Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code: MEC801 and Course Name: Design of Mechanical Systems Time: 1hour Max. Marks: 50

Note to the students: - All the Questions are compulsory and carry equal marks .

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| Q1.  | In morphology of design, feasibility study involves |
| Option A: | Sensitivity analysis  |
| Option B: | Simulation Analysis |
| Option C: | Exploring design problems with constraints  |
| Option D:  | Testing design concept |
| Q2. | In morphology of design, Planning for Manufacturing involves |
| Option A: | Economic commitment and financial capabilities  |
| Option B: | Planning Warehouse system |
| Option C: | Planning Promotional activities  |
| Option D: | Design for safety |
| Q3. | In methodology of design, blue print of the design contents |
| Option A: | Dimensions, tolerances, surface finish and manufacturing methods |
| Option B: | Determine the material |
| Option C: | Determine the mode of failure  |
| Option D: | Requirement of the products |
| Q4. | In morphology of design, Testing design concept and simplification comes under |
| Option A: | Preliminary design  |
| Option B: | Detailed design |
| Option C: | Feasibility study  |
| Option D: | Primitive need |
| Q5. | The following is the preliminary stage of Production planning |
| Option A: | Capacity planning  |
| Option B: | Material requirements planning |
| Option C: | Scheduling  |
| Option D:  | Product development and design |
| Q6. | Find width of cross piece if the outer diameter of hook bearing is 150mm |
| Option A: | 200mm |
| Option B: | 180mm |
| Option C: | 250mm |
| Option D:  | 225mm |
| Q7.  | Find number of turn on drum for one rope from given data : Maximum lift = 10m, Ratio of pulley system = 2, Drum diameter = 726mm |
| Option A: | 7 |
| Option B: | 11 |
| Option C: | 9 |
| Option D:  | 6 |
| Q8.  | Find the area of cross section of rope for a design of hoisting mechanism considering from following data : Stress factor is 6, Maximum tension is 26.315 kN ,Ratio of 𝑫𝒎𝒊𝒏/𝒅 𝒊𝒔 𝟐𝟑, ultimate tensile is 180kgf/mm2 |
| Option A: | 190.84 mm2 |
| Option B: | 180.95 mm2 |
| Option C: | 189.64 mm2 |
| Option D:  | 178.94 mm2 |
| Q9. | Find breaking strength of rope for 6 x 37 group of rope for design of hoisting mechanism with given data : load on tension per fall is 2025kgf, tensile strength of wire is 180kgf/ mm2, stress factor or design factor is 6, assume d/Dmin = 1/23 |
| Option A: | 26.3714 ton |
| Option B: | 25.4045 ton |
| Option C: | 25.1278 ton |
| Option D:  | 23.4823 ton |
| Q10.  | What is the mass capacity of flat belt conveyor if volumetric capacity 0.55m3/hr? (ρ = 1500 kg/m3) |
| Option A: | 825 tons/hr |
| Option B: | 825 kg/hr |
| Option C: | 2.727 tons/hr |
| Option D:  | 2722 kg/hr |
| Q11.  | Find number of troughing idler if length of conveyor is 90mm & maximum spacing for idler is 1.5 |
| Option A: | 60 |
| Option B: | 180 |
| Option C: | 40 |
| Option D:  | 160 |
| Q12.  | Find number of return idler if length of conveyor is 60mm & maximum spacing is 3 |
| Option A: | 300 |
| Option B: | 180 |
| Option C: | 200 |
| Option D: | 20 |
| Q13. | Determine rolling resistance of to the bottom run for belt conveyor system with following data : friction between idler & belt is 0.02, secondary resistance factor is 2.2, inclination conveyor is 18°,weight of belt/meter length is 12kgf, weight of straight idler on bottom run/meter is 6.06kgf, conveyor length is 50m, height through material is conveyed is 15.45m. |
| Option A: |  -110.45kgf |
| Option B: |  -210.48kgf |
| Option C: |  -251.85kgf |
| Option D:  |  - 146.96kgf |
| Q14.  | The mean effective pressure obtained from engine indicator indicates the |
| Option A: |  Maximum pressure developed |
| Option B: | Minimum pressure |
| Option C: |  Instantaneous pressure at any instant |
| Option D:  |  Average pressure |
| Q15. | If petrol is used in a diesel engine, then |
| Option A: | Low power will be produced |
| Option B: | Efficiency will be low |
| Option C: |  Higher knocking will occur |
| Option D:  | Black smoke will be produced |
| Q16.  | If diameter of cylinder of bore is 120mm, then thickness of the cylinder will be |
| Option A: |  Information not sufficient |
| Option B: | 7mm |
| Option C: | 12mm |
| Option D:  |  6mm |
| Q17. | If diameter of cylinder bore is 120mm, then thickness of dry liner will be |
| Option A: |  2.2mm |
| Option B: |  3.6mm |
| Option C: | 4.8mm |
| Option D: | 6mm |
| Q18. | Find thickness of water jacket for water cooled engine for 4-stroke single cylinder water cooled vertical diesel engine if bore diameter/ diameter of cylinder is 140mm |
| Option A: |  6.4mm |
| Option B: | 8.7mm |
| Option C: | 7.3mm |
| Option D:  | 9.2mm |
| Q19.  | With the increase in load, Energy in the turbine\_\_\_\_\_\_\_\_ |
| Option A: |  Decreases |
| Option B: | Increases |
| Option C: |  Remains same |
| Option D:  | Independent |
| Q20. | Which of the following is the need of the gearbox? |
| Option A: |  To vary the speed of the vehicle |
| Option B: | To vary the torque of the vehicle |
| Option C: |  To vary the power of the vehicle |
| Option D: |  To vary the acceleration of the vehicle |
| Q21.  | What causes suction of fluid into the gear pump? |
| Option A: | when pressure drops during disengagement of teeth at the suction side |
| Option B: | when pressure increases during disengagement of teeth at the suction side |
| Option C: | when pressure drops during engagement of teeth at the suction side |
| Option D:  | when pressure increases during engagement of teeth at the suction side |
| Q22. | \_\_\_\_\_\_\_\_\_\_\_ pump is also called as velocity pump. |
| Option A: | Reciprocating |
| Option B: | Rotary displacement |
| Option C: | Centrifugal Pump |
| Option D:  | Screw |
| Q23. | Economic cutting speed is minimum if geometric ratio is \_\_\_\_\_\_\_\_\_ |
| Option A: | Minimum          |
| Option B: | Maximum            |
| Option C: |  equal to economic cutting speed     |
| Option D:  | constant |
| Q24. | What is the geometric progression ratio if maximum and minimum spindle speeds are 500 r.p.m and 300 r.p.m respectively? (Number of speed steps = 7) |
| Option A: | 0.91           |
| Option B: | 1.5             |
| Option C: | 1.08            |
| Option D:  | 2 |
| Q25. | Which of the following parts of the piston act as bearing for connecting rod side thrust?  |
| Option A: | Reinforcing ribs    |
| Option B: | Piston barrel  |
| Option C: | Piston gudgeon     |
| Option D:  | Piston skirt |