NARAYANA GROUP OF SCHOOLS

40 YEARS OF EXCELLENCE

Class: NSEJS | **NSEJS FINAL EXAM KEY** | **Date: 17-11-19**

Time: 2hrs | **QP CODE.54** | **Max. Marks: 240**

CODE.54			NSEJS INITIAL KEY					17-11-19		
Q.No.	1	2	3	4	5	6	7	8	9	10
Ans.	C	B	B	D	B	D	A	C	A	D
Q.No.	11	12	13	14	15	16	17	18	19	20
Ans.	B	C	B	A	D	B	B	C	D	C
Q.No.	21	22	23	24	25	26	27	28	29	30
Ans.	C	A	B	B	A	C	Block	A	B	C
Q.No.	31	32	33	34	35	36	37	38	39	40
Ans.	C	B	A	A	A	C	B	C	D	A
Q.No.	41	42	43	44	45	46	47	48	49	50
Ans.	C	A	B	A	B	B	C	A	C	B
Q.No.	51	52	53	54	55	56	57	58	59	60
Ans.	A	D	A	C	B	C	D	A	C	D
Q.No.	61	62	63	64	65	66	67	68	69	70
Ans.	D	C	C	B	A	D	D	D	B	A
Q.No.	71	72	73	74	75	76	77	78	79	80
Ans.	A	C	A	A	A	A	A	D	C	B

BIOLOGY

01. Appearance of notochord in larval stage with chitinous exoskeleton in adult is a feature of protochordates

03. Nissil bodies main function is to synthesize and release proteins that are important for neuronal growth and regeneration of axons

04. Saturated lipids in plasma membrane

05. (i) a fungal
(iii) conjugation deficient bacteriam

06. Central dogma of DNA

07. Learning process through which strength of a behaviour is modified by reinforcement

08. Initial length / final length

$$\frac{6\times10^{-2}}{4\times10^{-6}}=1.5\times10^{4}$$

09. Salt mixed for fermentation.
Yeast granules were not activated prior to mixing with the flour

10. Prokaryotic cells are unicellular while eukaryotes are multicellular
Histones are present in euarkyotes and absent in prokaryotes
(i) and (iii) false

11. In planaria each piece develops into new organism. In asterias central disc along with limb is used for regeneration.

12. The ability to produce on abundance of offspring needs all the factors

15. Nociceptors are for painful stimuli.

16. Wavelength

17. (54 and 27) Meiosis-II = Mitosis

18. Seed is not covered by ovary

19. Gibberllic acid

20. Mangrooves

CHEMISTRY

21. Y is phosphorus because it forms two oxides, P_2O_3 and P_2O_5, which when dissolved in water forms weak acids, H_3PO_3 & H_3PO_4 respectively. Phosphorus is observed in various allotropic forms like white, red, yellow, scarlet etc. and phosphates are used in agriculture.

22. Fullerene is an allotropic form of carbon and represented as C_{60}, its structure consists of hexagonal and pentagonal rings. In between any two carbon atoms only one sigma bond is present.

23. $CaCO_2 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$

44 gm CO_2 = 100 gm $CaCO_3$

Therefore 0.88 gm $CO_2 = \frac{100}{44} \times 0.88 = 2gm$

Percentage purity = $\frac{2}{4} \times 100 = 50\%$

24. $Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2 \uparrow$

$Al + NaOH \rightarrow NaAlO_2 + \frac{1}{2}H_2 \uparrow$

26. $\underset{78}{C_6H_6} + \underset{213}{\underset{106.5}{3Cl_2}} \rightarrow \underset{291}{C_6H_6Cl_6}$

$3 \times 71 \rightarrow 291$

$106.5 \rightarrow ?$

$\frac{106.5}{3 \times 71} \times 291 = 145.5g$

27. P) $\left[H^+\right] = 10^{-1}$ $pH = 1$ Q) $\left[H^+\right] = 2 \times 10^{-1}$ $pH = 0.699$ R) $\left[OH^-\right] = 10^{-3}$ $pH < 11$ S) $\left[OH^-\right] = 10^{-3}$ $pH = 1$

