



6. The following are maintenance practices carried out on a communication tower except
- Replacement of lightening arresters
  - Weak pans, booms and brackets are checked and replaced
  - Tower segment are lubricated to reduce stress due to expansion
  - Retightening bolt and nuts to ensure loose contacts are firmly tightened
7. Which of these tools is used by maintenance technicians to identify a particular network cable among a bundle of cables?
- Inductive tester
  - Signal generator
  - Toner and Probe
  - Solenoid voltage meter
8. The following maintenance practices are carried out on
- Check for shaft and sprocket alignment
  - Replacement of damaged links
  - Check for cleanliness of components.
- Chain drives
  - Belt drives
  - Shaft drive
  - Couplings
9. What is the possible solution when the display of the projector at ED 1 gets dim
- Clean the filter
  - Clean the lens
  - Put out the room light
  - Replace the projector lamp
10. A tinted dot on a projector image means that dust particles have settled on
- Lens
  - Filter
  - Lamp
  - Colour module
11. Which of these bodies is responsible for ensuring the day-to-day safety of our passenger vehicle before embarking on a trip.
- MTTU
  - GPRTU
  - DVLA
  - NIC
12. In ultra sonic and sonic fault detection of a transformer, high Hydrogen generation is an indication of
- Partial discharge
  - High external temperature
  - loose windings
  - Arcing
13. In IR scan of a transformer bushing, low oil level is as a result of
- Failure of seal at the bushing bottom
  - Failure of seal at the top of bushing
- i only
  - ii only
  - i and ii
  - None of the above

14. Which of the following will result in vibration, overheating of phase windings and pulsations in motor maintenance.
- a) Loose connections
  - b) Voltage and current imbalance
  - c) Worn out brushes
  - d) Broken slip ring
15. The maintenance of control system in the Ward Leonard Speed control of DC motors is targeted at.
- a) Flux control
  - b) Voltage control
  - c) Thyristor control
  - d) Field generated by both motor and generator
16. What does this mean to you as a maintenance person; when a specific gravity difference of 0.050 or more exist between cells of a battery.
- a) The battery is discharging abnormally
  - b) The electrolyte is depleted of Hydrogen ions
  - c) The battery is nearing its useful life
  - d) The battery needs to be charged again
17. Which of these has a ventilation system to reduce fire hazard and corrosion.
- a) Lead acid battery
  - b) Lithium ion Battery
  - c) Nickel Cadmium battery
  - d) Potassium ion Battery
18. All the following precautionary measures must be observed when maintaining batteries except.
- a) Stir the mixture with a glass or plastic rod
  - b) Ensure neutralizing solution are available for immediate use
  - c) Add concentrated acid slowly to water
  - d) Maintain charging room above 35°C but not greater than 50°C
19. Which of these is not done on brakes.
- a) Check fluid levels and leaks
  - b) Check linings and pads condition
  - c) Check brake linkages condition and lubrication
  - d) Check filter condition
20. \_\_\_\_\_ will lead to poor performing pump, over-heating and burning of pistons
- a) Clogged fuel filters
  - b) Broken radiator
  - c) Damaged water pump
  - d) Dirty engine oil
21. All the following constitute bus body inspection at Western Transport Services except.
- a) Check floor condition
  - b) Check seat and upholstery condition
  - c) Check seat belt
  - d) Check dashboard condition

22. On crane maintenance, how often should the gear box oil be changed.
- a) Once every one month  
 b) Once every three months  
 c) Once every six months  
 d) When necessary
23. Which of the following cannot take radial load?
- a) Cylindrical Roller bearing  
 b) Taper roller bearing  
 c) Thrust ball bearing  
 d) None of the listed
24. Thick film lubrication describes a phenomenon where two surfaces are \_\_\_\_\_ separated.
- a) completely  
 b) partially  
 c) not  
 d) None of the mentioned
25. Viscosity of lubricating oil decrease with increasing temperature.
- a) Yes  
 b) It increases linearly  
 c) It increases hyperbolically  
 d) it remains constant
26. In hydrodynamic lubrication, film thickness remains unaffected by change in speeds.
- a) True  
 b) Increase with increase in speed  
 c) It increases hyperbolically  
 d) Disappear as the speed tends to infinity
27. Adjusting screw can be used for adjusting belt tension?
- a) Yes  
 b) No  
 c) Distance can never be changed  
 d) None of the listed
28. Chain drives suffer from wear problems.
- a) Yes, chain might leave the sprocket  
 b) No, there is no wear problem  
 c) Wear is insignificant in chain drives  
 d) None of the listed
29. In gear boxes and small size motors, rolling contact bearings are used.
- a) True  
 b) False
30. In silent chain sprocket teeth have a rectangular profile.
- a) Yes rectangular  
 b) No trapezoidal  
 c) No circular  
 d) No hyperbolic
31. The science of friction, lubrication and wear is called
- a) Endiology  
 b) Metrology  
 c) Tribology  
 d) Morphology
32. Viscosity varies with the temperature and hence if a surface to be lubricated is normally at high temperature it should be supplied with oil of a higher viscosity.
- a) True  
 b) False

