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Model Questions for Entrance Test for PhD Admissions
Department of Physics

1) A force $\bar{F}$ = 3 *i* + 2 *j* -4 *k* is applied at the point (1, -1, 2). Find the moment of the force about the point (2, -1, 3)

a) 57 b) $\sqrt{57}$ c) 67 d) $\sqrt{67}$

2) Find the Laplace transform of F(t) when F(t) is a periodic function with the period 2π, such that $F(t) = sint, 0 < t < \pi$ and $F(t) = 0, \pi < t < 2\pi$

a) $\frac{1}{(1 - e^{-\pi s})(1 + s^2)}$ b) $\frac{1}{(1 - e^{\pi s})(1 + s^2)}$ c) $\frac{1}{(1 - e^{-\pi s})(1 + s)}$ d) $\frac{1}{(1 - e^{-\pi s})(1 - s^2)}$

3)

4) Find the characteristic equation of the symmetric matrix A = $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$

a) $\lambda^3 + \lambda^2 + 9\lambda + 4 = 0$ b) $\lambda^3 - 6\lambda^2 - 9\lambda - 4 = 0$

c) $\lambda^4 - 6\lambda^2 + 9\lambda - 4 = 0$ d) $\lambda^3 - 6\lambda^2 + 9\lambda - 4 = 0$

5) Let $P_n(x)$ be a legendre polynomial. Then $P_{\downarrow}n^{\uparrow}|\,(x) =$

a) $(-1)^{\uparrow}(n+1)\ P_{\downarrow}n^{\uparrow}|\,(x)$ b) $(-1)^{\uparrow}n\ P_{\downarrow}n^{\uparrow}|\,(x)$ c) $(-1)^n\ P_n(x)$ d) $P_{\downarrow}n^{\uparrow}(||)\ (x)$

6) A group of order 4 may be

a) cyclic b) not cyclic c) abelian d) both a & b