APPENDIX

Engine Repair: Sample Interprovincial Red Seal Examination Questions

1. A grade 8 UNF capscrew has _____ lines on the head.
   - **a.** 2
   - **b.** 4
   - **c.** 6
   - **d.** 8
2. A metric bolt size of M8 means that _____.
   - **a.** The bolt is 8 mm long
   - **b.** The bolt is 8 mm in diameter
   - **c.** The pitch (the distance between the crest of the threads) is 8 mm
   - **d.** The bolt is 8 cm long
3. On a metric bolt sized M8 × 1.5, the 1.5 means that _____.
   - **a.** The bolt is 1.5 mm in diameter
   - **b.** The bolt is 1.5 cm long
   - **c.** The bolt has 1.5 mm between the crest of the threads
   - **d.** The bolt has a strength grade of 1.5
4. Four-stroke cycle engines fire once _____ crankshaft revolution/s.
   - **a.** Every two
   - **b.** Every four
   - **c.** Every
   - **d.** Every one-half
5. If the bore of an engine is increased without any other changes except for the change to oversize replacement pistons, the displacement will _____ and the compression rate will _____.
   - **a.** Increase; increase
   - **b.** Increase; decrease
   - **c.** Decrease; increase
   - **d.** Decrease; decrease
6. An engine has low oil pressure. Installing a new oil pump and the correct grade of oil made no difference. What is the most likely problem?
   - **a.** Worn engine bearings
   - **b.** Worn piston rings
   - **c.** Loose valve clearance (lash)
   - **d.** Plugged PCV system
7. The stroke of the engine is determined by the
   - **a.** Connecting rod length
   - **b.** Piston pin location in the piston
   - **c.** Crankshaft
   - **d.** Height of the piston head
8. Air, at a pressure of 830 kPa (120 psi), is fed into a spark plug opening with a cylinder leakage tester. Air is heard escaping from the oil fill opening in the camshaft cover. This could indicate
   - **a.** A burned valve
   - **b.** A leaking head gasket
   - **c.** Broken piston rings
   - **d.** Cracks in the cylinder head
9. Checking compression on a diesel engine is done
   - **a.** At the spark plug opening
   - **b.** With a crankcase pressure test
   - **c.** At the glow plug opening
   - **d.** With a cylinder balance test
10. Most oil pressure tests are done at idle speed and _____ rpm.
    - **a.** 500
    - **b.** 1250
    - **c.** 2500
    - **d.** 3500

11. Engine oil leaks are often located by adding fluorescent dye to the oil and checking with an/a
- **a.** Aerosol powder spray
- **b.** Shop trouble light
- **c.** Black light
- **d.** Visual inspection

12. When removing a cylinder head, which order should the bolts/nuts be loosened?
- **a.** From the front of the engine to the rear
- **b.** The lower (or outer) row first
- **c.** In the reverse order of assembly
- **d.** Start in the middle and work to both ends

13. Removing the ring ridge before removing the piston/rod assembly is done to prevent damage to the
- **a.** Piston ring lands
- **b.** Cylinder block
- **c.** Piston rings
- **d.** Piston skirt

14. In what area does most cylinder wall wear take place?
- **a.** In the centre of the cylinder
- **b.** Varies with engine loading
- **c.** Near the top of the cylinder
- **d.** At the bottom, due to connecting rod loading

15. Squirting oil into the cylinders (wet test) before checking the compression is done to test
- **a.** Piston rings
- **b.** Valve sealing
- **c.** Head gasket leakage
- **d.** The cylinder head for cracks

16. The crankshaft harmonic balancer should be removed by pulling on
- **a.** The outer ring
- **b.** The crankshaft snout
- **c.** The damper hub
- **d.** Both the ring and the hub at the same time

17. If a notch is found on the head of a piston, the notch usually faces the
- **a.** Rear of the engine
- **b.** Major thrust side
- **c.** Front of the engine
- **d.** Minor thrust side

18. Piston pin offset is used to
- **a.** Reduce piston skirt temperature
- **b.** Reduce piston slap
- **c.** Lower piston crown temperature
- **d.** Reduce piston pin clearance

