KEAM 2024 Question Paper June 7

Mathematics

Ques 1. tan($\cos^{-1}$(-24/25)) =

Ans. -7/24

Ques 2. $sin(2\ cos^{-1}(\frac{5}{12}) + sin^{-1}(\frac{5}{12}))$

Ans. 5/12

Ques 3. If two samples of size 30 and 40 have Arithmetic means 35 and 42 respectively. Then the combined mean of 70 samples is

Ques 4. If sin theta + cos theta = sqrt(2) then tan theta + cot theta

Ans. 2

Ques 5. Simplify $\frac{cos\ ec^2\theta - 1}{cos\ ec^2\theta} - \frac{sec^2\theta - 1}{sec^2\theta}$

Ans. Cos 2θ

Ques 6. $\int \frac{e^x}{z^x} dx$

Ques 7. $\int x^5 e^{x^3} dx$

Ans. ⅓ $e^{x^3}[x^3-1] + c$

Ques 8. Integral of f|x-2|dx from 0 to 3

Ans. 5/2

Ques 9. $\int \frac{\sin\theta \sin 2\theta}{1 - \cos 2\theta} d\theta$

Ans. Sin θ +c

Ques 10. The Range of f(x) = 8 + sqrt(x - 5)

Ans. [8, ∞)

Ques 11. $\int \frac{6x^3 + 9x^2}{x^4 + 3x^3 - 9x^2} dx$

Ques 13. If p(x)=(1+x+x^ 2 +...x^ 10)(1 - x + x ^ 2 +.....x^ 10) sum of all coefficients of p(x)

Ans. 11

Ques 14. Sum of Ist 20 terms of GP sqrt(3) - 1/(sqrt(3)) + 1/(3sqrt(3))

Ques 15. $\int_{-2}^{2} x|x|dx$

Ques 16. $lim_{x\to 4} \frac{1}{(x-4)} - \frac{5}{x^2-3x-4}$

Chemistry Question

Ques 1. Radioactive decay follows
1) Ist order
2) 2nd order
3) 3rd order
4) zero order
5) Pseudo 1st order

Ans. A

Ques 2. 10g of alcohol is dissolved in 90g of H_2O % of alcohol in solu is

Ans. 10

Ques 3. The IUPAC name of $HOCH_2(CH_2),CH_2COCH_2$

Ans. 7 hydroxyheptan-2-one

Ques 4. The electronic configuration of Pd (z = 46)

Ans. $4d^{10}5s^{0}$

Ques 5. Which of the following is paramagnetic
A) O_2
B) C_2
C) N_2
D) F_2
E) H_2

Ans. A

Ques 6. Which of the following is acidic oxide
A) CrO
B) CrO 3
C) V_2O_4
D) V_2O_5

Ans. A

Ques 7. Kjeldhals method can be used to estimate N_2 in___

Ques 8. Vapour pressure of H_2O at 323K is 95mmHg 176g of sucrose is dissolved in 900g of water vapour pressure of solution is about

Ans. 94.06 mm Hg

Ques 9. Conductivity of 0.02molL^1 solution of KCl is 0.248sm^{-1}. Molar conductivity of KCl solution is 1.24×10 sm^{2}mol

Ans. $1.24 * 10^{-2}$ S m^2 mol^{-1}

Ques 10. Catalyst used in wackers process

Ques 11. Deficiency of which viamin causes muscle weakness

Ans. Vit E

Ques 12. Set of possible quantum numbers is
a) n = 3 l = 2 m_{1} = - 4 s = 1/2
b) n = 2 l = 2 m_{1} = 0 s = 1/2
c) n = 2 l = 2 m_{1} = - 1 s = 1
d) n = 3 l = 2 m_{1} = - 2 s = 1/2
e) n = 3 l = 3 m_{2} = - 2 s = ½

Ans. D

Ques 13. Which of the following is true for Daniel cell?
A) oxidation at cathode
B) Reduction at anode
C) E cell = 1.1V
D) Electrical energy is converted chemical energy
E) Electrolyte is CuSO4 and FeSO4

Ans. C

Physics Question

Ques 1. The ratio of of C_p/C_v is equal to

A. (3 + f)/(4 + f)
B. 3/(4f) * c
C. (4f)/3
D. f/3
E. (f + 2)/f

Ans. E

Ques 2. A particle executes SHM with amplitude a and angular velocity ω. The ratio between acceleration amplitude and displacement amplitude is

Ans. ω^2

Ques 3. The elastic energy stored per unit volume in a streteched wire

- **A. 1/2 * s/y**
- **B. 1/2 * s/(y ^ 2)**
- **C. 1/2 * (s ^ 2)/y**

Ans. C

Ques 4. Speed of a transvese wave on a stretched string under the tension T & linear density u is

- **A. sqrt(mu/T)**
- **B. sqrt(T/mu)**
- **C. sqrt(mu*T)**
- **D. mu*T**
- **E. mu/T**

Ans. B

Ques 5. A block of mass 3kg executes SHM under the listoring force of a spring. The amplitude & time period of motion are 0.1 m & 314 see respectively. The maximum force exerted by the spring on the block is

A) 2N
B) 3N
C) 1.2N
D) 30N
E) 90N

Ans. C

Ques 6. If the radius of two soap bubbles are 2cm & 3cm. Then the ratio of excess pressure inside the soap bubble is
1) 5:3
2) 3:2
3) 2:3
4) 1:1
5) 3:5

Ans. 2

Ques 7. The zeroth law of thermodynamics leads to the concept of
A) carnot engine
B) work
C) temperature
D) Heat
E) internal energy

Ans. C

Ques 8. The ratio of maximum KE to maximum PE of a bob of a simple pendulum executing small oscillations is

Ans. 1:1

Ques 9. For a smoothly running analog clock, the ratio of angular velocity of the minute hand to the average velocity of hour hand is

Ans. 12:1

Ques 10. When every light travels from rarer medium to a denser medium its
A) frequency increases
D) wavelength decreases
B) wavelength increases

D) wavelength constant
C) frequency decreases

Ans. D

Ques 11. The work done by a gas on the system is zero in
A) Adiabatic
B) isochoric
C) isothermal expansion
D) isothermal compression

Ans. B

Ques 12. The lowest frequency of the air col in an open pipe of length L

Ans. v/2L