كلية الهندسة- جامعة مصراته

القسم/ الهندسة النفطية
الزمن/ 3 ساعات
أستاذ المادة/ د. عبد الحكم

الامتحان النهائي

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اجب عن جميع الاسئلة

Question(1): (12 marks)

1. Define the following terms:
   a) Deviation control
   b) Inclination angle
   c) Jetting action
   d) Course departure
   e) Measured depth
   f) Survey azimuth
   g) Departure direction
   h) Lead angle

2. List the three types of trajectories commonly used to hit the target.

Question(2): (14 marks)

1. Using the angle-averaging method, calculate the trajectory for the well from 8500 to 8900 ft., where the kickoff is at 8500 ft. and the rate of build is 1^0/100 ft., using a lead of N17E and a right-hand walk rate of 1^0/100 ft. direction to the bull's eye is 35^0 . assume that the first 200 ft. is to set the lead, where the direction is held constant to 8700 ft. and then turn right at a rate of 1^0/100 ft.

   Note: for the first point the direction should average.

2. Write down different steps to plan a trajectory

Question(3): (10 marks)

1. Determine the dog leg severity flowing a jetting run where the inclination was changed from 6.2^0 to 8.9^0 and direction from S85W to N83W over a course length of 87.

   Note: index of angle change (i) is 100 ft.

2. With help of sketch, explain how to use Ouija Board Nomograph for determination total angle change , and tool face angle

Question(4): (14 marks)

1. It is desired to drill a well. For this well, a build and hold trajectory will be used. Horizontal departure to the target(X_3) is 1760 ft. at a TVD (D_3) of 6513 ft. the recommended rate of build(q) is 3^0/100 ft. The kickoff depth(D_1) is 1050 ft. determine the following :

   a) The radius of curvature r_1
   b) The maximum inclination angle θ
   c) The measured depth to the end of the build(D_m)
   d) The TVD at the end of the build section(D_2)
   e) The total measured depth(D_{tot})
   f) The horizontal departure to the end of the build (X_2)
   g) The measured depth at a TVD of 1320 ft.
   h) The horizontal displacement at a TVD of 1320 ft.

2. What are the direction, in alternative format, of each of the following wells:

   a) Well A S40W
   b) Well B 330^0
   c) Well C N60W
   d) Well D 110^0

Question(5): (10 marks)

1. Calculate the axial and polar moments of inertia for a 6-in. round collar with a 2.1875-in. ID (I_6 and J_6 respectively) and for an 11-in. collar with a 3-in. ID (I_{11} and J_{11} respectively).

2.Explain the mechanism of deviating the well using whip stock device.

3.List the problems associated with drilling horizontal wells.

انتهت الاسئله
مع تمنياتي بالنجاح

Appendix

$$r_1 - X_3 = (D_3 - D_1)\tan\tau$$

$$D_M = D_1 + \frac{\theta}{q}$$

$$D_2 = D_1 + r_1 \sin\theta$$

$$X_2 = r_1(1 - \cos\theta)$$

$$\frac{1}{q} = r_1 \frac{\pi}{180}$$

$$\theta = \Omega - \tau$$

$$D_{tot} = D_M + \frac{r_1}{\tan\Omega}$$

$$\sin\Omega = \frac{r_1}{\sqrt{(r_1 - X_3)^2 + (D_3 - D_1)^2}}$$

$$L = \Delta D_M \sin\left(\frac{\alpha_A + \alpha_{A-1}}{2}\right) \cos\left(\frac{\epsilon_A + \epsilon_{A-1}}{2}\right)$$

$$M = \Delta D_M \sin\left(\frac{\alpha_A + \alpha_{A-1}}{2}\right) \sin\left(\frac{\epsilon_A + \epsilon_{A-1}}{2}\right)$$

$$D = \Delta D_M \cos\left(\frac{\alpha_A + \alpha_{A-1}}{2}\right)$$

$$\beta = 2 \arcsin\sqrt{\sin^2\left(\frac{\Delta\alpha}{2}\right) + \sin^2\left(\frac{\Delta\epsilon}{2}\right)\sin^2\left(\frac{\alpha + \alpha_N}{2}\right)}$$

$$\delta = \frac{\beta}{L_e} \quad (i)$$