JEE Answer Booklet

Subjective Assessment - I

Ac. Yr. 2018-2019

Learn At Quest

Name Of Student :

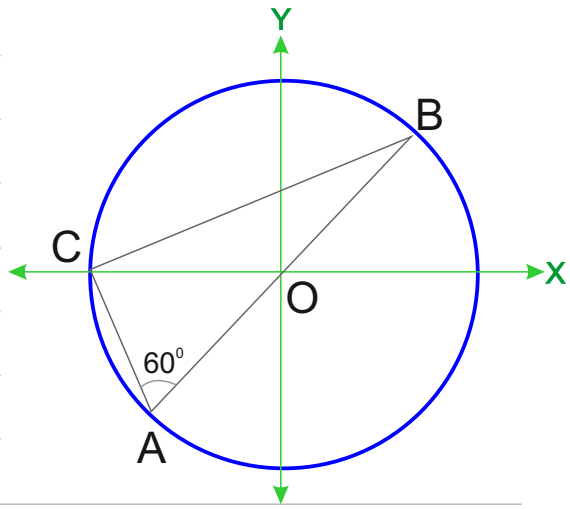
Chapters: Electrostatics
Limits, Continuity And Differentiability
Solid State

Date of Assessment ☐☐ / ☐☐ / ☐☐☐☐

Marks Scored

Q.1. Consider a system of three charges q/3, q/3 and –2q/3 placed at points A, B and C respectively as shown in the figure. Take O to be the centre of the circle of radius R and angle CAB = 60º.
Find:

a. Magnitude of electric field and its direction at O
b. Magnitude of total force on C and its direction
c. Potential at O
d. Total work done to bring a unit positive charge from infinity to point O
e. Potential energy of the system



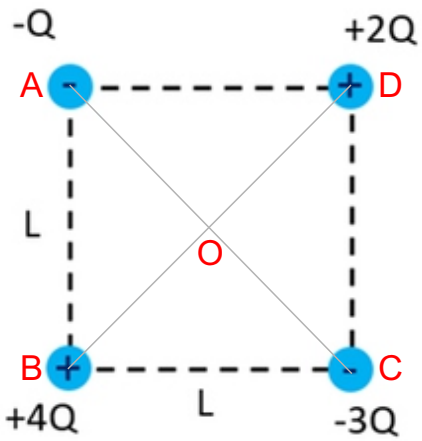
Questions To Be Solved On This Page: Q.1.

Rough Work

Questions To Be Solved On This Page: Q.2.

Q.2. Four charges q, 2q, 3q, 4q are placed at corners A, B, C and D of a square as shown below in the figure. Find:

a. The field at centre O of square.
b. Work done to move a 2 C charge from A to O
c. Work done to move a 2 C charge from O to B
d. Work done to move a 2 C charge from A to B through O

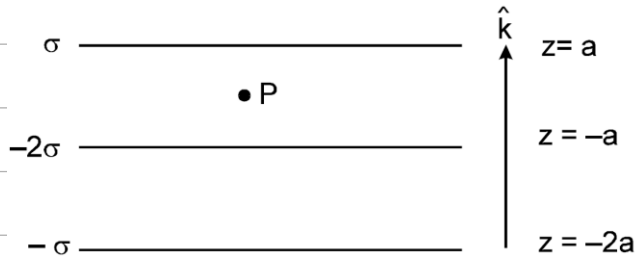


Rough Work

Questions To Be Solved On This Page: Q.3.

Q.3. a. The electric potential V as a function of distance x (in metre) is given by $V = (5x^2 + 10x - 9)$ volt. Find the value of electric field at x = 1 m.

b. Three large parallel plates have uniform surface charge densities as shown in the figure. Find out electric field intensity at point P.

