INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH KOLKATA

Date: 01/12/2018 FN   Time 3 Hrs.   Full Marks *50*   No. of Students **28**
Autumn Semester *2018-2019* Department of *Earth Sciences*   Sub. No. *ES3105*
3rd Yr. BS-MS *Earth Sciences (Major)*   Sub. Name *Seismology*
Instruction: **Answer all questions. Please write brief and to the point answers.**

Q1. The P-wave Receiver Functions (P-RFs) plotted in figure below have been calculated for ray parameter of 0.057 s/rad. Answer the following:

(a) What is the difference between the three plots?   **(1)**

(b) Draw the P-RF on the answer sheet and label all the phases.   **(3)**

(c) Draw the ray diagram for all these phases.   **(4)**

(d) Assume a Poisson's solid and use the arrival time of the converted and reverberating phases to calculate the thickness (H) of the layer from which these phases arrive.   **(5)**

(e) What are the assumption(s) that you have made for the calculation in (d)?   **(2)**

(f) What is the ideal distance range for calculating P-RFs and explain the choice.   **(2)**

(g) How is the source term accounted for in P-RF calculation?   **(3)**
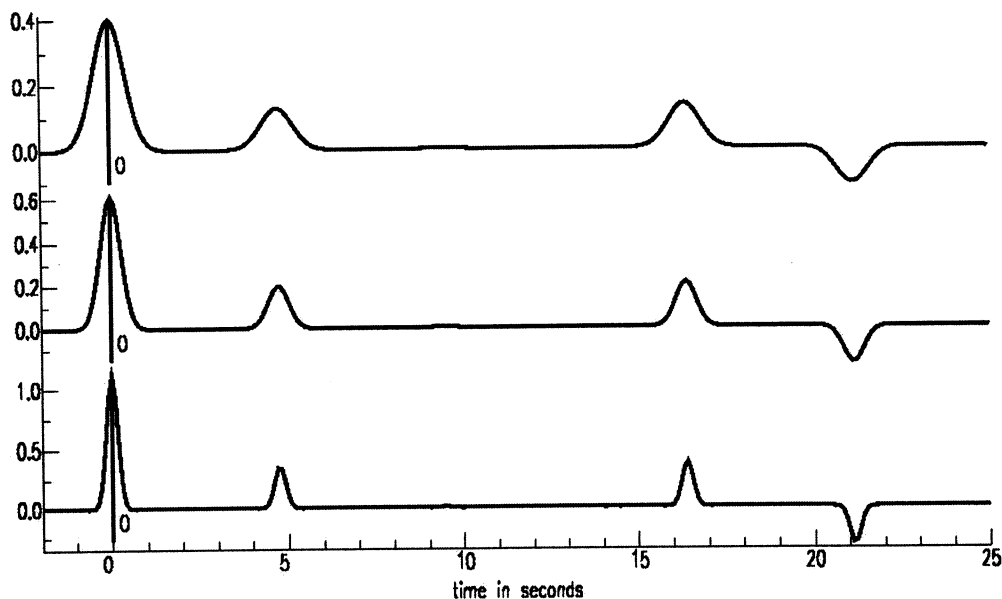
Q2. (a) What is equivalent body forces for a fault model?   **(2)**

(b) Draw and label the nine different force couples of the moment tensor.   **(5)**

(c) Write the moment tensor for a left-lateral vertical fault normal to the x_1 axis.   **(2)**

(d) What will be the orientation and sense of motion for the other force couple which balances the one in (c).   **(1)**

Q3. Derive the expression for reflection and transmission coefficients for an SH-wave propagating in a vertically stratified medium.   **(10)**

Q4. Derive the Eikonal equation for compressional waves.   **(10)**

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