FIITJEE

NSEJS Solutions

(2018)

PAPER CODE : JS511

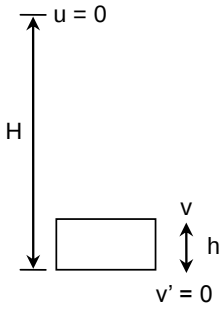
1. B

$V = \sqrt{2g(H-h)}$

Using $V^2 = u^2 + 2as$

$0 = V^2 + 2a(h)$

$a = g\left(\frac{H}{h} - 1\right).$



2. A

Musical note interval $= \frac{f_1}{f_2} = 1.4;\ f_1 = 1.4\, f_2;\ f_2 = \frac{1}{20\times10^{-3}}$

$\lambda_2 - \lambda_1 = 2$

$\frac{v}{f_2} - \frac{v}{f_1} = 2$

$\frac{v}{f_2}\left[\frac{1.4-1}{1.4}\right] = 2$

v = 350 m/sec.

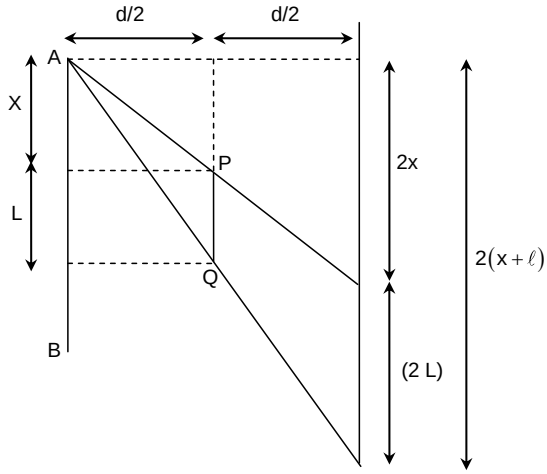
3. D

The net deviation is given as 360° – 2θ.

4. C

Length of shadow is 2 L

Hence, It will be of same size for any position of point source on line AB.



5. A

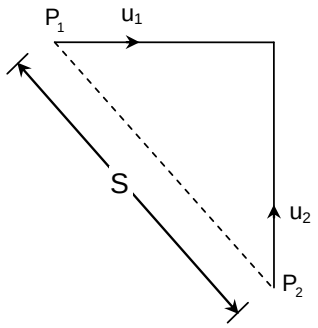
Distance traveled by P_1 in time t = a – u_1t

Distance traveled by P_2 in time t = b – u_2t

Let S be the instantaneous distance

$S = \sqrt{(a-u_1t)^2 + (b-u_2t)^2}$

$S = \left[a^2 + b^2 + \left(u_1^2 + u_2^2\right)t^2 - 2t\left(au_1 + bu_2\right)\right]^{1/2}.$



6. C

Let x kg/sec fuel is consumed

$$\text{efficiency} = \frac{\text{output}}{\text{input}};\ 0.25 = \frac{25}{17200 \times 4.18 \times x}$$

x = 0.00139 kg/sec

mass flow/hr = 0.00139 × 3600

= 5.004

= 5 kg/hr.

Energy generated per tonn of fuel burned = $\frac{17200 \times 4.18 \times 10^3 \text{ kJ}}{4}$

$$= \frac{17200 \times 4.18 \times 10^3}{3.6 \times 10^3 \times 4}\text{kWH} \approx 5{,}000 \text{ kWH}.$$

7. B

$m_2 = 4m_1$

$$\left(\frac{f}{f - u_2}\right) = 4\left(\frac{uf}{f - u_1}\right)$$

f = 20 cm.

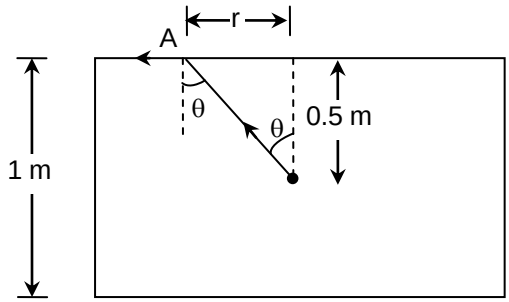
8. B

Using snell's law at A

$\mu_g \sin\theta = \mu \sin 90°$

$$1.5\left(\frac{r}{\sqrt{(0.5)^2 + r^2}}\right) = 1$$

r = 0.447 cm.



