $5\times10^{-3}NS$ 2) $3.5\times10^{-6}NS$ 3) $6.3\times10^{-4}NS$ 4) $1.4\times10^{-6}NS$

**49. A plane electromagnetic wave of wave length $\lambda$ has an intensity I. It is propagating along the positive Y-direction. The allowed expressions for the electric and magnetic fields are given by**

1) $\vec{E}=\sqrt{\frac{2I}{\in_0 C}}\cos\left(\frac{2\pi}{\lambda}(Y-Ct)\right)\hat{k},\ \vec{B}=\frac{1}{C}E\hat{i}$ 2) $\vec{E}=\sqrt{\frac{I}{\in_0 C}}\cos\left(\frac{2\pi}{\lambda}(Y-Ct)\right)\hat{k},\ \vec{B}=\frac{1}{C}E\hat{i}$

3) $\vec{E}=\sqrt{\frac{2I}{\in_0 C}}\cos\left(\frac{2\pi}{\lambda}(Y-Ct)\right)\hat{k},\ \vec{B}=\frac{1}{C}E\hat{k}$ 4) $\vec{E}=\sqrt{\frac{I}{\in_0 C}}\cos\left(\frac{2\pi}{\lambda}(Y-Ct)\right)\hat{k},\ \vec{B}=\frac{1}{C}E\hat{k}$

**50. A light wave incident normally on a glass slab of refractive index 1.5. If 4% of light gets reflected and the amplitude of the electric field of the incident light is $30\,Vm^{-1}$ then the amplitude of the electric field for the wave propagating in the glass medium will be**

1) $10\,Vm^{-1}$ 2) $6\,Vm^{-1}$ 3) $24\,Vm^{-1}$ 4) $30\,Vm^{-1}$

**51. An electromagnetic wave of frequency $1\times10^{14}hertZ$ is propagating along Z-axis, the amplitude of electric field is $4\,Vm^{-1}$. If $\in_0=8.8\times10^{-12}C^2N^{-1}m^{-2}$, then average energy density of electric field will be**

1) $35.2\times10^{-10}Jm^{-3}$ 2) $35.2\times10^{-11}Jm^{-3}$ 3) $35.2\times10^{-12}Jm^{-3}$ 4) $35.2\times10^{-13}Jm^{-3}$

**52. A metal sample carrying a current along X-axis with density $J_x$ is subjected to a magnetic field $B_z$ ( along Z-axis ). The electric field $E_y$ developed along Y-axis is directly proportional to $J_z$ as well as $B_z$. The constant of proportionality has SI unit**

1) $\frac{m^2}{A}$ 2) $\frac{m^3}{AS}$ 3) $\frac{m^2}{AS}$ 4) $\frac{AS}{m^3}$

**53. Select the correct statement from the following :**

**1) electromagnetic waves cannot travel in vacuum**

**2) electromagnetic waves are longitudinal waves**

**3) electromagnetic waves are produced by charge moving with uniform velocity**

**4) electromagnetic waves carry both energy and momentum as they propagate through space**

**54. Photons of an electromagnetic radiation has an energy 11KeV each. To which region of electromagnetic spectrum does it belong**

1) infra red region 2) X-ray region 3) visible region 4) ultraviolet region

**55. A parallel plate condenser has two circular metal plates of radius 10 cm separated by certain distance. The condenser is being charged with a variable electric field at the rate of** $5\times10^{13}Vm^{-1}s^{-1}$**. The displacement current is ( in A )**

**1) 0.139 2) 2.139 3) 1.39 4) 2.39**

**56. The intensity of solar radiation at the earth's surface is** $1\,KWm^{-2}$**. The power entering the pupil of an eye of diameter 0.5 cm is ( in mW )**