33. Which of the following can be used to identify primary symptom of misalignment.
- a) Vibration analysis
  - b) Infrared thermography
  - c) Machine castings
  - d) Vibration analysis and Infrared thermography

34. This is not a cause of misalignment in shafts.
- a) Relative movement
  - b) Torsional movement and human error
  - c) Settling
  - d) Angular alignment and strain

35. Which factor is the odd amongst the effects of misalignment.
- a) Higher than normal repair order
  - b) Reduced profits
  - c) Increased inventory of spare parts
  - d) Good quality of products

36. In kinetic lifting it incorrect to have the following:
- a) a proper hold of the item being lifted
  - b) a straight back
  - c) the chin held into the chest
  - d) correct foot position, *i.e.* on foot forward and the feet 300 mm apart

37. Spur gears are the simplest types of gears, with teeth cut at an angle to the axis.
- a) True
  - b) False

38. Part X shown in Figure 1 is called \_\_\_\_\_
- a) Grate
  - b) Bearing support

- c) Grating system
- d) Grout dam

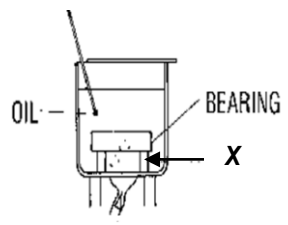


Figure 1

39. Identify the part labelled C in Figure 2.
- a) Bedplate
  - b) Driven

- c) Driver
- d) Foundation

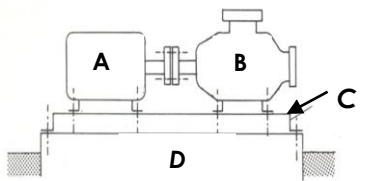


Figure 2

40. Under what condition(s) of transmission of power do we use the gear arrangement shown in Figure 3?

- a) Decreasing speed
- b) Increasing speed
- c) Change in direction of rotation
- d) All the above

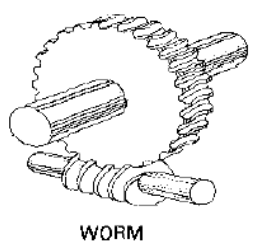


Figure 3

41. What will be the adjustment at A shown in the Figure 4?

- a)  $\frac{L_1}{L_2} t^2$
- b)  $\frac{L_1}{L_2} t$
- c)  $\left(\frac{L_1}{L_2}\right)^2 t$
- d)  $\frac{L_1}{L_2} t^3$

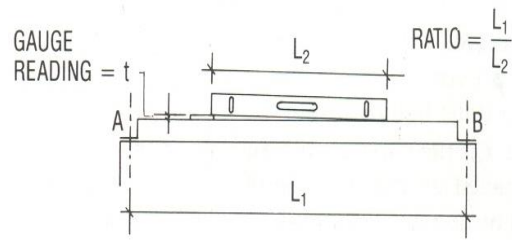


Figure 4

42. Name the part labelled Y in Figure 5

- a) Absorbent pad
- b) Grout
- c) Sleeve
- d) Foundation

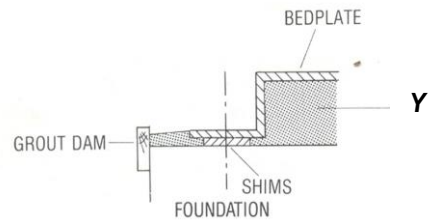


Figure 5

43. Identify part Z in Figure 6

- a) Absorbent pad
- b) Grout
- c) Sleeve
- d) Foundation

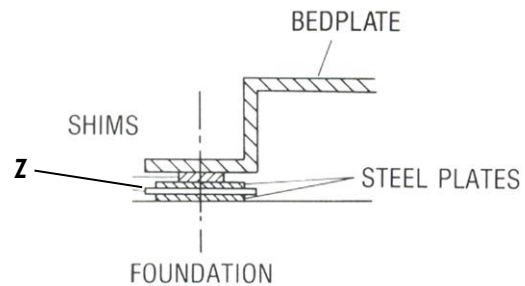


Figure 6

Use Figure 7 to answer question 39 to 41

44. What type of bearing is shown in Figure 7a?

- a) Thrust bearing
- b) Plain bearing
- c) Journal bearing
- d) Linear bearing

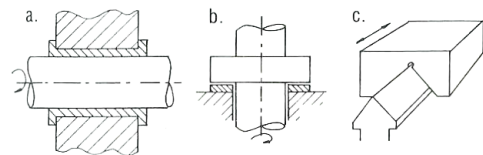


Figure 7

45. Figure 7b represents which type of bearing?

- a) Thrust bearing
- b) Plain bearing
- c) Journal bearing
- d) Linear bearing

46. \_\_\_\_\_ is shown in Figure 7c.