9. C

SI unit of coefficient of linear expansion is K^{-1}.

10. A

Length of a seconds pendulum is 1 m.

Number of oscillation = 60

In 120 seconds beats of soldier is 110 times

beats per minute $= \frac{110}{2} = 55$ (Which is less than 60)

So, symptoms of bradycardia.

11. B

Redraw the circuit

R equivalent across A and B is $\frac{29R}{8}$ so $R = 8\ \Omega$.

12. B

Buoyant force in water = Buoyant force in salt water

$$\frac{5}{8} \times 1 \times g = 1.12 \times x \times g$$

$x = 0.56$

Fraction outside water = 1 – 0.56

= 0.44.

13. B

$F = [M][L]\left[T^{-2}\right]$ (i)

$[S] = [L][T]^{-1}$

So, $[L] = [S][T]$ (ii)

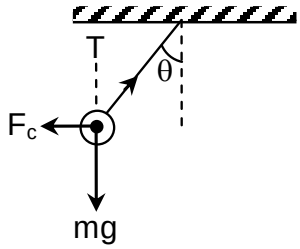
From (i) and (ii)

$[F] = [M][S][T]^{-1}$

$[M] = [F][S]^{-1}[T]^{+1}$

$M = 10^{-3}$ kg.

14. A



$T\cos\theta = mg$

$T\sin\theta = F_c$

$\tan\theta = \frac{F_c}{mg}$

$\tan\theta = \frac{kq^2}{\sin^2\theta \times mg}$

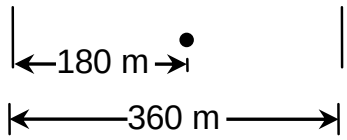
$\tan\theta\sin^2\theta = \frac{kq^2}{mg}$,

So, as g increases θ decreases.

15. C

A good absorber is a good emitter.

16. B



For first echo t_1

$360 = (30 + 330)t_1$

$t_1 = 1\,\text{sec}$

For second echo t_2

$720 + 30t_2 = 330t_2$

$t_2 = 2.4$ sec

For third echo t_3

$900 + 30t_3 = 330t_3$

$t_3 = 3\,\text{sec}$.

17. B

A charged body can attract another uncharged body by induction.

18. B

Current passing through voltmeter; using ohm's law

$117 = i \times 9 \times 10^3$

Potential across the resistor will be same as voltmeter reading

$117 = R(0.13 - 0.013)$

$R = 1000\,\Omega$

$= 1\,\text{k}\Omega$.

19. B

Potential energy $(U) = -\vec{\mu}_0 \cdot \vec{B}$.

20. A

On cooling water will expand while the beaker will contract so water will overflow.

21. D

The electrons in P^{3-} have a greater coulombic repulsion that those in P atom.

22. B

Substance $\longrightarrow$ 0.5 M

Volume = 4 L

Given weight = 240 gm

Molarity = $\frac{\text{No. of moles}}{\text{Volume}}$

= $\frac{\text{Given weight}}{\text{Mol. Wt / Volume}}$

= $\frac{290}{\text{M.Wt}} \times 4$

= $\frac{60}{\text{M.Wt}}$

As/Q $\frac{60}{\text{M. Wt}} = 0.5\ \text{M}$

M.Wt = $\frac{60}{0.5} = 120$ gm

23. C

$\frac{\text{Mass of sol}^n}{\text{Vol. of sol}^n} = \alpha$

$\frac{M}{1000} = 1.28$

Mass of solution = 1280 gm

$4.2 = \frac{\text{moles of } H_2SO_4}{1000} \times 1000$

Moles of H_2SO_4 = 4.2

$\frac{W}{98} = 4.2$

W = 4.2 × 98

= 411 g

% = $\frac{411}{1280} \times 100 = 32\%$

24. A

Number of moles of X in 60 = $\frac{60}{10}$ = 6

Number of moles of Y in 40 = $\frac{40}{20}$ = 2

Simple mole ratio of X and Y = 6 : 2 = 3 : 1

Simplest formula is X_3Y.