**1) 19.6 2) 19 3) 18.6 4) 18**

**57. A carrier wave of 1000KHz is used to carry the signal, the length of the transmitting antenna will be equal to**

**1) 3m 2) 30m 3) 300m 4) 3000m**

**58. When signal amplitude is equal to the carrier wave amplitude, then the modulation factor is**

**1) 2 2) 1 3) 1/2 4) 1/4**

**59. The height of transmitting antenna if the TV telecast is to cover a radius of 128Km is**

**1) 1560m 2) 1280m 3) 1050m 4) 1280 km**

**60. The carrier frequency generated by a tank circuit containing 1nF capacitor and** $10\mu H$ **inductor is**

**1) 1592Hz 2) 1592 M Hz 3) 1592 KHz 4) 159.2Hz**

## CHEMISTRY

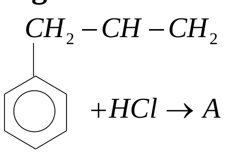
**SYLLABUS : Halo alkanes, Halo arenes**

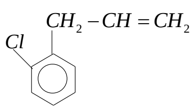
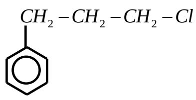
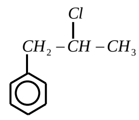
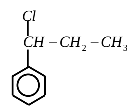
**61. Which reagent will you use for the following reaction?**

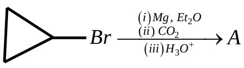
$$CH_3-CH_2-CH_2-CH_3 \rightarrow CH_3-CH_2-CH_2-CH_2Cl + CH_3-CH_3-CH_2-\overset{Cl}{\overset{|}{C}}H-CH_3$$

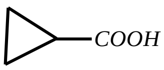
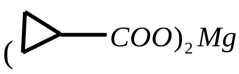
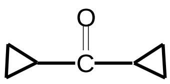
1) $Cl_2/uv$ light 2) $NaCl+H_2SO_4$ 3) $Cl_2$ gas in dark 4) $Cl_2$ gas in presence of Iron

**62. What is 'A' in the following reaction?**



1) 
2) 
3) 
4) 

**63. For the following reaction**  **, then what is A?**

1) 
2) 
3) 
4) 

**64. Reaction of t-butyl bromide with sodium methoxide produces**

1) Isobutane 2) Isobutylene 3) Sodium-t-butoxide 4) t-butyl methyl ether

**65.** $2CHCl_3+O_2 \xrightarrow{X} 2COCl_2+2HCl$ **. In the above reaction, X stands for**

1) An oxidant 2) A reductant 3) light and air 4) Both 1 & 2

**66.** **Ethyl iodide when heated with silver nitrate, the product obtained is**
1) $C_2H_5Ag$ 2) $Ag-O-NO_2$ 3) $C_2H_5-O-NO_2$ 4) $C_2H_5-I-NO_2$

**67.** **The hydrolysis of 2-bromo-3-methyl butane by $SN^1$ mechanism gives mainly**
1) 3-methyl-2-butanol 2) 2-methyl-2-butanol 3) 2,2-dimethyl-2-propanol 4) 2-methyl-1-butanol

**68.** **Reaction of methyl bromide with aqueous sodiumhydroxide involves**
1) Reacemization 2) $SN^1$ mechanism 3) carbocation formation 4) $SN^2$ mechanism

**69.** **When $CH_3CH_2CHCl_2$ is treated with $NaNH_2$, the product formed is**
1) $CH_3-CH=CH_2$ 2) $CH_3-C\equiv CH$ 3) $CH_3CH_2CH(NH_2)(Cl)$ 4) $CH_3CH_2C(NH_3)_2$

**70.** **$C_6H_6Cl_6$, on treatment with alcoholic $KOH$, yields**
1) $C_6H_6$ 2) $C_6H_3Cl_3$ 3) $C_6H_5OH$ 4) $C_6H_6Cl_4$

**71.** **The number of chiral compounds which are possible on monochlorination of 2-methyl butane is**
**1) 1** **2) 2** **3) 3** **4) 4**

**72.** **$-OH$ can be replaced by $-Cl$ if we use**
1) $PCl_5$ 2) $PCl_3$ 3) $SOCl_2$ 4) All

**73.** $C_2H_5Cl \xrightarrow{alc.\,KCN} X\,(major\ product) + Y\,(\min or\ product)$**, X and Y are _____ isomers**
1) positional 2) functional 3) optical 4) metamers

**74.** **The alkyl halide is converted into an alcohol by**
1) addition 2) substitution 3) elimination 4) Dehydrohalogenation

