Manual Drivetrains and Axles, 8th Edition
Chapter 15

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) Why must there be a center differential in a four-wheel drive vehicle that is used on hard pavement?

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2) How is front/rear torque split using a planetary gear –type center differential accomplished?

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3) How can a four-wheel-drive vehicle get stuck if one or more wheels are on a slippery surface?

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4) What is the difference between a mode shift and a range shift?

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1) All-the-time four-wheel drive, all-wheel-drive, and full-time four-wheel-drive systems use a center differential, also called interaxle differential, to prevent driveline harshness and vibration.
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2) The torque split can be varied by using a planetary gear set as a center differential by changing the number of teeth on the various elements and how they are interconnected can result in various torque splits front to rear.
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3) This can occur in the following instances:
• If the front, center, and rear differentials are open type, and if only one wheel is on a slippery surface, then the other wheels will only get the torque required by the wheel on the slippery surface and thus the vehicle may not be able to move.
• In case the rear differential is a limited slip-type and both front and center differentials are open type, then if one of the rear tires was on a slippery surface, then the vehicle could continue to move only if the other rear drive wheel was on dry pavement.
• If one front wheel and one rear wheel were on a slippery surface and the rear axle was limited slip, the vehicle may not be able to move because the center differential is an open type.
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4) Mode shift—Either two-wheel drive or four-wheel drive may be selected.
Range shift—A low range may be selected to deliver high torque at low speeds to the drive wheels.
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