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B.Sc. Ag/Vet./Fisheries/Forestry

For TU Model

2075

Set-XII

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Hints and Solutions

1. b) $y = A\cos(\omega t - kx)$
   $y = 3\cos(100\pi t - \pi x)$ $\therefore K = \pi, \omega = 100\pi$
   $K = \frac{2\pi}{\lambda}$ $\lambda = \frac{2\pi}{\pi} = 2$ cm
2. b) Lower than the source frequency, since the observer is moving away from source.
   $f' = \left(\frac{v - v_0}{v}\right) f$ so, $f' < f$
3. b)
4. c) The phenomenon due to which the wave oscillations are restricted to a particular plane only is called Polarization. Only transverse waves can be polarized and polarization is not possible in longitudinal waves.
5. a) For a small angle prism of angle A and refractive index μ:
   Angle of deviation = $(\mu - 1)A$
6. d) A charged particle moving under the influence of both electric and magnetic fields gain energy only from electric field (but not from magnetic field). K.E. of a charged particle entering a strong magnetic field remains constant.
7. a) Capacitance of a capacitor depends upon–
   size of conductors
   separation between conductors
   medium between the conductors
8. c) Lens law – conservation of energy
9. c) 45^o
10. c) The function of transformer is based on the principle of mutual induction and thus it always works on AC and not on DC.
11. b) The rate of decay i.e. number of disintegrations/sec of a radioactive substance which is also called its activity is given by
    $A = \frac{dN}{dt} = \lambda N_0$
    [Where λ = disintegration const.; N_0 = no. of total atoms initially]
    $\therefore \frac{dN}{dt} \propto N$
12. b)
13. c) Work function $(w_0) = 2eV = 3.2 \times 10^{-19}$ V
    Wave length $(\lambda) = 230$ nm $= 2.30 \times 10^{-7}$m
    Velocity (V) = ?
    From Einstein's equation, $h\nu = w_0 + \frac{1}{2}mv^2$
    $\frac{6.6 \times 10^{-34} \times 3 \times 10^8}{2.3 \times 10^{-7}} = 3.2 \times 10^{-19} + \frac{1}{2}mv^2$ [$\because v = c/\lambda$]
    $(8.6 \times 10^{-19} - 3.2 \times 10^{-19}) = \frac{1}{2}mv^2$
    $\frac{2 \times 5.4 \times 10^{-19}}{9.1 \times 10^{-31}} = v^2$ $\therefore v = \sqrt{1.18 \times 10^{12}}$ $v = 1 \times 10^6$ ms^{-1}
14. c) High resistance in series.

15. c) Remains constant

$\rho = \frac{1}{\sigma}$ $\left[\because R = \rho \frac{l}{A}\right]$

$\rho\sigma = 1$ = constant

16. c) $C_2H_5Br \xrightarrow{NaOH(aq)} C_2H_5OH \xrightarrow{Na} C_2H_5ONa \xrightarrow{CH_3I} C_2H_5OCH_3$

17. c)

18. c) Glucose and fructose have molecular formula $C_6H_{12}O_6$ and possess – CHO and >CO gp. respectively.

19. d) An orbital can accommodate maximum two electrons with opposite spin.

20. d) Among the given molecules, only ethanol can form H – bonding.

21. d) van der Waals forces are weak force of attractions.

22. a) In O_2F_2 oxygen has +1 oxidation state and in OF_2 oxygen has +1 oxidation state.

23. d) $E°_{cell} = E°_{cathode} - E°_{anode}$ = -0.41 – (-0.76) = + 0.35V (first convert oxidation potential to reduction potential).

24. a) $t_{1/2} \propto \frac{1}{[A]^{n-1}}$, where n is order of the reaction.

For zero order reaction, $t_{1/2} \propto \frac{1}{[A]^{-1}} \propto [A]$.

25. c) $2NO + O_2 \rightarrow 2\ NO_2$

32 g 92g

26. c) $V_1N_1 = V_2N_2$ or, $V_1 \times (0.5 \times 2) = 10 \times 0.5 \therefore V_1 = 5$ mL.

27. b) $MgCl_2$; it is a salt of strong acid and weak base.

28. b) Mol. mass of Y = M $\therefore$ V.D of Y = $\frac{M}{2}$

V.D. of X = $4 \times \frac{M}{2} = 2M$

$\therefore$ Mol mass of X = 2 × 2 M = 4M

29. a) $V_2 = \frac{V_1 \times T_2}{T_1} = \frac{5.46}{273} \times \frac{373}{1}$ = 7.46 L

30. a) Here 0.2 mole of NaOH is limiting reagent

$\therefore$ Neutralisation of 0.2 mole of NaOH release heat = 57.0 kJ

Neutralisation of 0.2 mole of NaOH release heat = 57.0 × 0.2 = 11.4 kJ.

31. a)

32.c	33.b	34.d	35.c	36.d	37.c	38.a	39.a	40.a	41.c
42.a	43.b	44.b	45.b	46.c	47.c	48.a	49.b	50.c	51.a
52.b	53.a	54.c	55.b	56.a	57.d	58.a	59.c	60.b	**61.a**
62.d	**63.b**	**64.a**	**65.b**	**66.c**	**67.b**	**68.c**	**69.d**	**70.a**	**71.b**
72.b	**73.d**	**74.b**	**75.d**						

76. c $\frac{dcosecx}{dx} = -coseecx.cotx$

77. c $2x^2+2y^2+8x-2y-3=0$, $x^2+y^2+4x-y-3/2=0$ Hence, g=2 , f=-1/2 so, centre(h,k)=(-g,-f)=(-2,1/2)

78. c The given equation is $4x^2-3y^2=36$ or, $x^2/9-y^2/12=1$, comparing with $x^2/a^2-y^2/b^2=0$ $a^2=9$, $b^2=12$

$e=\sqrt{1+\frac{a^2}{b^2}}=\sqrt{1+\frac{9}{12}}=\sqrt{1+\frac{3}{4}}=\sqrt{7/4}=\sqrt{7}/2$

79. a $\frac{d\tan^{-1}x}{dx} + \frac{d\tan^{-1}y}{dy} = 0$,

On integrating,

$\tan^{-1}x + \tan^{-1}y = \tan^{-1}C$ $\tan^{-1}\frac{x+y}{1-xy} = \tan^{-1}C \Rightarrow \frac{x+y}{1-xy} = C$

80. b

81. c A=(-3,2)={-2,-1,0,1} B=(-2,3)={-1,0,1,2} so, A-B=(-3,-2)

82. d 6 gentlemen can be arranged in (6-1)!=5! Ways and 4 men in 6 positions $^6P_4$

83. c Directly solve, the value will satisfy 1/e.

84. b arg (z)=-arg($\bar{z}$); therefore arg(z)+ arg($\bar{z}$)=0

85. d $f(x)=x^2-5x+k$; or, $f(4)=4^2-5.4+k$; since 4 is a root, f(4)=0. On solving, we get k=4

86. d

87. c No. of non-empty proper subsets=2^n-2.

88. c Here, if x>1 and x<2, the real value of the function won't exist. So, x=(1,2).

89. a

90. c If $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, (the equation is consistent and dependent); if $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, It has no solution (i.e. inconsistent and independent); and if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, it has unique solution (i.e. consitent and independent)

GK

91.b	92.c	93.c	94.b	95.a	96.d	97.d	98.a	99.c	100.a

Result will be published on Sunday

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Best of Luck