**75.** **The absolute configuration of a molecule changes during the reaction**
1) $SN^1$ 2) $SN^2$ 3) free radical substitution 4) $SE^2$

**76.** **Freon R-22 is**
1) $CHClF_2$ 2) $CCl_2F_2$ 3) $CH_3Cl$ 4) $CH_2Cl_2$

**77.** **Ethyl chloride reacts with sodium metal in presence of dry ether and forms**
1) Isobutane 2) n-butane 3) Neopentane 4) $3^0$-butyl chloride

**78.** **During chlorination of benzene using $Cl_2$ in the presence of $FeCl_3$ the attacking species is**
1) $Cl^-$ 2) $Cl^+$ 3) $Cl_2$ 4) $FeCl_4^-$

**79.** **$C-X$ bond is strongest in**
1) $CH_3Cl$ 2) $CH_3Br$ 3) $CH_3F$ 4) $CH_3I$

**80.** **$CCl_4$ is used as fire extinguisher because of**
1) high Melting point 2) due to covalent bond
3) low boiling point 4) gives incombustible vapour

# KEY SHEET

## MATHS-A

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1) **1** | 2) **1** | 3) **4** | 4) **1** | 5) **2** | 6) **4** | 7) **4** | 8) **2** | 9) **4** | 10) **3** |
| 11) **1** | 12) **3** | 13) **2** | 14) **1** | 15) **2** | 16) **3** | 17) **2** | 18) **3** | 19) **4** | 20) **1** |

## MATHS-B

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21) **3** | 22) **2** | 23) **3** | 24) **1** | 25) **3** | 26) **3** | 27) **1** | 28) **1** | 29) **1** | 30) **4** |
| 31) **2** | 32) **1** | 33) **1** | 34) **3** | 35) **1** | 36) **2** | 37) **2** | 38) **2** | 39) **3** | 40) **1** |

## PHYSICS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 41) **3** | 42) **1** | 43) **2** | 44) **3** | 45) **1** | 46) **1** | 47) **2** | 48) **1** | 49) **1** | 50) **3** |
| 51) **3** | 52) **2** | 53) **4** | 54) **2** | 55) **1** | 56) **1** | 57) **3** | 58) **1** | 59) **2** | 60) **1** |

## CHEMISTRY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 61) **1** | 62) **3** | 63) **1** | 64) **2** | 65) **3** | 66) **3** | 67) **2** | 68) **4** | 69) **2** | 70) **2** |
| 71) **2** | 72) **4** | 73) **2** | 74) **2** | 75) **2** | 76) **2** | 77) **2** | 78) **2** | 79) **3** | 80) **4** |

## HINTS & SOLUTIONS

## MATHS-A

1. As in half cases we get tail add number of times

   $\therefore$ Required probability $= \frac{1}{2}$

2. We have four favorable choice (2, 3, 4, 5)

   $\therefore$ Required probability $\frac{4^4}{6^4} = \frac{16}{81}$

3. We can select 4 person out of 15 in ${}^{15}C_4$ let us now tide four person and A, B, together we can arrange them around a table in $\underline{|15-6+1-1} = \underline{|9}$ ways.

   Four person can arranged them solve in $\underline{|4}$ ways and A and B van arranged in $\underline{|2}$ ways together

   $\therefore$ Required ways $= {}^{15}C_4 \underline{|9}\,\underline{|4}\,\underline{|2} = \frac{{}^{15}C_4 \underline{|9}\,\underline{|4}\,\underline{|2}}{\underline{|15-1}} \quad \frac{15\times14\times12\times13}{\underline{|4}} \times \frac{\underline{|9}\,\underline{|4}\,\underline{|2}}{10\times11\times\underline{|14}} = \frac{3}{11}$

4. Let P(A) = .25 and P(B) = .50 and P(A $\cap$ B) = .25 + .50 - .14 = .61

   Now P(A' $\cap$ B') = 1 – P(A $\cup$ B)= 0.39

5. $P(A \cap B) = \frac{2}{3} + \frac{1}{2} - \frac{5}{6} = \frac{1}{3} = P(A)P(B)$

   $\therefore$ A and B are independent event

6. $P(4H) = {}^{n}C_4 \left(\frac{1}{2}\right)^n$

   $P(5H) = {}^{n}C_5 \left(\frac{1}{2}\right)^n$

$P(6H) = {}^nC_6 = \left(\frac{1}{2}\right)^n$

Now as P(4H), P(5H) and P(6H) are in A.P.

