

## Quiz 2: (Reservoir Geophysics & Deepwater Imaging - GPD 510)

Total points 12/20 

Answer all questions

No negative marks

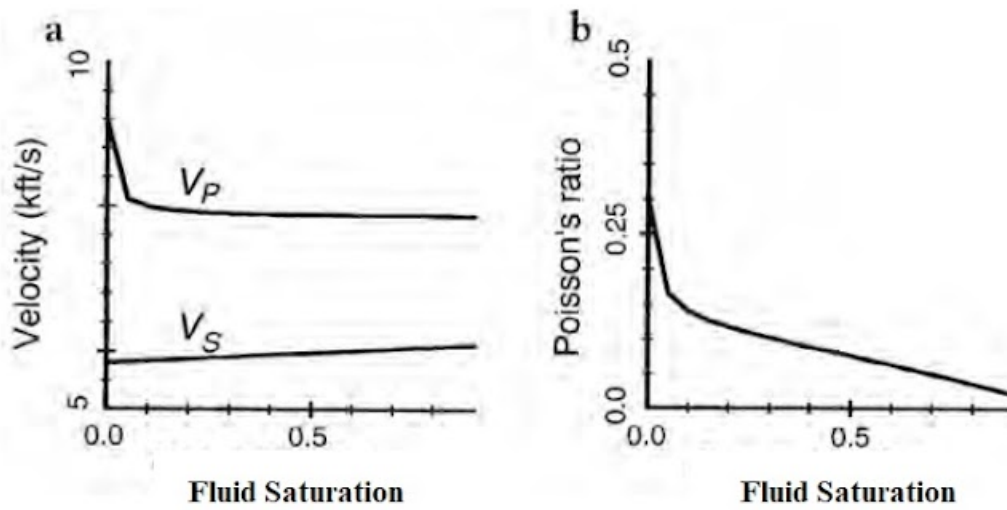
Maximum marks : 20

The respondent's email ([shiwani.19mc0074@agp.iitism.ac.in](mailto:shiwani.19mc0074@agp.iitism.ac.in)) was recorded on submission of this form.



✗ Interpret the curves based on the presence of fluid in the reservoir. \*

3/4



As the fluid increases poisson ratio go down below 0.25 and also  $V_p$  decreases as saturation increases, from ratio of  $V_p$  by  $V_s$ , we may assume the presence of gas sand

✗

Correct answer

(a) P-wave velocity of a porous solid rapidly decreases with the introduction of a small percentage of gas. The S-wave velocity increases linearly with gas saturation. (b) The two effects show a decrease in the Poisson's ratio of the rock with increasing gas saturation (Allen and Peddy, 1993).



✗ What are the benefits of VSP for seismic data processing? Provide minimum four points. \*

2/4

1. Anisotropy measurement, 2. High resolution borehole image, 3. Continuous velocity, 4. Well to seismic tie it has resolution comparable to seismic so works better than logs

