B.Tech. DEGREE EXAMINATION, DECEMBER 2015
First Semester

15ME101 – BASIC MECHANICAL ENGINEERING
(For the candidates admitted during the academic year 2015 – 2016)

Note:
(i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer **ALL** Questions

1. The power transmitted by the belt drive is (T_1 – tension on tight side, T_2 – tension on slack side, where v = linear velocity, ω = angular velocity)
   (A) $(T_1 - T_2)V$ (B) $(T_1 - T_2)\omega$
   (C) $(T_1 + T_2)v$ (D) $(T_1 + T_2)\omega$
2. The difference between the circle thickness of one gear and tooth space of the making gear.
   (A) Clearance (B) Backlash
   (C) Circular thickness (D) Pitch surface
3. For constant velocity ratio positive drive with large centre distance between the driven and the driven shaft use.
   (A) Chain drive (B) Gear drive
   (C) V belt (D) Flat belt
4. The minimum radius circle drawn to the cam profile is called.
   (A) Prime circle (B) Base circle
   (C) Pitch circle (D) Pitch curve
5. In a gear drive module is equal to
   (A) 1/circular pitch (B) 1/diametrical pitch
   (C) π/circular pitch (D) Diametrical pitch / π
6. The device which converts thermal energy to Mechanical Energy in a steam power plant is
   (A) Boiler (B) Generator
   (C) Condensor (D) Turbine
7. Which is the most common type of collector in solar water heating?
   (A) Evacuated tube collector (B) Flat plate collector
   (C) Concentrating collector (D) Solar PV
8. ---------- is required four stroke CI engine for combustion.
   (A) Compressor (B) Fuel injector
   (C) Carburetor (D) Spark Plug
9. Which of the following is not shearing sheet metal operation?
   (A) Blanking (B) Piercing
   (C) Drawing (D) Notching

10. Shaping a metal around a straight axis is called as
(A) Bending
(B) Drawing
(C) Coining
(D) Embossing

11. In soldering, the composition of the Plumber's solder is lead -------- % and bin -------- %
(A) 37 and 63
(B) 70 and 30
(C) 50 and 50
(D) 58 and 42

12. In brazing, the commercially used filler metal normally consists of ------- copper and ------ zinc alloy
(A) 45% and 55%
(B) 60% and 40%
(C) 55% and 45%
(D) 40% and 60%

13. ---------- is a multi tooth cutting tool in drilling.
(A) Boring tool
(B) Counter sink tool
(C) Counter bore tool
(D) Reamer tool

14. The most commonly used tool for making holes in drilling is
(A) Centre drill
(B) Cone drill
(C) Twist drill
(D) Gun drill

15. In lathe, the operation type of honing is
(A) Tool rotates, single pass cutting
(B) Tool rotates, multi point cutting
(C) Work-piece rotates, single pass cutting
(D) Removes large amount to get close to shape

16. --------- is a lathe operations of cutting edge at an angle on the corner of the cylinder
(A) Threading
(B) Chamfering
(C) Parting
(D) Grooving

17. Formula for Module is
(A) D/N
(B) N/D
(C) π D/N
(D) π N/D

18. Angle of contact for smaller pulley is
(A) $180 - \alpha$
(B) $180 + \alpha$
(C) $180 - 2\alpha$
(D) $180 + 2\alpha$

19. Diameter of the coil is 20mm and diameter of the wire is 1.5mm. What is spring index?
(A) 10
(B) 13.33
(C) 20
(D) 18.5

20. Chamfer angle in a chamfering tool is
(A) 15°
(B) 30°
(C) 45°
(D) 60°

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

21. If the tension in tight side is 1.3kN tension on the slag side is 54N and the coefficient of friction between belt and pulley is 0.25 diameter of the drive is 200mm and follower is 400mm, speed of driver is 400rpm. Find out the power capacity of the drive.

22. Calculate the equivalent spring stiffness K_{eq} separately for springs in series with K_1 = 40kN/m, K_2 = 30KN/m and for springs in parallel with K_3 = 20 kN/m is K_4 = 25 kN/m.

23. Write short notes on gears and classify them.

24. What are the advantages and disadvantages of wind energy?

25. What do you understand by spring back effect?

26. If the diameter of one end of the rod is 7cm and that of the other is 5.2cm the length of the rod is 14 cm. Find the tapper angle.

27. Explain the lathe operations turning and facing with neat sketch.

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

28. a. Explain the terms used in springs with neat sketch.

(OR)

b. Explain the motion of the follower with motion curves.

29. a. Explain the nomenclature of a spur gear with neat sketch.

(OR)

b. Classify belt drives and explain the terminologies used in belt drive.

30. a. Explain the hydro electric power plant and its components with neat sketch.

(OR)

b. Describe the working principle and operation of a 4 stroke CI engine with neat sketches.

31. a. Explain with suitable sketches blanking punching, piercing & notching operations.

(OR)

b. Describe with suitable sketches arc welding using metal electrode.

32. a. List out the various Lathe operations with neat sketches.

(OR)

b. Describe the parts of sensitive drilling machine with neat sketch.

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