28. $CuCl_2 \rightarrow Cu^{+2} + 2Cl^-$

Correct option should be $Q > P > R > S$

So, No change in concentration

29. Polyvinyl chloride and polyethene are thermoplastic

30. 1) Vinegar-acidic

2) $NaCl$ – *Neutral*

3) $NaOH$ – Strong base

4) Baking soda-Weak base

32. No. of meq of HCl = No. of meq of ammonia + No. of meq of $NaOH$

$$50\times1 = x + 60\times\frac{1}{2}$$

$$x = 50 - 30 = 20$$

Wt. of ammonia = $\frac{20}{1000}\times17 = 0.34$

33. $Hg < Ga < Li < Ca$

Element	M.P
Hg	$-38.83^{0}C$
Ga	$29.76^{0}C$
Li	$180.5^{0}C$
Ca	$842^{0}C$

34. $Na_2WO_4 \rightarrow WO_4^{-2}, Na^{+}$

$Pb_2(PO_4)_2 \rightarrow Pb^{+2}, PO_4^{-3}$

$\therefore Pb(WO)_4$

35. $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$

36. CO_2 & NO are linear

NO_2 & N_2O are angular

37. $CaCl_2 \rightarrow Ca^{+2} + 2Cl^{-}$

No. of moles of $CaCl_2 = \frac{44.4}{101} = 0.4396$

No. of moles of ions in 1 litre = $3\times0.4396 = 1.3188$

No. of ions in 1 litre = $1.3188\times6.023\times10^{23} = 7.94\times10^{23}$

No. of ions in 1 ml = 7.94×10^{20}

38. Ne, N^{-3} & Mg^{2+} have ten electrons each

39. Equal volumes of all gases have same number of moles or molecules at STP

40. $AlCl_3, MgCl_2, LiCl$ are covalent in Nature

PHYSICS

41. Conceptual

42. Total area $(28\times14)\text{cm}^2$, change = 420 μC

For $\left[(28\times14)-\left(2\times\frac{22}{7}\times7^2\right)\right]$ change be

Then $\frac{28\times14}{14\times6}=\frac{420}{9}$

$\Rightarrow g=90\mu C$

So, change for the proton asked is $\frac{g}{2}=45\mu C$.

43. $i_1=\frac{3\varepsilon}{R}$

$H_1=i_1^2Rt=\frac{g\varepsilon^2}{R}t$

Given $H_1=H_2$

$i_2=\frac{n\varepsilon}{4R}$

$H_2=i_2^2(4R)t=\left(\frac{N\varepsilon}{4R}\right)^2\times4R=\frac{N^2\varepsilon^2}{4R}t$

$\Rightarrow\frac{9\varepsilon^2}{R}=\frac{N^2\varepsilon^2}{4R}=N^2=36\therefore N=6$

44. Let '*m*' be the mass of ice block

So, when ice block is in the water

Amount of water displaced be $V_1=\frac{m}{(P_W \text{ at } 4^0C)}$

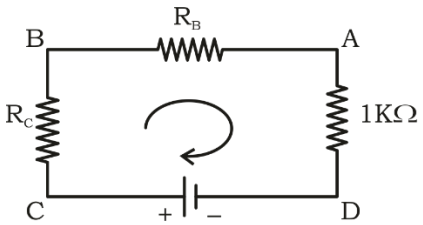
When ice melts completely, amount of water formed be V_2

$\Rightarrow V_2=\frac{m}{(P_W \text{ at } 0^0C)}$

As P_W at $0^0C<P_W$ at 4^0C

$V_2>V_1\Rightarrow$ water level will rise.

45. Given $V_A - V_D = 2$ ...(1)



$V_B - V_D = 6$ ...(2)

$V_C - V_D = 8V$ ...(3)

$R_A = 1K\Omega$

$(2)-(1) \Rightarrow V_B - V_A = 4$

$$R_B = \frac{4}{2\times10^{-3}} = 2K\Omega$$

$(3)-(2) \Rightarrow V_C - V_B = 2$

$$R_C = \frac{2}{2\times10^{-3}} = 1K\Omega, i = \frac{2}{10^3} = 2\times10^{-3}A$$