25. C
Number of molecules = 4.095 X 10^{24} / 2 = 2.0475 × 10^{24}
Number of moles of nitrogen gas = 2.0475 × 10^{24} / 6.023 × 10^{23} = 3.4

26. D
At space, absence of atmospheric pressure balances the surface tension, thereby making the water molecule to fill the capillary tube along its full length.

27. C
Under similar conditions of temperature and pressure, equal volume of gases contain equal number of molecule.

28. D
A small amount of water entered the gas jar slowly and sulphur dioxide is sparingly soluble in water.

29. B
$\underset{342}{Al_2(SO_4)_3} + 3Ba(OH)_2 \longrightarrow 3BaSO4 + \underset{156\ g}{2Al(OH)_3}$
$\because$ 54 g Al $\longrightarrow$ 342 g $Al_2(SO_4)_3$
0.170 g Al $\longrightarrow \dfrac{342\times 0.170}{54} = 1.07$ g
342 g $Al_2(SO_4)_3 \longrightarrow$ 699 g $BaSO_4$
1.07 g $Al_2(SO_4)_3 \longrightarrow \dfrac{699\times 1.07}{342} = \dfrac{747.93}{342}$ = 2.16 g
342 g $Al_2(SO_4)_3 \longrightarrow$ 156 g $Al(OH)_3$
1.07 g $\longrightarrow \dfrac{156\times 1.07}{342} = \dfrac{166.92}{342} = 0.48$ gm
Total mass of ppt = 2.16 + 0.48 = 2.74 g

30. B
Out of sodium chloride, sodium phosphate, aluminium sulphate and ammonium chloride, sodium phosphate forms a basic solution. This solution shall be suitable to increase the pH of soil. So, bobby was successful in growing daffodils.

31. A
Melting point of compound X and Y (ionic) is more than that of by W and Z (covalent).

32. B
$C + O_2 \longrightarrow CO_2$
$\dfrac{W}{12}$ 0
Moles of $CO_2 = \dfrac{W}{12}$
$KOH + CO_2 \longrightarrow KHCO_3$
Moles of KOH = $\dfrac{0.1\times 5}{1000}\times 5\times 10^{-4}$
Moles of CO_2 = moles of KOH
$\dfrac{W}{12} = 5\times 10^{-4}$
W = 60 × 10^{-4} = 6 × 10^{-3} gm = 6 mg

33. A

$n_{SO_3} = \frac{1120}{22400} = 0.05$

$n_{NH_3} = \frac{0.85}{17} = 0.05$

34. A

Mass of iron = initial mass – final mass = 15.5 – 8.5 = 7.0 g
Mass of copper (II) sulphate = 21.0 g
Mass of copper = 8.60 g
According to law of conservation of mass, mass of iron + mass copper (II) sulphate = mass of copper + mass of iron (II) sulphate
7.0 g + 21.0 g = 8.60 g + mass of iron (II) sulphate
So, mass of iron (II) sulphate = 19.40 g

35. A

$\frac{N}{2} \times V_1 + \frac{N}{10} \times V_2 = \frac{N}{5} \times 2$

$5V_1 + V_2 = 4$

$0.5 \times 5 + 1.5 = 4$

36. C

$M = \frac{6.3}{126} = 0.05$

Moles in 25 ml = $\frac{0.05 \times 25}{100}$ = 1.25×10^{-2}

Molarity of oxalic acid solution = $\frac{1.25 \times 10^{-2} \times 1000}{250}$ = 0.05

Number of moles of oxalic acid in 10 ml solution $= \frac{0.05}{1000} \times 10 = 0.5 \times 10^{-3}$

Moles of oxalic acid = 2 × moles of NaOH

$\because$ $2NaOH + H_2C_2O_4 = Na_2C_2O_4 \times H_2O$

Number of moles of NaOH
= 2 × moles of oxalic acid
= $2 \times 0.5 \times 10^{-3}$

$\frac{\text{Mass in gram}}{\text{Molecular mass of NaOH}} = \text{Number of moles of NaOH}$

Mass in gram = molecular mass × number of moles of NaOH
= $40 \times 2 \times 0.5 \times 10^{-3} = 40$ ppm

37. D

The quality of petrol is determined by its octane number. Higher is the amount of iso-octane in petrol, the better is its quality.