$\Rightarrow\ 2\,{}^nC_5 = {}^nC_4 + {}^nC_6$

$$\frac{2n(n-1)(n-2)(n-3)(n-4)}{20} = \frac{n(n-1)(n-2)(n-3)}{24} + \frac{n(n-1).....(n-5)}{720}$$

12(n – 4) = 30 + (n – 4) (n – 5)

$n^2 - 9n + 50 = 12n - 48$

$n^2 - 21n + 98 = 0$

(n – 14) (n – 7) = 0

n = 7 or 14

7. Rectangle of dimension $(1\times 6) = {}^8C_1 \times {}^{(8-6+1)}C_1 = 24$

Rectangle of dimension $(2\times 3) = {}^{(8-2+1)}C_1\ {}^{(8-3+1)}C_1 = 42$

$\therefore$ Total number of rectangle of 65cm 2 × 66 = 132

$\therefore$ Total number of rectangle $= {}^9C_2\ {}^9C_2$

$\therefore$ Required probability $= \frac{132\times 4}{9\times 8\times 9\times 8} = \frac{11}{108}$

8. Case –I If it is leap year, probability $= \frac{2}{7}$

Case –II If it is not year probability $= \frac{1}{7}$

$\therefore$ Required probability $= \frac{3}{4}\times\frac{1}{7} + \frac{1}{4}\times\frac{2}{7} = \frac{5}{28}$

9. For value $b^2 \ge 4ac$ or $\left(\frac{b}{2}\right)^2 \ge ac$

$\therefore$ Required probability $= \frac{4}{27}$

10. Total number of subset of $A = 2^n$

Total number of two element set $= {}^nC_2$

$\therefore$ Required probability $= \frac{{}^nC_2}{2^n} = \frac{n(n-1)}{2^{n+1}}$

11. The set of tow digit number can be (1, 4), (2, 3), (3, 2), (4, 1)

$\therefore$ Required probability $= \frac{4}{\left(2\cdot{}^8C_2\right)} = \frac{4\times 2}{8\times 7\times 2} = \frac{1}{2.7} = \frac{1}{14}$

12. 3 people can be select out of 10 in ${}^{10}C_3$ ways. Now letus lie A and B will 3 peoples they can arrange in $\lfloor 12-5+1 = \lfloor 8$ ways three peoples can arranged them solve in $\lfloor 3$ ways and A and B can arranged in $\lfloor 2$ ways

$\therefore$ Required ways $= {}^{10}C_3 \lfloor 8\ \lfloor 3\ \lfloor 2$

$\therefore$ Required probability $= \frac{10\times 8\times 9\lfloor 8\times 6\times 2}{12\times 11\times 10\times 9\lfloor 12\times 6} = \frac{4}{33}$

13. Required ways $= \lfloor 12-6+1 \cdot \lfloor 6 = \lfloor 7 \lfloor 6$

$\therefore$ Required probability $= \frac{\lfloor 7\ 6\times 5\times 4\times 3\times 2\times 1}{\lfloor 12\ 8\times 9\times 10\times 11\times 12} = \frac{1}{132}$

14. Required probability $= \frac{2\cdot{}^{12}C_5}{{}^{24}C_5}$

15. Let the boy be A and B

Given $P(A)=\frac{6}{10}=\frac{3}{5}$

$P(B)=\frac{8}{10}=\frac{4}{5}$

$\therefore$ Required probability $P(A\cap\bar{B})+P(B\cap\bar{A})+P(A\cap B)$

$=\frac{3}{5}\times\frac{1}{5}+\frac{4}{5}\times\frac{2}{5}+\frac{3}{5}\times\frac{4}{5}=\frac{23}{25}$