19. The valve timing on a single overhead camshaft engine is retarded because of a stretched timing belt. How will this affect performance?
- **a.** High RPM power will be reduced
- **b.** No change in performance
- **c.** Low RPM power will be reduced
- **d.** Power will be reduced at all engine speeds

20. Low compression in two cylinders that are side by side is likely caused by
- **a.** Two burned exhaust valves
- **b.** Two burned intake valves
- **c.** A leaking intake manifold gasket
- **d.** A leaking head gasket

21. Before removing the piston/rod assemblies from the engine, the connecting rods should be checked for
- **a.** Proper marking for location
- **b.** Free movement of the piston pin
- **c.** Big-end elongation
- **d.** Rod bolt torque values

22. Connecting rods are resized by grinding the parting surfaces of the rod and honing the bore back to standard. This cannot be done with most _____ rods
- **a.** Forged steel
- **b.** Powdered metal
- **c.** Full-floating
- **d.** Press-fit

23. Piston rings are installed on the piston with a
- **a.** Piston ring compressor
- **b.** Pair of snap-ring pliers
- **c.** Piston ring expander
- **d.** Piston press

24. A bearing shell is being installed in a connecting rod. The ends of the bearing are slightly above the parting line. This is called bearing _____.
- **a.** Spread
- **b.** Oil clearance
- **c.** Crush
- **d.** Side play

25. Press-fit piston pins are often installed in the connecting rod by
- **a.** Cooling the piston pin in dry ice
- **b.** Soaking the rod eye in boiling water
- **c.** Heating the eye of the connecting rod with a rod heater
- **d.** Pushing the pin with a vise and soft jaws

26. Crankshaft rod journal damage during piston/rod installation is prevented by using
- **a.** Rod bolt protectors
- **b.** The old bearing while installing the rod
- **c.** Heavy grease on the crank journal
- **d.** A wooden hammer handle to push the piston into the cylinder

27. A scored or cracked cylinder wall in a cast-iron block can be repaired by
- **a.** Welding the cylinder wall
- **b.** Installing cast-iron threaded plugs
- **c.** Reboring for a larger piston
- **d.** Installing a dry cylinder sleeve

28. Piston ring end gap is usually about 0.10 mm (0.004 in.)
- **a.** On most engines
- **b.** Per 25 mm (1 in.) of bore size
- **c.** Per 100 mm (4 in.) of bore size
- **d.** To prevent blowby

29. Piston ring end gap should be measured _____ in a worn cylinder
- **a.** At the top of the cylinder
- **b.** At the bottom of the cylinder
- **c.** Above the ring travelled area
- **d.** In the centre of the cylinder

30. Oil holes in main bearing shells should
- **a.** Be in both upper and lower bearings
- **b.** Face the block

c. Be small enough to retain high oil pressure
d. Face the cap

31. Most engine bearing clearance specifications are in the range of
a. 0.00 to 0.05 mm (0.000 to 0.002 in.)
b. 0.025 to 0.075 mm (0.001 to 0.003 in.)
c. 0.05 to 0.10 mm (0.002 to 0.004 in.)
d. 0.075 to 0.125 mm (0.003 to 0.005 in.)

32. RTV silicone sealant cures from
a. Evaporation in the air
b. The moisture in the air
c. The absence of air
d. Pressure of the two components

33. The heat shield has been removed from the bottom of a carbureted V-8 intake manifold. This may cause
a. The manifold to run cooler
b. Engine oil to coke (harden)
c. An increase in high RPM power
d. The engine to overheat

34. A cast-iron V-8 cylinder head is checked for warpage using a straightedge and a feeler (thickness) gauge. Maximum warpage is 0.05 mm (0.002 in.). What should be done?
a. Straighten the head in a press
b. Resurface the head
c. Replace the head
d. Reinstall as is

35. Many automakers recommend that torque-to-yield head bolts should
a. Be measured for overall length
b. Be thread checked with a thread pitch/gauge
c. Not be reused
d. Be lubricated only with anti-seize lubricant