38. A

$\overset{+5}{K}BrO_3 \longrightarrow \overset{0}{Br_2}$

n-factor of $KBrO_3$ = 5

Equivalent weight = $\frac{M}{5}$

$\overset{+5}{Br} \longrightarrow 1/\ 2\overset{0}{Br}_2$

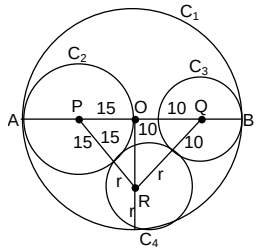
$5 \times 1 \qquad \frac{1}{2} \times 2 \times 0$

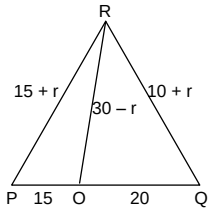
n = 5 – 0 = 5

39. C
Diluted potassium hydrogen carbonate solution is basic so, colour of solution in universal indicator is blue.

40. C
Chemically, calamine is an ore of zinc($ZnCO_3$).

41. Consider ΔPQR, apply stewart's law,
$(30 - r)^2 35 + (15)(20)30$
$= (15 + r)^2 20 + (10 + r)^2 15$
$\Rightarrow 900(35) + 35r^2 - 60r(35) + 300(35)$
$= 225(20) + 20r^2 + 30r(20) + 100(15) + 15r^2 + 29r(15)$
Simplifying, $r = \frac{1200(35) - 1500 - 4500}{2100 + 600 + 300} = \frac{360}{30} = 12$



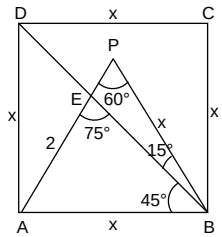


42. Total number of cuboids will be
$(1 + 2 + 3 + 4 + 5)^3$
$= (15)^3 = 3375$

43. $n^2(n^2 - 1)(n^2 - n - 2)$
$\Rightarrow \{(n - 2)(n - 1)n(n + 1)\}\{n(n + 1)\}$
$\Rightarrow \{(n - 2)(n - 1)n(n + 1)\}$ is divisible by 4! i.e. 24 and $\{n(n + 1)\}$ is divisible by 2! i.e. 2
So, largest value of k is 48

44. 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 1, 5 or 6, 6, 5, 5, 4, 4, 3, 3, 1, 1, 2, 6
1 and 2 can appear least number of times

45. In ΔEAB, applying sine low,



$\frac{2}{\sin 45^o} = \frac{x}{\sin 75^o}$

$x = \frac{2\sin\left(30^o + 45^o\right)}{\sin 45^o}$

$x = \frac{2\left(\frac{1}{2} \times \frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2} \cdot \frac{1}{\sqrt{2}}\right)}{\frac{1}{\sqrt{2}}}$

$x = 2\left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right)$

$x = 1 + \sqrt{3}$

$\therefore x^2 = 4 + 2\sqrt{3}$

46. $6 = 1 \times 6 = (0 + 1)(5 + 1)$
$\Rightarrow 3 \times 2 = (2 + 1)(1 + 1)$
$\therefore n = p_1^5$
or $n = p_1^2 \times p_2$
since n is not divisible by 6, p_1 and p_2 are not 3.
now, $9n = p_1^5 \times 3^2 \rightarrow$ number of factors = (5 + 1)(2 + 1) = 18
or $9n = p_1^2 \times p_2 \times 3 \rightarrow$ number of factors
= (2 + 1)(1 + 1)(1 + 1) = 18

47. $\frac{\sqrt{a+x}-\sqrt{a-x}}{\sqrt{a+x}+\sqrt{a-x}}$, $x = \frac{2ab}{b^2+1}$

$$x = \frac{2ab}{b^2+1}$$

$$\frac{x}{a} = \frac{2b}{b^2+1}$$

$$\frac{a}{x} = \frac{b^2+1}{2b}$$

$$\frac{a+x}{a-x} = \frac{(b+1)^2}{(b-1)^2} = \frac{(b+1)^2}{(1-b)^2}$$

$$\frac{\sqrt{a+x}}{\sqrt{a-x}} = \frac{b+1}{1-b}$$

$$\frac{\sqrt{a+x}-\sqrt{a-x}}{\sqrt{a+x}+\sqrt{a-x}} = \frac{b+1-1-b}{b+1+1-b} = \frac{2b}{2} = b$$

48. Let there be n sides in first polygon and m sides in second. Thus, there are $\frac{n(n-3)}{2}$ diagonals in first and $\frac{m(m-3)}{2}$ in second.