46. Conceptual

47. From graph from $x = 0$ to $x = 4m$ work done

$$w = \frac{1}{2}\times4\times4 = 85$$

From $x = 4m$ to $x = 5m$ workdone = $(4)(1) = 4$J

$\therefore$ from $x = 0$ to $x = 5$m total work = 12J

From w.e.t $12 = \frac{1}{2}\times(6)V^2 - 0 \Rightarrow V = 2$m/s

48. $W_g = -\Delta V$

$$\Rightarrow -mgL(1-\cos\theta) = -\Delta V \Rightarrow \Delta v = mgL(1-\cos\theta)$$

49. To acquire terminal velocity net force on ball should be zero

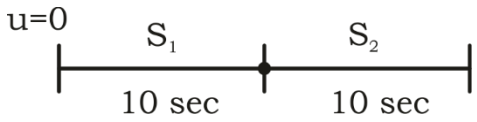
50. At max displacement $KE = 0$

$PE = ME$

$$\frac{1}{2}\times A^2 = 4\times10^{-3}$$

$$\frac{1}{2}\times K\left(10^{-1}\right)^2 = 4\times10^{-3} \Rightarrow K = 0.8\,N/m$$

51. $S_1 = \frac{1}{2}(a)(10)^2 = 50a$



$S_1 + S_2 = \frac{1}{2}(a)(20)^2 = 200a$

$S_2 = 150a \therefore S_2 = 3S_1$.

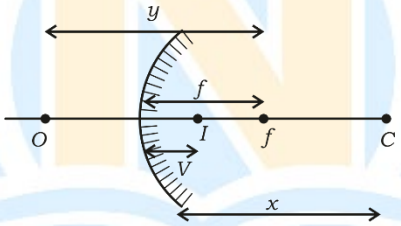
52. for hydrogen of deuterium $\left(\frac{g}{m}\right)$ ratio is $\frac{1}{2} = \frac{(q/m)_D}{(q/m)_H}$

$r = \frac{mv}{Bq} = \frac{v}{B(q/m)}$

$\frac{r_H}{l_D} = \frac{V_H}{B(q/m)_H} \times \frac{(B)(q/m)_D}{V_D} = \left(\frac{2}{1}\right) \times \frac{1}{2} = 1$

53. Conceptual

54. $f = \frac{x}{2}$



$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{v} - \frac{1}{-(y-f)} = \frac{1}{f}$

$\frac{1}{v} = \frac{1}{f} + \frac{1}{y-f} = \frac{y}{fy - f^2}$

$V = \frac{f_y - f^2}{y}$

Distance of image from focus = $f - v$

$= f - \frac{fy - f^2}{y} = \frac{f^2}{y} = \frac{x^2}{4y}$.

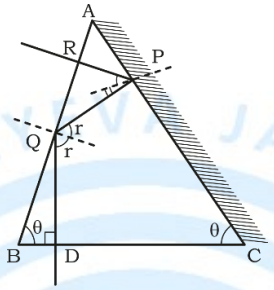
55. First position $\frac{V}{-x} = -3 \Rightarrow V = 3x, \frac{1}{3x} - \frac{1}{x} = \frac{1}{6} \Rightarrow x = 8\text{cm}$

Second position $\frac{V}{-y} = -2 \Rightarrow V = 2y$

$\frac{1}{2y} - \frac{1}{-y} = \frac{1}{6} \Rightarrow y = 9\text{cm} \Rightarrow y - x = 1\text{cm}$

So number of rotations = 10

56. from the diagram



From triangle BDQ $\theta + 90 + 90 - r = 180 \Rightarrow r = g$

From triangle PRQ $2i + 90 + 90 - r = 180 \Rightarrow 2i = \theta$

From PQDC $(90 - i) + 2r + 9\Delta + \theta = 360^0$

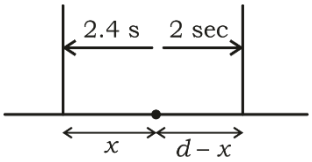
$3\theta - \frac{\theta}{2} = 180, \quad \frac{5\theta}{2} = 180 \Rightarrow \theta = 72^0 \Rightarrow \angle A = 36^0.$

57. Sound wave produced by the string will be longitudinal in nature

58. Conceptual

59. $\frac{2x}{V} = 2.4 \quad \ldots(1)$

$\frac{2(d-x)}{V} = 4.4 \quad \ldots(2)$



$\frac{d}{v} = 3.4 \Rightarrow d = (3.4)(340) = 1.156\text{km} \approx 1.16\text{km}$