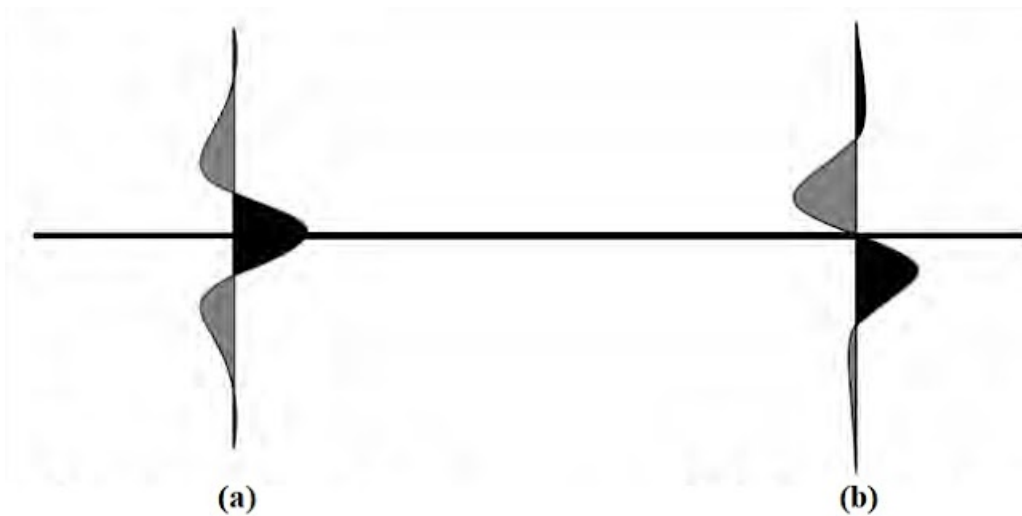
✗

#### Correct answers

- (a) Designing an appropriate wavelet for deterministic deconvolution,
- (b) Identifying multiples and their genesis for effective removal,
- (c) Determining attenuation spectrum of subsurface for 'Q' compensation,
- (d) Estimating the interval velocity and zero-phase reflectivity, and
- (e) Determining optimal filter bands for signal enhancement.

✗ Identify the phase of the wavelets: "a" & "b" \*

1/2



a). zero phase, b) 45

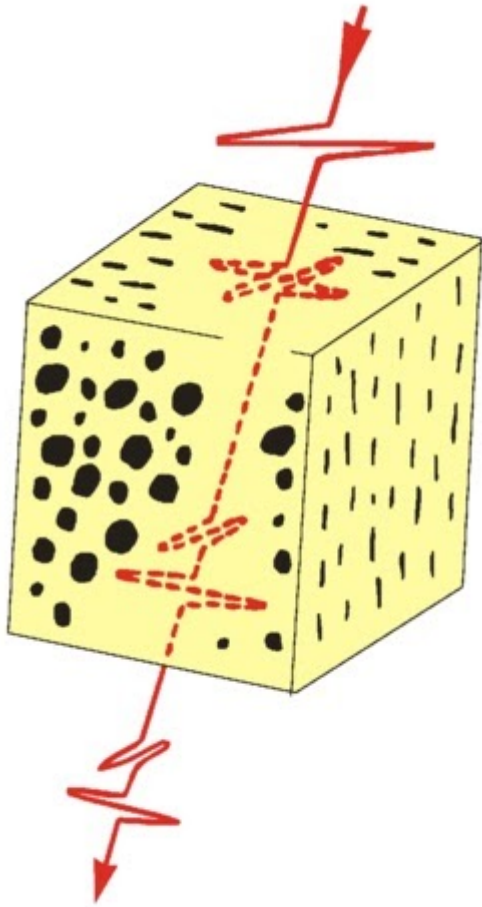
✗

#### Correct answer

Zero degree & 90 degree



- ✓ Based on the provided diagram of MCS principle what processes are demonstrated here? \* 2/2



Propagation of P-wave, SV-wave, SH-wave, Due to anisotropy Shear wave splitting, where SH-wave moving parallel to fracture orientation and SV-wave perpendicular to that. ✗

Correct answer

Shear-wave splitting in fracture-induced HTI media.