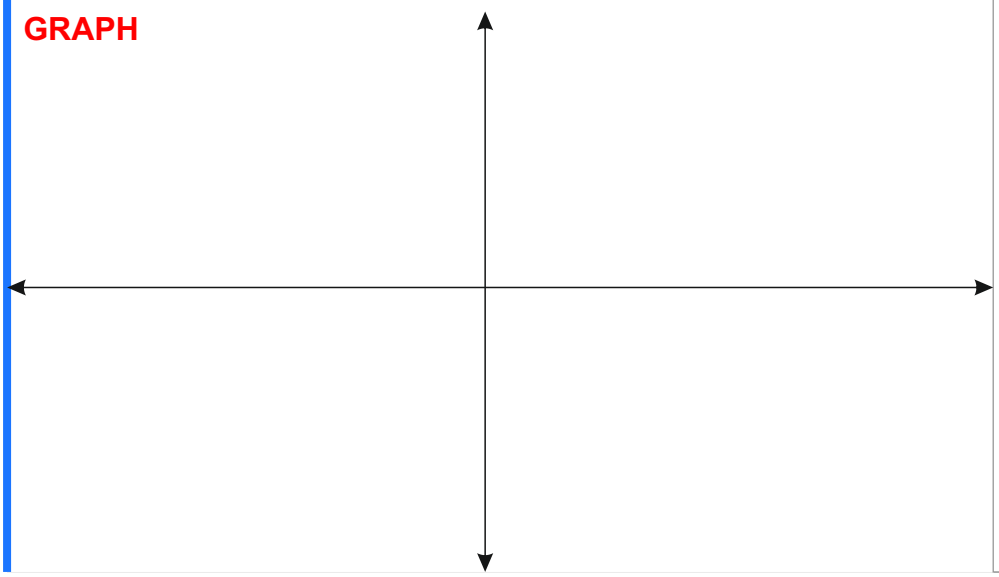


Rough Work

Questions To Be Solved On This Page: Q.4.

Q.4. Discuss the continuity & differentiability of the function f(x) = sin x + sin |x|.
Draw a rough sketch of the graph of f(x).

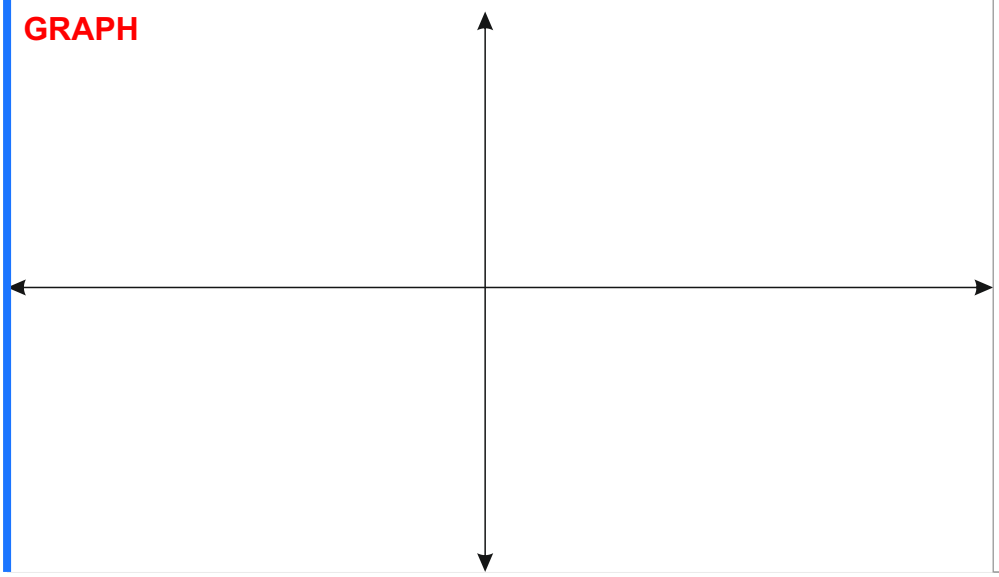
GRAPH



Questions To Be Solved On This Page: Q.5.

Q.5. Examine the continuity and differentiability of f(x) = |x| + |x - 1| + |x - 2|.
Also draw the graph of f(x).

GRAPH



Questions To Be Solved On This Page: Q.6.

Q.6. If $x^y + y^x = 2$ then find dy/dx.

Rough Work

Questions To Be Solved On This Page: Q.7.

Q.7. An element crystallizes in a structure having FCC unit cell of an edge 200 pm. Calculate the density, if 200 g of this element contains 24×10^{23} atoms.

Rough Work

Questions To Be Solved On This Page: Q.8.

Q.8. The edge length of unit cell of a metal having atomic weight 75 g/mol is 5 Å which crystallizes in cubic lattice. If the density is 2 g/cc then find the radius of metal atom. ($N_A = 6 \times 10^{23}$).
Give the answer in pm.

Rough Work

ROUGH WORK

ROUGH WORK

ROUGH WORK