36. All valve train components should be kept together because
a. They can be inspected for wear
b. They should always be replaced as a set
c. Parts wear into each other
d. They are easier to measure for wear when they are a pair

37. A valve being removed from a cylinder head begins to bind as the tip enters the guide. What should be done?
a. Apply penetrating oil to the guide
b. Tap the valve through with a brass punch
c. The valve tip edges should be filed
d. Cut the valve stem off with a hacksaw

38. Timing chains are usually replaced when chain slack exceeds
a. 6 mm (1/4 in.)
b. 13 mm (1/2 in.)
c. 19 mm (3/4 in.)
d. 25 mm (1 in.)

39. The timing belt breaks on a free wheeling overhead camshaft engine. What will happen?
a. All intake valves will be bent
b. The piston and valves collide
c. The exhaust valves are bent
d. The engine will quit

40. Before the valve seats are reconditioned, the _____.
a. Valves must be refaced
b. Valve guides must be reconditioned
c. Valve installed height must be measured
d. Valve spring assembled height must be measured and noted

41. Typical valve stem to guide clearance should be
a. 0.012 to 0.025 mm (0.0005 to 0.001 in.)
b. 0.025 to 0.075 mm (0.001 to 0.003 in.)
c. 0.125 to 0.250 mm (0.005 to 0.010 in.)
d. 0.250 to 0.380 mm (0.010 to 0.015 in.)

42. Some manufacturers recommend that valves be ground with an interference angle. This angle is the difference between the _____.
a. Valve margin and valve face angles
b. Valve guide and stem angle
c. Valve face and valve seat angles
d. Margin angle and valve head

43. Valve margin should be at least _____ with most valves
a. 0.38 mm (1/64 in.)
b. 0.75 mm (1/32 in.)
c. 1.50 mm (1/16 in.)
d. 3 mm (1/8 in)

44. Integral valve guides are reconditioned by installing bronze guide liners or by
a. Installing oversize valve guides
b. Installing undersize valve stems
c. Reaming the guide for an oversize valve stem
d. Pressing out the old valve guide and installing a new guide

45. To narrow and lower a 45º valve seat, the technician should use a _____ stone
a. 75º
b. 60º
c. 45º
d. 30º

46. To widen a 45º valve seat without lowering or raising its position, the technician should use a _____ stone
a. 45º
b. 60º
c. 75º
d. 90º

47. Valve springs are checked for _____, free height and squareness
a. Tension
b. Out of round
c. Open valve height
d. Twist

48. Multiple valve springs (dual springs) generally have both coils
a. Wound in the same direction
b. With exactly the same tension
c. Wound in opposite directions
d. With the same number of coil turns

49. Excessive valve stem height is usually corrected by
a. Replacing the valve
b. Grinding the valve seat
c. Grinding material from the valve tip
d. Replacing the valve seat

50. Valve spring installed height is usually adjusted by
- **a.** Replacing the valve spring retainers
- **b.** Installing longer valve springs
- **c.** Installing valve spring inserts (shims)
- **d.** Installing shorter valves

51. Which type of valve seal moves up and down with the valve?
- **a.** Umbrella seals
- **b.** Rubber and teflon seals
- **c.** Positive valve seals
- **d.** All teflon positive seals

52. Cylinder head bolts are generally lubricated with
- **a.** SAE 80W-90 gear lube
- **b.** Never-seize compound
- **c.** Silicone spray lubricant
- **d.** Engine oil

53. The freezing and boiling point of engine coolant is measured with a/an
- **a.** Spectrograph
- **b.** Coolant hydrometer
- **c.** Infared pyrometer
- **d.** Scan tool

54. Radiator cores are made of sheet brass or
- **a.** Aluminum
- **b.** Copper
- **c.** Steel
- **d.** Plastic

55. A cooling system with a 100 kPa (15 psi) radiator pressure cap has raised the coolant boiling point to
- **a.** 100°C (212°F)
- **b.** 125°C (257°F)
- **c.** 150°C (302°F)
- **d.** 175°C (347°F)