60. $\frac{C}{100} = \frac{x-20}{200} \Rightarrow X = 2C + 20 = 2(20) + 20 = 60Z$

MATHEMATICS

61. $x^2-5x+3=0 \qquad \alpha^2+3=5\alpha$

$x^2+3=52 \qquad \beta^2+3=5\beta$

$3a_6+a_8=3\left(\alpha^6-\beta^6\right)+\left(\alpha^8-\beta^8\right)$

$=\alpha^6\left(3+\alpha^2\right)-\beta^6\left(3+\beta^2\right)\ =5\left(\alpha^7-\beta^7\right)$

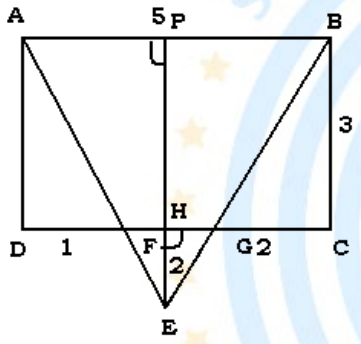
$\frac{3a_6+a_8}{a_7}=5$

62. Length of side of ABCD = a

Radius of the outer circle = a

$\frac{\text{the perimeter of the circle}}{\text{the perimeter of ABCD}}=\frac{2\pi a}{4a}=\frac{\pi}{2}$

63.



$FG=2$

$\Delta ABE\sim EFG$

$\frac{FG}{AB}=\frac{2}{5}$

$\Delta HEG\sim GCB$

$\frac{HE}{BC}=\frac{x}{3}=\frac{2}{3}\Rightarrow x=2$

Area of triangle = $\frac{1}{2}\times5\times5=\frac{25}{2}$

64. $x+yz=1$ _____ (1)

$y+xz=2$ _____ (2)

$z+xy=2$ _____ (3)

Equation (1)-Equation(2)

$(x-y)+z(y-x)=0$

$(x-y)(1-z)=0$

$z=1, x=y$

Case : 1 *For* $x=y$ equations are convert into

$y+yz=2 \Rightarrow y(1+z)=2$ _____ (4)

$z+y^2=2 \Rightarrow z=2-y^2$ _____ (5)

Put z in equation (4)

$y(3-y^2)=2\ 3y-y^2=2$

$3y-y^3=2$

$y^3-3y+2=0$

$(y-1)^2(y+2)=0$

So $y=1$ *or* $y=-2$

Case : 2 *For* $z=1$ equations are convert into

$x+y=2 \Rightarrow x=(2-y)$

$xy+1=2$

$so(2-y)y=1$

$2y-y^2=1$

$y^2-2y+1=0$

$(y-1)^2=0$

So $y=1$ *and* $x=1$

So 2 solutions $(1,1,1)$ *and* $(-2,-2,-2)$

65. $x^2-16>0 \Rightarrow x<-4 \& x>4$

$5|x|+8=|x|^2-16$

$|x|^2-5|x|-24=0$

$(|x|-8)(|x|+3)=0$

$|x=8| \Rightarrow x=\pm 8$

Product = -64

66. 2008=2008+8

$2000 = 2^4 \times 5^3$

Number of factors of $2000 = 5 \times 4 = 20$

In which 1,2,4,5,8 are also include but N>8

So, total $20 - 5 = 15$ values are possible

67. $5775 = 3 \times 5^2 \times 7 \times 11 = 5^2 \times 231 = 15 \times 385 = 175 \times 33$

455 is not a factor of 5475

68. $a + \frac{1}{b} = b + \frac{1}{c} = c + \frac{1}{a}$

$a - b = \frac{1}{c} - \frac{1}{b} = \frac{b-c}{bc} \ldots\ldots\ldots\ldots (1)$

$b - c = \frac{1}{a} - \frac{1}{c} = \frac{c-a}{ac} \ldots\ldots\ldots (2)$

$c - a = \frac{1}{b} - \frac{1}{a} = \frac{a-b}{ab} \ldots\ldots\ldots (3)$

Multiply these 3 relations

$(a-b)(b-c)(c-a) = \frac{(b-c)(c-a)(a-b)}{a^2b^2c^2}$

$a^2b^2c^2 = 1 \Rightarrow abc = \pm 1$

Examples:

$a = 1, b = -\frac{1}{2}, c = -2 \Rightarrow abc = 1$

$a = -1, b = \frac{1}{2}, c = 2 \Rightarrow abc = -1$

69. Lets the ages of children's 9,8,7,6,4,3,2,1(as 9 is oldest age)

L.C.M of ages = 504

We need to calculate 4 digit number which is multiple of 504 and have each digit twice

$504 \times 11 = 5544.$

70. Let number is N

$N = 9x + 6 \quad x, y \in I^+$

$N = 21y + 12$

$9x + 6 = 21y + 12$

$3x - 7y = 12$

x	3	10	17	.....
y	1	4	7	.....

So number are $9\times3+6,\ 9\times10+6,\ 9\times17+6.....$

$33,96,159.....T_n$

$T_n<1111$

$a+(n-1)d<1111$

$33+(n-1)63<1111$

$n<18.11.....$

$n=18$

71. Given equation identify, so each coefficient zero

$\alpha^2-5\alpha+6=0,\alpha^2-3\alpha+2=0\ \&\ \alpha^2--=0$

$\therefore\alpha=2$

72. $\dfrac{1}{x+a}+\dfrac{1}{x+b}=\dfrac{1}{c}$

$\dfrac{2x+a+b}{x^2+(a+b)x+ab}=\dfrac{1}{c}$

$(2x+a+b)c=x^2+(a+b)x+ab$

$x^2+(a+b-2c)x+ab-bc-ca=0$

Sum of the roots is zero

$a+b=2c$

Product = $ab=c(a+b)$

$=ab-\dfrac{(a+b)^2}{2}$

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

73. $x=1+(n-1)3$

Sum = $\dfrac{n}{2}[2+(n-1)3]=925$

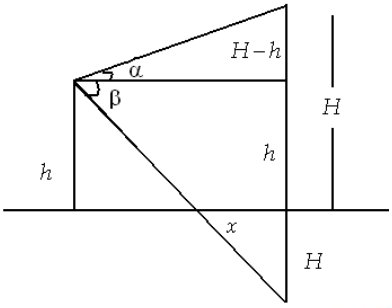
$n[3n-1]=25\times74$

$n=25,x=73$

74. The probability of getting a sum either 7 or 11 is $\frac{2}{9}$

$$P(E)=1-\frac{2}{9}=\frac{7}{9}$$

75.



$$\tan\alpha=\frac{H-h}{x}$$

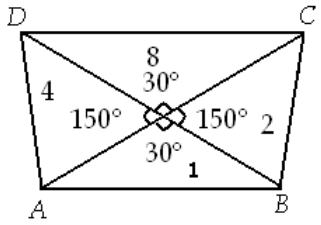
$$\tan\beta=\frac{H+h}{x}$$

$$\frac{\tan\alpha}{\tan\beta}=\frac{H-h}{H+h}$$

$$\frac{\tan\alpha+\tan\beta}{\tan\alpha+\tan\beta}=\frac{(H-h)-(H+h)}{H-h+H+h}$$

$$h=H\frac{(\tan\beta-\tan\alpha)}{\tan\alpha+\tan\beta}$$

76.



$OA=a;OB=b;OC=c;OD=d$

$ab=4;bc=8;cd=32;da=16$

$b(a+c)=12$

$d(a+c)=48$

$(a+c)(b+d)=60$

77. $\sec\theta+\tan\theta=\frac{3}{2}$

$\sec\theta-\tan\theta=\frac{2}{3}$

$\sec\theta=\frac{1}{2}\left[\frac{2}{3}+\frac{3}{2}\right]=\frac{13}{12}$

$\sin\theta=\frac{5}{13}$

78. –2 not possible

79. $x^{51}=p(a)\left(x^2-3x+2\right)+Ax+B$

Put $x=1$

$1=O+A+B$

Put $x=2$

$2^{51}=2A+B$

By solving $A=2^{51}-1$ & $B=2-2^{51}$

80. The length of the side of triangle = $2+2\sqrt{3}$

Area = $\frac{\sqrt{3}}{4}\left(2+2\sqrt{3}\right)^2=4\sqrt{3}+6$