16. These distinct no. can be chooses in ${}^6C_3$ ways image no. can be arranged in $\lfloor 3$ ways.

$\therefore$ Required probability $=\frac{{}^6C_3\lfloor 3}{6\times6\times6}=\frac{5}{9}$

17. Required probability $=\frac{{}^{13}C_2}{{}^{52}C_2}=\frac{1}{17}$

18. Tossing of each coin is independent event

$\therefore$ The probability that the fifth coin will fall with lead upwards $=\frac{1}{2}$

19. Case –I : We choose first square from corner square. In this total no. of ways choosing 25 square = 4 × 2

Case –II : We choose first square from first or last crow or colour. Total no. ways = 24 × 3

Case – III : Any square except probability

Total ways = 36 × 4

Total ways = 8 + 72 + 144 = 224

Now any square can be choose as first or second

$\therefore$ Required probability $=\frac{112}{{}^{64}C_2}=\frac{1}{18}$

20. Let we choose firstly five digit if these sum is even we place an even no. at six place so that overall sum is even

$\therefore$ Required probability $=\frac{9\times10^4\times5}{9\times10^5}=\frac{1}{2}$

## MATHS-B

**21.** $\int e^x\left(\frac{(x^2+x+1)(x^2-x+1)}{x^2+x+1}\right)dx$

**Use byparts**

**22.** $\int\left(\frac{f(x)g'(x)-f'(x)g(x)}{(f(x))^2}\right).\frac{1}{g(x)/f(x)}\log\left(\frac{g(x)}{f(x)}\right)dx=$

**Put** $\log\left(\frac{g(x)}{f(x)}\right)=t$

**23. Using Reduction formula**

**24. Using Reduction formula**

**25. Using Reduction formula**

**26. The anti derivative** $f(x)=1+2^x\log 2$ is g(x) and curve y = g(x) passes though $\left(-1,\frac{1}{2}\right)$ then the curve y = g(x) meets the y – axis at

1) $(0,-2)$ 2) $(0,-1)$ 3) $(0,2)$ 4) $(1,0)$

**27.** $\int\frac{d^2}{dx^2}(\tan^{-1}x)dx=\frac{d}{dx}(\tan^{-1}x)=\frac{1}{1+x^2}$

**28.** **Using By parts**

**29.** **Using By parts**

**30.** **Put** $x+\frac{1}{x}=t$

**31.** $\int \sin^5 x.\cos^{100} x\,dx = \int \sin x\left(1-\cos^2 x\right)^2 \cos^{100} x\,dx$

**Put cos x = t and use reduction formula**

**32.** **Put cos x = t**

**33.** $\int e^x\left[\frac{x+6-2}{(x+6)^3}\right]dx = \int e^x\left[\frac{1}{(x+6)^2}-\frac{2}{\left(x+6\right)^3}\right]dx$

**34.** **Using Reduction formula**

**35.** **Put log x = t**

**36.** **Using By parts**

**37.** **Put log x = t**

**38.** $\int\left(\frac{x}{2}\sec^2\frac{x}{2}+\tan\frac{x}{2}\right)dx = \frac{x}{2}\frac{\tan\left(\frac{x}{2}\right)}{2} - \int\frac{1}{2}\frac{\tan\left(\frac{x}{2}\right)}{2}dx + \int\tan\left(\frac{x}{2}\right)dx$

**39.** $\int\frac{e^x\left(1+2\sin\left(x/2\right)\cos\left(x/2\right)\right)}{2\cos^2\left(x/2\right)}dx = \int e^x\left(\frac{1}{2}\sec^2\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)\right)dx$