56. Checking the radiator coolant level should be done when the engine is
- **a.** Warm
- **b.** Cold
- **c.** At operating temperature
- **d.** Idling

57. Engines that use reverse cooling pump the coolant from the
- **a.** Engine block into the cylinder head
- **b.** Cylinder head into the radiator
- **c.** Engine block into the radiator outlet
- **d.** Radiator into the cylinder head

58. A leaking water pump may show coolant flowing from the
- **a.** Bypass hose
- **b.** Water pump weep hole
- **c.** Bearing assembly
- **d.** Radiator overflow container

59. The cooling fan on most transverse engine vehicles is driven by
- **a.** A belt from the crankshaft
- **b.** A serpentine (one piece) drive belt
- **c.** An electric motor
- **d.** Hydraulic oil pressure

60. Radiator pressure caps are tested with
- **a.** An air hose and adaptor
- **b.** A radiator pressure tester
- **c.** A scan tool readout of cooling system pressure
- **d.** The pressure cap mounted on the radiator

61. The top radiator hose collapses flat whenever the engine is allowed to cool. The most likely problem is
- **a.** A leaking pressure valve seal at the cap
- **b.** Insufficient coolant in the coolant recovery container
- **c.** Low coolant level
- **d.** A sticking pressure cap vent valve

62. If the level of the coolant in the overflow container is correct, the radiator coolant level must also be correct.
- **a.** False
- **b.** True
- **c.** Only with a cold engine
- **d.** Only at operating temperature

63. Radiators that use an integral transmission oil cooler locate the cooler in the
- **a.** Overflow tank
- **b.** Inlet tank
- **c.** Outlet tank
- **d.** Opening to the radiator core

64. Oil pumps are usually driven by the camshaft or
- **a.** Timing chain
- **b.** Camshaft sprocket
- **c.** Crankshaft snout
- **d.** Timing belt

65. Lubricating oil moves from the oil pump to the
- **a.** Main oil gallery for the bearings
- **b.** Valve train
- **c.** Oil filter
- **d.** Hydraulic valve lifters

66. A vehicle is towed in with an oil filter that has blown open. After replacing the filter and oil, the technician should
- **a.** Check the maximum oil pressure
- **b.** Run the engine at high RPM
- **c.** Check the minimum oil pressure
- **d.** Check the original oil for the correct weight

67. When an oil pump drive shaft breaks, the usual cause is
- **a.** Excess oil in the engine
- **b.** Debris in the oil pump
- **c.** Lack of lubrication
- **d.** A worn oil pump

68. The oil pump relief valve (pressure regulating valve) controls
- **a.** Maximum oil pressure
- **b.** Oil pressure to the valve train
- **c.** Minimum oil pressure
- **d.** Return oil from the bearings

69. A new or rebuilt engine should be broken in during the first road test by
- **a.** Keeping maximum speed under 50 km/h (30 mph)
- **b.** Light throttle acceleration

c. Full throttle acceleration from 50 to 80 km/h (30 to 50 mph)
d. Driving at higher speeds: over 80 km/h (50 mph)

70. The first oil and filter change on a rebuilt engine should be done in _____ kilometres (_____ miles)
a. 80 (50)
b. 500 (300)
c. 800 (500)
d. 1500 (1000)

ANSWERS

1. c
2. b
3. c
4. a
5. a
6. a
7. c
8. c
9. c
10. c
11. c
12. c
13. a
14. c
15. a
16. c
17. c
18. b
19. c
20. d
21. a
22. b
23. c
24. c
25. c
26. a
27. d
28. b
29. b
30. b
31. b
32. b
33. b
34. d
35. c
36. c
37. c
38. b
39. d
40. b
41. b
42. c
43. b
44. c
45. d
46. a
47. a
48. c
49. c
50. c
51. a
52. d
53. b
54. a
55. b
56. b
57. d
58. b
59. c
60. b
61. d
62. a
63. c
64. c
65. c
66. a
67. b
68. a
69. c
70. c