VIVA Institute of Technology

Department of Applied Mathematics

All divisions(Sem-II)

Academic year: 2014-15

Assignment no 5

1 1. Show that

$$\int_0^\infty \sqrt[4]{x}\, e^{-\sqrt{x}} dx = \frac{3\sqrt{\pi}}{2}$$

2 **P.T** $$\int_0^\infty x\, e^{-x^8} dx . \int_0^\infty x^2 e^{-x^4} dx = \frac{\pi}{16\sqrt{2}}$$

3 **Show that** $$\int_0^1 \frac{dx}{\sqrt{x \log \frac{1}{x}}} = \sqrt{2\pi}$$

4 **Show that** $$\int_0^1 x^{a-1} \left(\log \frac{1}{x} \right)^{n-1} dx$$

5 Prove that $$B(m,n) = B(m,n+1) + B(m+1,n)$$

6 **Show that (i)** $$\int_0^1 \sqrt{(\sqrt{x} - x)} dx = \frac{\pi}{8}$$

7 **Show that** $$\int_0^{\pi/2} \sin^m \theta d\theta . \int_0^{\pi/2} \sin^{m+1} \theta d\theta = \frac{\pi}{2(m+1)}$$

8 Evaluate $$\int_0^1 \frac{x^2 + x^3}{(1+x)^7} dx$$

9 **Prove that** $$\int_0^1 \frac{x^{2n}}{\sqrt{1-x^2}} dx = \frac{(2n)!}{2^{2n}(n!)^2} \frac{\pi}{2}$$ **, where n is a positive integer**

10 Prove that $$B(m,m).B(m+\frac{1}{2}, m+\frac{1}{2}) = \frac{\pi}{m} 2^{1-4m}$$