

1/3

(BIG) FE - II  
APP. Maths-II  
(OLD COURSE)

18/11/2014  
QP Code 11825

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is compulsory.  
(2) Attempt any four questions from remaining six questions.  
(3) Figures to right indicate full marks.

1. (a) Find by double integration the total area enclosed by the lemniscate of Bernoulli 3

$$(x^2 + y^2)^2 = a^2 (x^2 - y^2)$$

- (b) Evaluate  $\int_0^{\infty} \frac{\sqrt{x}}{(1+2x+x^2)} dx$  3

- (c) Using Taylor's method solve  $\frac{dy}{dx} = x^3 + y$  with  $x_0 = 1, y_0 = 1$ . 3

- (d) Evaluate  $\int_0^2 \int_1^2 \int_0^{yz} xyz \, dx dy dz$  3

- (e) Solve  $(D^4 - 1)y = e^x + \cos x \cos 3x$  4

- (f) Solve  $\frac{dy}{dx} + (2x \tan^{-1} y - x^3)(1 + y^2) = 0$ . 4

2. (a) Evaluate  $\int_0^a \int_0^{a-x} \int_0^{a-x-y} x^2 \, dx dy dz$  6

- (b) Evaluate  $\int_0^2 \frac{\int_0^{\sqrt{4-x^2}} dy dx}{\sqrt{2x-x^2} \sqrt{4-x^2-y^2}}$  6

- (c) Evaluate  $\int_0^{\infty} \frac{e^{-x}}{x} \left( a - \frac{1}{x} + \frac{1}{x} e^{-ax} \right) dx$ . 8