**40.** **Put** $\sqrt{x}=t$

## PHYSICS

41. $id = C\frac{dv}{dt}$

42. magnetic field, $B=\frac{\mu_0}{2\pi}$ is $\frac{r}{R^2}$

43. momentum $P=\frac{U}{C}$

$U = Flux\times Area\times time$

44. $B\,\alpha\,Radius$, $\frac{B_1}{B_2}=\frac{R_1}{R_2}$

45. Intensity $I=\frac{power}{Area}=\frac{P}{A}$

46. magnetic field $B=\frac{E}{C}$

C is light velocity

47. Force on the surface $F=\frac{125}{100}\times\frac{I}{C}$

48. Momentum transferred $= Force\times\Delta t == \frac{1}{C}\times Area\times\Delta t$

49. $E_0=\sqrt{\frac{2I}{C\varepsilon_0}}, B_0=\frac{E_0}{C}$

Direction of $\overline{E}\times\overline{B}$ will be along $+\hat{j}$

50. $E=\sqrt{\frac{0.96}{\mu}}E_0$

51. $U=\frac{1}{2}\varepsilon_0 E^2$

52. $E_0 = CB_0$

53. EMW carry energy, momentum and information

54. $\lambda = \frac{hc}{ev} = \frac{12400}{11\times10^3}$

X-ray region

55. $I_d = A\varepsilon_0 \frac{dE}{dt}$

56. $P = I \times Area$

57. Length of antenna, $\ell = \lambda$

$\lambda = \frac{C}{V}$

58. $\mu = \frac{A_m}{A_c}$

59. $d = \sqrt{2Rh}$

60. $\mu = \frac{1}{2\pi\sqrt{LC}}$

## CHEMISTRY

61. Direct chlorination of alkanes takes place in presence of sunlight(UV)

62. In accordance to Markownikoff's rule

63. 



Grignard reg reagent

64. $CH_3 - \underset{CH_3}{\overset{CH_3}{C}} - Br + CH_3ONa \xrightarrow{Elimination} CH_3 - \overset{CH_3}{C} = CH_2 + CH_3OH + NaBr$

$CH_3ONa \rightarrow CH_3O^- + Na^+$

Methoxide

Methoxide ion is a strong base there it abstract proton from $3^0$ alkylhalide and favours elimination reaction

65. $2CHCl_3 + O_2 \xrightarrow[air]{light} 2COCl_2 + 2HCl$

Phosgene

66. $C_2H_5 - I + AgNO_3 \rightarrow C_2H_5ONO_2 + AgI$

67. $CH_3 - \overset{Br}{CH} - \overset{CH_3}{CH} - CH_3 \xrightarrow{slow} CH_3 - \overset{+}{CH} - \overset{CH_3}{CH} - CH_3$

$2^0$ carbo cat ion

$\xrightarrow{Hydride\ shift} CH_3 - CH_2 - \underset{CH_3}{\overset{CH_3}{\overset{+}{C}}} \xrightarrow[Hydrolysis]{OH^-} CH_3 - CH_2 - \underset{CH_3}{\overset{OH}{C}} - CH_3$

$3^0$ carbo cat ion( more stable ) 2-methyl – 2 butanol

68. The order of reactivity of $SN^2$ reaction is methyl halide $> 1^0 > 2^0 > 3^0$ and reaction is concerted and configuration of carbon is inverted

69. $CH_3 - CH_2 - CHCl_2 + 2NaNH_2 \xrightarrow[196k]{LiqNH_3} CH_3 - C \equiv CH + 2NaCl + 2NH_3$

70. $C_6H_6Cl_6 + 3KOH \rightarrow C_6H_3Cl_3 + 3KCl + 3H_2O$

71. $CH_3 - CH_2 - \underset{CH_3}{CH} - CH_3 \xrightarrow[h\upsilon]{Cl_2} chiral\ \ monochloro\ \ derivatives$

i) $CH_3-CH_2-\overset{*}{\underset{CH_3}{\underset{|}{C}}}H-CH_2Cl$ ii) $CH_3-\overset{Cl}{\overset{|}{\underset{H}{\underset{|}{C}}}}-\underset{CH_3}{\underset{|}{C}}H-CH_3$

72. $R-Cl$ can be prepared from alcohols by using phosphorous halides and thionyl chloride

73. $C_2H_5Cl \xrightarrow{alc\ KCN} C_2H_5CN\ (X) + C_2H_5NC$

Cyanides and isocyanides are functional isomers

74. The conversion of $R-X$ into $R-OH$ is a good example for substitution reaction

75. During $SN^2$ reactions inversion of configuration takes place

78. Chloronium ion $\left(Cl^+\right)$ is the attacking species. It initiates the reaction

79. $Bond\ \ length\ \alpha \dfrac{1}{Bond\ \ strength}$