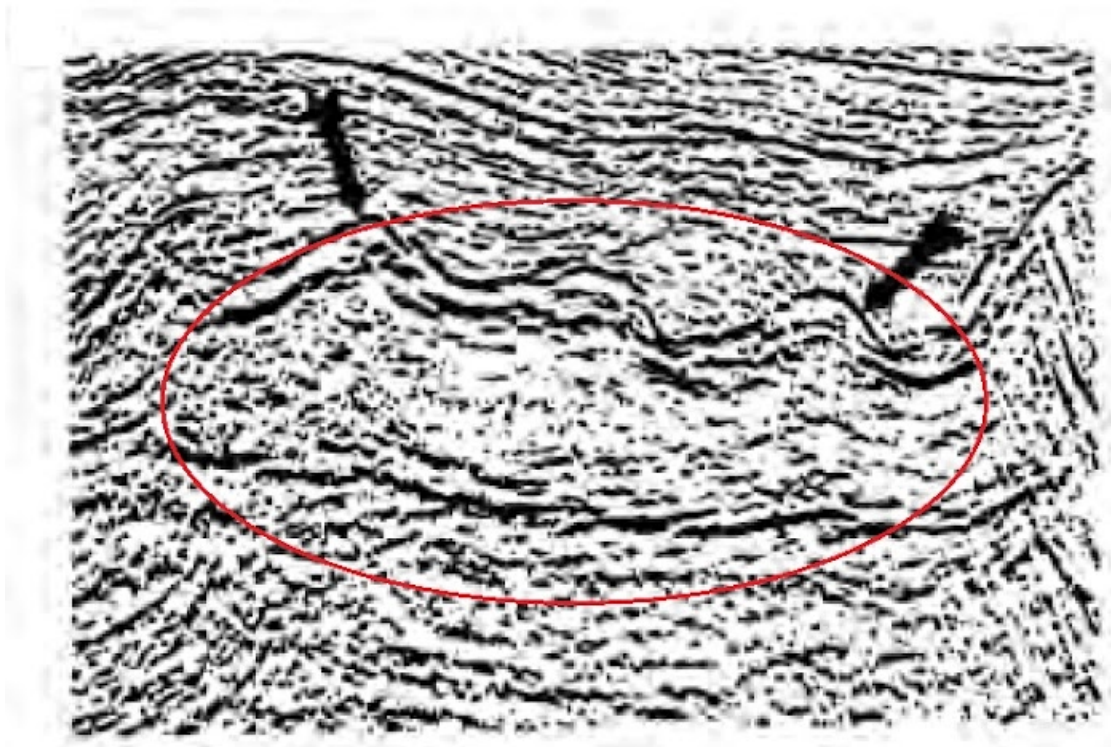
✗ Based on the information of “Q” provide justification that VSP supply more information than check-shot. \* 1/2

VSP is advancement of check-shot, Check shot only gives time depth relationship and records only first breaks i.e. only downgoing wave, but VSP records both upgoing and downgoing waves and produces wellbore seismic image. ✗

#### Correct answers

- Source signal not recorded and does not offer information about absorption (Q) loss
- Source signal recorded at each geophone and its variation with depth provides absorption (Q) information

✗ Identify the structure which is circled by RED colour based on 1994 data 3D migrated seismic data. \* .../2



Rollover anticline ✗

#### Correct answer

Salt



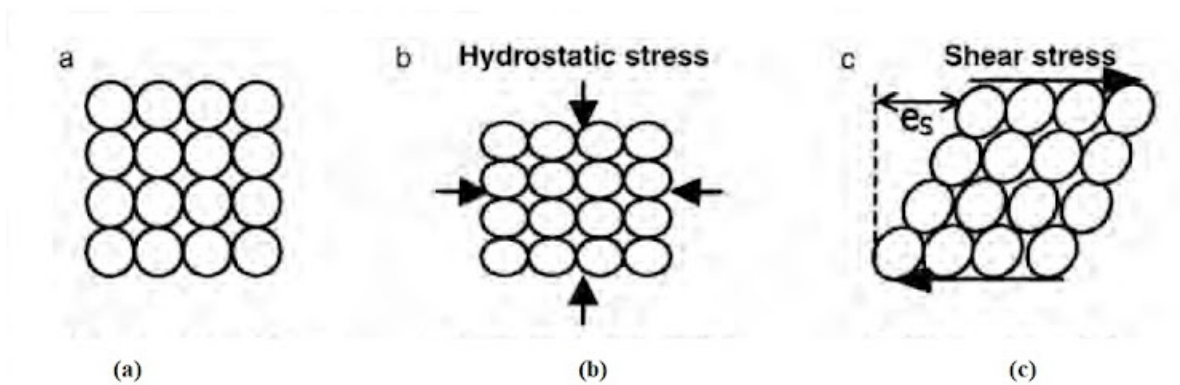
✓ Why MEMS provides better development for MCS study specially MCS data acquisition. \* 2/2

It is the miniature version of accelerometer, it improves data quality by improving S/N ratio and it reduce the crossfeed between the 3 geophone components. ✗

Correct answer

Reducing cross feed between three components based on miniaturized accelerometer development like microchips.

✗ Identify the rock matrix "a", "b" and "c" based on stress orientation. \* 1/2



1. unloaded b. vertically loaded, c Sideways ✗

Correct answer

Unstressed, compressed and Sheared

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