- a) Thrust bearing
- b) Plain bearing
- c) Journal bearing
- d) Linear bearing

47. **A** and **B** shown in Figure 8 are respectively \_\_\_\_\_
- Sleeve and bushing
  - Bushing and sleeve
  - Seal and sleeve
  - Bushing and journal bearing

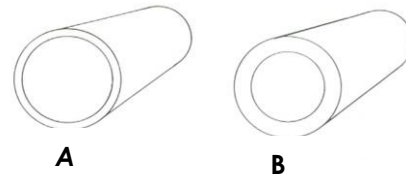


Figure 8

48. Which of the arrangements in Figure 9 will produce the maximum transmission power?

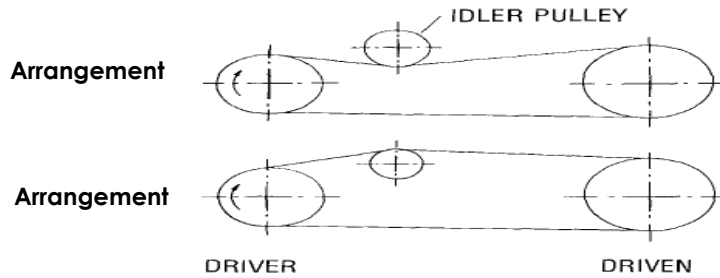


Figure 9

- Arrangement 1
- Arrangement 2

49. What does Figure 10 portray?
- Setup for alignment
  - Setup for speed measurement
  - Setup for pressure measurement
  - Setup for temperature measurement



Figure 10

50. What type of failure pattern is shown in Figure 11?
- Fatigue
  - Scoring
  - Undercutting
  - Pitting

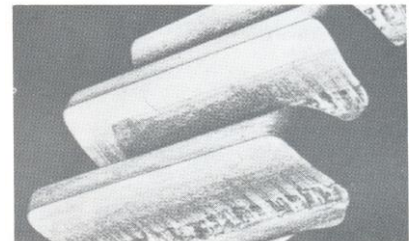


Figure 11

51. Which of these best describes the Class II type of motion?
- Fingers, wrist and forearm
  - Fingers only
  - Fingers and wrist
  - Entire body
52. Motions involving the fingers, wrist, forearm and shoulder can be described by:
- Class I type of motion
  - Class II type of motion
  - Class III type of motion
  - Class IV type of motion

53. Motors are subject to shock loading from the driven machine and must be designed to \_\_\_\_\_ referred shock.
- absorb
  - withstand
  - transmit
  - transfer

54. A longer and larger diameter shaft may be required to handle higher radial load of belt drivers. What will be the appropriate type of bearing to be provided at the drive end?
- a) Ball bearing
  - b) Roller bearing
  - c) Sleeve
  - d) Bushing
55. Standard motors are designed for long life when operated within their rating under usual service conditions. What other condition in addition to dirt, dust, oil and chemicals can cause a marked decrease in their insulation life.?
- a) Speed
  - b) Feed rate
  - c) Vibration
  - d) Lubricants
56. Ambient temperature is added to the temperature rise of the motor to determine the total temp imposed upon the insulation.
- a) True
  - b) False
57. On the maintenance checklist for a substation is a subsection on SWITCH GEAR. One would have to check the following: oil/compound leakage, signs of corrosion, hissing sound, Plinth and \_\_\_\_\_
- a) Oil level
  - b) Arching horns
  - c) Earth lead or arrestors
  - d) Link or fused
58. The two main ways of performing the maintenance function are \_\_\_\_\_
- a) Job planning and scheduling
  - b) Planned and routine maintenance
  - c) Preventive and corrective maintenance
  - d) Preventive and repair of breakdown
59. The probability that a failed equipment or machine will be restored to a required working condition is that machine's \_\_\_\_\_
- a) Serviceability
  - b) Maintainability
  - c) Availability
  - d) Efficiency
60. A maintenance method which involves the planning and subsequent execution of maintenance procedures is termed as \_\_\_\_\_
- a) Planned corrective maintenance
  - b) Routine work
  - c) Planned maintenance
  - d) Maintenance

## SECTION B

### ANSWER QUESTION 1 AND ANY OTHER (60 MARKS)

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#### Q1

In a Graduate-Trainee class at Royal Mechelect Company Limited, you are to:

- a. discuss the importance of lubrication in your area of specialization to achieve lean maintenance.
- b. identify a particular equipment/device/component and select a suitable lube for it; make sure you bring out clearly what will inform your choice of lube for the setup.
- c. explain why you would have to change the lube from time to time.

(30 marks)

#### Q2

Your company is faced with financial constraints. Consequently, the Management Board is looking at a way to reduce maintenance cost.

- a. How would you address the board on this issue, taking cognisance of the essence of maintenance of your plant and equipment?
- b. What maintenance activities would you adopt to bring about reduced operating cost and why?

(20 marks)

#### Q3

It has come to the notice of your company that some portion of the frontline workers are complaining of unfair treatment of allocation of jobs that are tedious and require longer periods of time to accomplish.

- a. How would you use the principles of work study to alleviate the stress the workers go through?
- b. Could this stress be eased up by applying Ergonomics?

(20 marks)

**Examiner:** A. Simons