

SARASWATI EDUCATION SOCIETY'S

SARASWATI COLLEGE OF ENGINEERING, NAVI MUMBAI, KHARGHAR

DEPARTMENT OF ENGINEERING SCIENCES & HUMANITIES

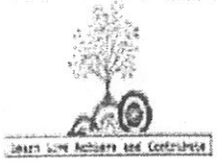
FIRST UNIT TEST SEM- II (2014-2015)

APPLIED MATHEMATICS-11

Total Marks: 20

SET A

Time: 1 Hr



Q1. Solve the following.

[5]

1) Which of the following is not exact differential equation

a) $(2xy^4e^y + 2xy^3 + y)dx + (x^2y^4e^y - x^2y^2 - 3x)dy = 0$

b) $(2x^2 + 3y^2 - 7)xdx + (3x^2 + 2y^2 - 8)ydy = 0$

c) $\left[y\left(1 + \frac{1}{x}\right) + \cos y\right]dx + [x + \log x - x \sin y]dy = 0$

d) $\frac{dy}{dx} = \frac{y+1}{(y+2)e^y - x}$

2) Integrating factor of the differential equation $(x \sec^2 y - x^2 \cos y)dy = (tany - 3x^4)dx$

Is a) $\frac{-2}{x}$

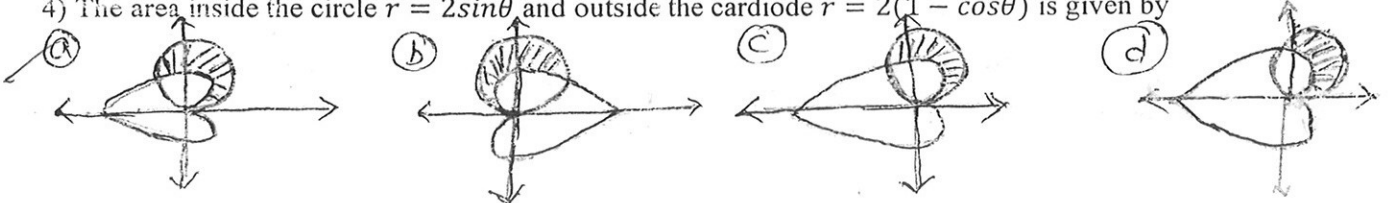
b) x^2

c) $\frac{1}{x^2}$

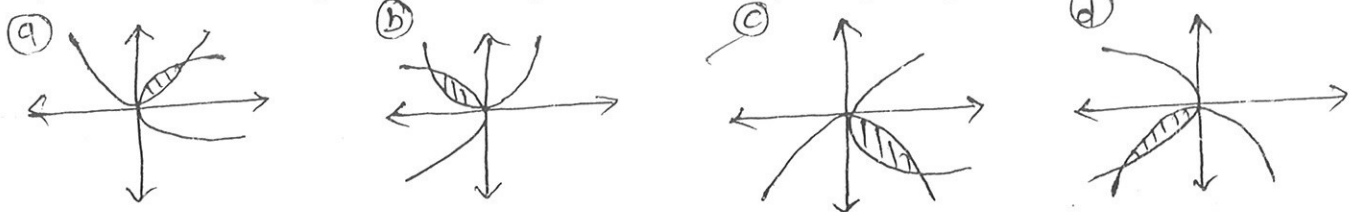
d) $\frac{-2}{x^2}$

3) If $\frac{dy}{dx} = x^2 + y^2$, $y = 1$ when $x = 0$, $h=0.2$ then by Eulers method first and second approximations are given by a) 1, 1.2 b) 1.2, 1.9 c) 1.48, 1.49 d) 1.2, 1.496

4) The area inside the circle $r = 2 \sin \theta$ and outside the cardioid $r = 2(1 - \cos \theta)$ is given by



5) The area bounded by the parabolas $y = x^2$ and $x = -y^2$ is given by



Q2. Attempt any THREE questions.

[15]

a) Change the order of integration $\int_0^a \int_{y^2/a}^y \frac{y dx dy}{(a-x)\sqrt{ax-y^2}}$

b) Evaluate $\iint xy dx dy$ over the region bounded by the x-axis, ordinate at $x = 2a$ and the parabola $x^2 = 4ay$

c) Change to polar coordinates and evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} (x^2 + y^2) dy dx$

d) Solve $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$

e) Solve $(1 + \sin y) \frac{dx}{dy} = [2y \cos y - x(\sec y + \tan y)]$

f) Use Euler's modified method to find the value of up to 4 places of decimals satisfying the following equations $\frac{dy}{dx} = x + \sqrt{y}$, $y(0) = 1$ for $x = 0.2$

$x_0 = 0 \quad y_0 = 1$

$h = 0.05$