Given: $n + \frac{m(m-3)}{2} = 103$

and $m + \frac{n(n-3)}{2} = 80$

$\Rightarrow 2n + m^2 - 3m = 206$
$2m + n^2 - 3n = 160$
Subtracting and simplifying, we get
$(m - n)(m + n - 5) = 46$
Since m and n are natural number,
Case I: $m + n - 5 = 46$
$m - n = 1$
$\Rightarrow m = 26$
$n = 25$
does not satisfy
Case II: $m + n - 5 = 23$
$m - n = 2$
$\Rightarrow m = 15$
$n = 13$
satisfies given equations.
Therefore, $m + n = 28$

49. $\frac{1}{7}\left[(r-1)+y\right] = r - 1$

$\frac{1}{6}\left[r+(y-1)\right] = r$

$\Rightarrow r + y - 1 = 7r - 7$

and $r + y - 1 = 6r$

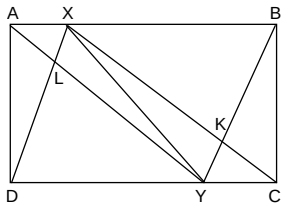
solving, we get $r = 7$, $y = 36$

$\therefore r + y = 43$

$\Rightarrow$ sum of digits = 7

50. $AX : XB = 1 : 2$

$CY : YD = 1 : 2$



$ar[AD \times C] = \frac{1}{2} ar[\square ABCD]$

$ar[\Delta DXY] = \frac{2}{3} ar[\Delta DXC] = \frac{1}{3}[\square ABCD]$

$\Delta ALY \sim \Delta YLD \Rightarrow XL : LD : 1 : 2$

$\Rightarrow ar[\Delta XLY] = \frac{1}{3} ar[\Delta DXY] = \frac{1}{9}[\square ABCD]$

$ar[\square XLYK] = 2ar[\Delta XLY] = \frac{2}{9}[\square ABCD]$

$\Rightarrow \frac{ar[\square XLYK]}{ar[\square XLYK]} = \frac{2}{9} = \frac{m}{n}$

$\Rightarrow m + n = 2 + 9 = 11$

51. Let P be a point on AD such that AP = BD.

Join PC

In ΔAPC and ΔBCD,

AP = BD (by construction)

$\angle PAC = \angle CBD$ (angle in the same segment)

AC = BC (sides of equilateral triangle)

$\therefore \Delta APC \cong \Delta BDC$

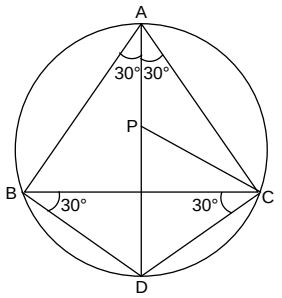
$\therefore \angle ACP = \angle BCD = 30°$

$\therefore \angle PCB = 30°$

$\therefore$ PC is also angle bisector.

Hence p is circumcentre and ΔPDC is equilateral

$\therefore$ PA + PD = BD + DC = 4



52. $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$

If $a + (k - 1)d = T_k$

$\Rightarrow a + (m - 1)d = \frac{1}{n}$ …(i)

$a + (n - 1)d = \frac{1}{m}$ …(ii)

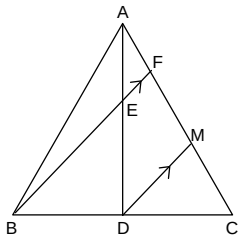
solve equation (i) and (ii)

$a = \frac{1}{mn}$ and $d = \frac{1}{mn}$

$T_{mn} = a + (mn - 1)d$

$= \frac{1}{mn} + \frac{(mn-1)}{mn} = 1$

53. BD = DC and AE : ED = 1 : 2



Draw DM || EF, In ΔADM

$\frac{AE}{ED} = \frac{AF}{FM} = \frac{1}{2}$

Let AE = k and FM = 2k

In ΔCBF

$\Rightarrow \frac{BD}{DC} = 1$

$\Rightarrow$ BD = DC

$\therefore$ FM = MC = 2k

$\therefore \frac{AF}{FC} = \frac{k}{4k} = \frac{1}{4}$

54. $px^2 + qx + r = 0$ and $\alpha = \sin\theta, \beta = \cos\theta$

$\alpha + \beta = \sin\theta + \cos\theta = -\frac{q}{p}$ and $\alpha\beta = \sin\theta\cos\theta = \frac{r}{p}$

