V26/S01022/EE/20160711

Time : 3 Hours **Marks : 80**

Instruction :

1. All Questions are Compulsory.
2. Each Sub-question carry 5 marks.
3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
4. Question paper of 80 Marks, it will be converted in to your programme structure marks.

1. Solve any **four** sub-questions.

   a) Evaluate 5

   $$\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dx\,dy\,dz$$

   b) Evaluate $\int_{0}^{a}\int_{0}^{\sqrt{ay}} xy\,dx\,dy$ 5

   c) Find the circumference of the circle of radius (a). 5

   d) Evaluate $\int_{0}^{4a}\int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dx\,dy$ 5

   e) Evaluate $\int_{0}^{a}\int_{\frac{x^2}{a}}^{2a-x} xy\,dx\,dy.$ 5

2. Solve any **four** sub-questions.

   a) Prove that 5

   B (m, n) = B (m, n + 1) + B (m + 1, n).

   b) Find the area of a collision bulkhead 12m high. The half breadths at equal intervals from top are : 7, 4.8, 2.95, 2, 1.65, 1.3 and 0m. 5

   c) Find the area of transverse bulkhead 10m high whose half-breadths at equal vertical. intervals are 10, 9.3, 8.3, 7.1, 5.7, and 3.8 meters. 5

   d) A ships water plane is 150m long. Half Breadths at equal intervals from aft are:

   2.97, 6.15, 7.84, 8.48, 8.06, 7.21, 5.72, 3.6 and 0 m respectively. Find area coefficient and TPC in SW. 5

   e) Find the area of a boat cover 10m long if half breadths at equal intervals from fwd are 0, 2.25, 3, 2.25 and 0m. 5

3. Solve any **four** sub-questions.

a) Test for convergence the series whose nth term is $\frac{\sqrt{n}}{n^2+1}$ 5

b) Test the series for convergence whose n^{th} term is $\frac{2\pi}{1+n^s}$. 5

c) Test the convergence of the series $\frac{(n+1)^n}{n!}$ 5

d) Test the convergence of the series $u_n = \frac{2^n(n!)}{n^n}$ 5

e) Discuss the convergence of the series 5

$$\sum_{n=1}^{\infty} u_n = \frac{2}{1^p} + \frac{3}{2^p} + \frac{4}{3^p} + ... + \frac{n+1}{n^p} + ...$$

4. Solve any **four** sub-questions.

a) In spherical triangle DEF, d = 57° 09′, e = 83° 12.0′ and f = 71° 08′. Calculate D. 5

b) In spherical triangle RST, t = 80° 32′, r = 60° 40′ and T = 90°. Calculate S. 5

c) In spherical triangle DEF, D = 64° 36′, e = 90° 00′ and E = 76° 47′. Calculate d. 5

d) Define great circle. And State its properties. 5

e) 1n spherical triangle JKL, j = 64° 18′, k = 85° 47.0′ and L = 93° 36′. Calculate I. 5