$\sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta = \frac{q^2}{p^2}$

$1 + \frac{2r}{p} = \frac{q^2}{p^2}$

$p^2 + 2pr = q^2$ or $p^2 - q^2 + 2pr = 0$

55. $\alpha(k)$ denotes interior angle

$\alpha(k) = \frac{(k-2)180}{k}$

$\alpha(n-2) = \frac{(n-4)180}{n-2}$ …(i)

$\alpha(n) = \frac{(n-2)180}{n}$ …(ii)

$\alpha(n+3) = \frac{(n+1)180}{n+3}$ …(iii)

from equation (i), (ii) and (iii) are in A.P.

$\frac{(n-2)180}{n} - \frac{(n-4)180}{n-2} = \frac{(n+1)180}{n+3} - \frac{(n-2)180}{n}$

$\frac{n-2}{n} - \frac{n-4}{n-2} = \frac{n+1}{n+3} - \frac{n-2}{n}$

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

$\frac{4}{n(n-2)} = \frac{n^2+n-n^2-n+6}{n(n+3)}$

$\frac{4}{n-2} = \frac{6}{n+3}$

$4n + 12 = 6n - 12$

$2n = 24$
$n = 12$
Sum of digits of n is 3.

56. Let terms are $\frac{a}{r^2}, \frac{a}{r}, a, ar, ar^2$

$\Rightarrow a\left(\frac{1}{r^2}+\frac{1}{r}+1+r+r^2\right) = 24$ …(i)

and $\frac{1}{a}\left(\frac{1}{r^2}+\frac{1}{r}+1+r+r^2\right) = 6$ …(ii)

from equation (i) and (ii)
$a^2 = 4$
$\Rightarrow a = \pm 2$
product $a^5 = (\pm 2)^5 = \pm 32$

57. $\overline{4a1} \times \overline{25b}$ is divisible by 36(i.e. 4×9)
$\Rightarrow \overline{4a1} \rightarrow$ odd
$\therefore \overline{25b}$ is divisible by 4
$\Rightarrow$ b can be 2, 6
If b is 2 then a can be 0 to 9
If b is 6 then a can be 4
So (0, 2), (1, 2), (2, 2), (3, 2), (4, 2), (5, 2), (6, 2), (7, 2), (8, 2), (9, 2), (4, 6)

58. $\sqrt{1111.....(2018 \text{ times}) - 222.....(1009 \text{ times})}$

$= \sqrt{\left(10^{2017}+10^{2016}+.....+10^{o}\right) - 2\left(10^{1008}+10^{1007}+....+10^{o}\right)}$

$= \sqrt{\frac{10^{2018}-1}{9} - 2\frac{\left(10^{1009}-1\right)}{9}}$

$= \frac{\sqrt{10^{2018}-2\times10^{1009}+1}}{3}$

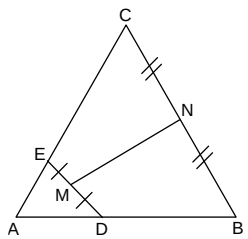
$= \frac{\sqrt{10^{1009}\left(10^{1009}-2\right)+1}}{3}$

Now, $10^{1009} >>> 2 > 1$

$\approx \frac{\sqrt{10^{2018}}}{3} = \frac{10^{1009}}{3}$

Closest integer = $\frac{10^{1009}-1}{3}$

59. DE || BC
$\Rightarrow \Delta ADE \sim \Delta ABC$
$\therefore \frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \left(\frac{1}{4}\right)^2 = \frac{1}{16}$
let ar[ΔADE] = 1k
ar[ΔABC] = 16k
$\therefore$ ar[$\square$BDEC] = 16k – k = 15k



$\therefore$ ar[□BDMN] = $\frac{15k}{2}$

$\Rightarrow \frac{ar[\square BDMN]}{ar[\Delta ABC]} = \frac{15k}{2\times 16k} = \frac{15}{32}$

60. $\left[\frac{100}{13}\right] = \left[\frac{100}{14}\right] = 7$

$\left[\frac{100}{15}\right] = \left[\frac{100}{16}\right] = 6$

$\left[\frac{100}{17}\right] = \left[\frac{100}{18}\right] = \left[\frac{100}{19}\right] = \left[\frac{100}{20}\right] = 5$

Number of different values = 12 + 1 + 1 + 1 = 15

61. A
Platyhelminthes are triploblastic, acoelomate organisms.

62. B
Golgi apparatus, an organelle helps in the formation of acrosome in human spermatozoa.

63. B
The genetically modified brinjal-BT Brinjal has been developed in India for increased resistance against Lepidopteran insects.

64. A
Archeabacteria can reproduce by binary fission or budding, possess flagella and contain pseudopeptidoglycan in their cell walls.

65. D
Acquired immunity or specific immunity can differentiate between self and nonself and also retains memory.

66. D
Azolla – *Anabaena*, a symbiotic association between water fern and cyanobacteria helps in N_2 fixation in paddy fields. *Azolla*, being a water fern can be easily grown along with paddy.

67. C
During action potential more sodium ions enter the axon while less potassium ions leave the axon.

68. C
Since all the mutants grow on addition of additive T, the biosynthetic pathway for X should start with T.

69. C
Albino rats (cc) in the progeny represent atleast one 'c' in genotype of both parent rabbits. The Himalayan rabbit (C^hc) suggests atleast one parent having C^h. Chinchilla rabbit ($C^{ch}C^h$) represents atleast one C^{ch} in the parents. Thus parent genotypes are $C^hXC^{ch}c$.

70. D
Both pituitary gland (anterior) and thyroid gland are affected by the mutation.

71. B
Bull shark gives birth to young ones while rest of Group A lays eggs. Alpine Salamander gives birth to young ones while rest of the organisms in Group B lays eggs.

72. A
Guanfacine hydrochloride is a symphatholytic drug used to treat hypertension.

73. C

	T	C	A	G
Strand I	348	590	650	1400
Strand II	650	1400	348	590

According to Chargaff's Rule, number of bases (A, C) in one strand should be equal to number of bases (T, G) in other strand.

74. C
The mRNA formed from 2988 bp of a bacterial gene should consist of 2988 bases. Among these 3 bases form the stop codon to stop the translation process. Thus the length of the polypeptide translated from mRNA should have 2985/3 = 995.

75. A
Bacterial cell is prokaryote lacking any membrane bound organelles and possessing a cell wall, cell membrane, genetic material and vacuole.
Plant cell possess all the characteristics mentioned except a centriole.
Virus contains no characteristic of a cell except the presence of genetic material.
An animal cell is devoid of cell wall and chloroplast.
A fungus being a saprophyte and an eukaryotic cell does not have centriole and chloroplast.

76. A
To qualify as a biodiversity hotspot a region must have atleast 1500 species of vascular plants as endemic and have lost at least 70% of its natural habitat. Since in site B habitat loss is 70%, so it should be included as a biodiversity hotspot.

77. D
A bacteria will multiply 6 times in 300 minutes since its generation time in 50 minutes. Thus the number of cell after 300 minutes would be
$2^6 \times 10^8 = 64 \times 10^8 = 6.4 \times 10^9$ cells.

78. B
The enzymes X and Y represents the gene products. Thus in Ramesh (I^Ai), 50% of enzyme X which is the gene product of I^A is present while allele i is not able to express being a recessive gene.
Ali (I^AI^B) expresses both the enzymes since both I^A and I^B are codominant.
Sophia (I^AI^A) expresses 100% of enzymes X being homozygote for I^A allele.
Balwinder (I^BI^B) expresses 100% of enzyme Y being homozygote for I^B allele.

79. A
Individuals with XXY being infertile will not be able to produce gametes. But a female with genotype 22AA + XXX although produces gametes, probability of producing gametes with 22AA + XX is higher compared to a woman with genotype 22AA + XX.
Thus the eight year old boy having a darkly stained chromatin body (Barrbody) having genotype XXY should have parents as 22AA + XY and 22AA + XXX.

80. A
According to the DNA profile, Mary's child has more bands matching with Jim's compared to Lou's child.